INSCRIBED LANDSCAPES

Contextualising prehistoric rock art in Ireland

Volume 1 of 2

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For Jack Clarke and Mabel Colhoun, whom I wish I had met.

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Abstract

This study addresses the landscape context of Atlantic rock art, comparing three study areas in Ireland; the Inishowen Peninsula, Donegal, the Louth / Monaghan area, and the Dingle Peninsula, Kerry. Recent dating evidence is reassessed, suggesting a Late Neolithic *terminus ante quem* for the practice and a potentially earlier origin, with related traditions continuing into the Bronze Age. A combination of field observations and GIS analyses reveals that a complex range of landscape features, as well as taphonomic and survey biases, have influenced the known rock art distribution. At the regional level geological formations, topography, wetlands and soil types played a role in structuring general distribution. Within these areas, rock art appears to cluster on particular topographical features, outcrop formations, distinctive soil zones, and specific viewpoints or 'hidden' parts of the landscape. This echoes recent landscape theory that such distinctive places were actively used to enhance certain experiences and activities. A pilot study into motif analysis is conducted using an innovative recording method combining photogrammetry and epigraphic survey, and three new approaches to classification. By linking these classifications to the GIS, subtle variations across the landscape are also investigated. The collation of survey and excavation evidence indicates that in these areas rock art was located in relative proximity to prehistoric settlement, yet frequently removed from contemporary monument complexes. This suggests that many panels may have formed foci for 'everyday' ritual activity by broad and unrestricted social groups, contrasting with the proposed specialist nature of megalithic art. Within each study area a distinction between dispersed panels and regional clusters is identified, the latter situated in removed locales, demonstrating that different panels played different roles. One of the regional clusters formed the focus for further field investigations. By employing a high-resolution data collection method, a geophysical survey identified a wide range of low visibility archaeological features across the site. Following this, excavation (the first at an *in situ* rock art site in Ireland) demonstrated that the features dated to the Early and Middle Neolithic, as well as later periods. The various contextual studies presented here suggest that rock art research can be approached as a way of accessing the complexities of different social relationships and identities in the past, and that the practice of carving may have played a key role in the maintenance of social memory.

Keywords

Landscape, rock art, petroglyph, prehistoric monuments, memory, identity, Neolithic, Early Bronze Age, Ireland, Britain, excavation, geophysical survey, geographical information system (GIS).

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Much *aroha*!

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NB: All photographs, maps and drawings are by the author unless otherwise stated.

CHAPTER ONE

Rock art landscapes

Introduction

Prehistoric petroglyphs, commonly referred to as rock art, are widely viewed as some of the most enigmatic archaeological features in Britain and Ireland (Waddell 2000: 166-8). By way of definition, what might be termed ‘quintessential’ or ‘classic’ British and Irish rock art (also referred to as Atlantic, Galician, or cup and ring rock art) can be characterised and identified on the basis of its context, motifs, technique and composition. It is predominantly situated on ‘living’ outcropping rock or earthfast boulders, most commonly on slightly sloping surfaces, but very occasionally on vertical faces (Stevenson 1993; Van Hoek 1997), and on rock shelter floors (Van Hoek and Smith 1988). Occasionally, panels were incorporated into built monuments, though debate continues as to whether this represents the re-use of older panels, or simply an alternative context for the carvings (see Chapter 2). As a whole, the panels feature a variety of motifs, but the so-called ‘cup and ring’ forms - central circular depressions surrounded by one or more closed or gapped circles - dominate the repertoire. Other elements such as single linear grooves that radiate from the cup and rings, separate or conjoining curvilinear grooves and enclosures, and a whole range of cup variations, also frequent the panels. The abstract nature of these carvings adds to the enigmatic, and seemingly impenetrable, character of the tradition.

The known rock art of Britain and Ireland consists exclusively of petroglyphs, as opposed to pictographs (painted or drawn motifs). These were formed through the repeated pecking of the stone surface, probably using a stone tool. The motifs are usually relatively deeply pecked, in some cases to a high relief and taking on an almost three-dimensional quality. This indicates an apparent concern for both the technical and performative process, seeing that the designs themselves could just as easily have been formed using quicker, less laborious methods, as seen in the comparatively shallow pecking exhibited in some passage tomb or megalithic art (Shee Twohig 1981). This perhaps also indicates a concern for durability; the intention that the designs should endure well into the future despite their exposed location (see Taçon 1994: 126). Classic rock art compositions are frequently irregular and idiosyncratic, incorporating clusters of motifs, isolated designs and expanses of uncarved stone. The varied designs often interact in compositional terms with natural fissures and depressions in the stone surface, borrowing them as pseudo-motifs or responding to their presence. These characteristics, their ‘quirkiness’ if you like, make the tradition readily distinguishable from a series of related carving practices, as discussed in Chapter 2. A long-lived practice, the carvings are widely understood to date to the Late Neolithic to Early Bronze Age though, as we shall see, the chronology of classic rock art remains problematic.

Rock art is a unique kind of material culture and practice. It is one of the few aesthetic phenomena that occur directly on the surface of the 'natural' landscape (outcropping bedrock, boulders, caves, rock shelters) rather than on the walls of structures, on artefacts or other mobile sculptural forms. Though landscape approaches have become increasingly popular, as Whitley has noted (1998: 11) the full potential of the "defining contextual attribute" of this "landscape art" has only been recognised relatively recently by rock art researchers around the world. What has become such a key line of enquiry in Ireland and Britain did not feature, for instance, among the themed chapters of the American published *Handbook of Rock Art Research* (Whitley 2001). That context has for so long been sidelined in favour of detailed symbolic analysis is all the more ironic given its considerable importance in the formation of meaning (ibid; Hodder 1987).

The present study addresses the landscape context of Atlantic rock art by comparing three study areas in Ireland; the Inishowen Peninsula, Donegal, the Louth / Monaghan area, and the Dingle Peninsula, Kerry. As argued below, contextual information, whether drawn from broad landscape studies, more focused archaeological excavation, or motif analyses, has the potential to reveal the types of social processes and settings within which rock was created and used. One of the key objectives has been to draw together a range of different lines of landscape and archaeological evidence in a complementary manner. In doing so it has been important to begin with a reassessment of the dating evidence for the origin of the practice of rock art, and its relationship to other broadly contemporaneous carving traditions. The research then draws on a combination of field observations and Geographical Information Systems (GIS) analyses to explore the types of landscape features, as well as taphonomic and survey biases, that may have influenced the known rock art distribution. Geophysical survey and test excavation are also used to investigate the immediate archaeological context of a particularly dense concentration of rock art panels in County Monaghan. A pilot study into the ways in which the relationship between 'style', motif content and the landscape context of rock art can be addressed is also presented. By linking these qualitative observations to the GIS, this highlights the potential for very subtle variations across the landscape to be investigated.

Context as a stepping-stone

Looking back on the present study, it is poignant to note that the original Latin meaning of the word 'context' - essentially the starting point for the research presented here - engenders the concept of 'weaving together':

> **Context** /'kontekst/ *noun* **1** the parts surrounding a written or spoken word or passage that can throw light on its meaning. **2** the interrelated conditions in which something exists or occurs. [Latin *contextus* connection of words, coherence, past part. of *contexere* – to weave together] (Allen 2001: 299).

This notion, the gathering of relevant strands of separate evidence and bringing them together in order to enrich our understanding, describes the underlying approach of the present project. As a landscape approach to prehistoric rock art in Ireland, the research takes into consideration a range of multi-scalar or 'nested' contexts, from the individual panel to local clusters, regions, and national and international distributions. A series of interrelated and converging lines of evidence including landscape modelling, field observation, geophysical survey, targeted excavation, and motif analysis, is explored from broader to increasingly intimate contexts.

It is argued here that by weaving together a context for prehistoric rock art, a compelling means to answer some of our questions, and test some of our theories, can be provided. Yet it must also be acknowledged that what might appear to be a straightforward investigation of the landscape settings and activities associated with rock art is in fact replete with challenges and complexities. As with many archaeological endeavours, this type of investigation is inevitably a subjective pursuit, since context is itself culturally constructed, rather than a fundamental truth to be uncovered (Bender 1993: 1-2; Layton and Ucko 1999: 3). The researcher's own "constituting contexts" (Conkey 1997 after Gero 1996, see also Tomásková 1997) and "mediation" (Knapp and Ashmore 1999: 20) between evidence and interpretation, shape the way we piece together archaeological contexts. As Conkey (1997: 347) has pointed out, context and interpretation are closely intertwined, and can become confused in less critical approaches. Establishing context does not in itself reveal the meaning or function of rock art (ibid 361, Whitley 1998:25). However, it can improve on previous ahistorical and symbolism-focused approaches to ancient art, and offer to enrich our understanding of, as Gell puts it, "the practical mediatory role of art objects in the social process" (1998: 6). As a result, we can start to explore the ways people used these sites, and also the *potential associations* surrounding ancient art practices. Although the identification of certain activities (e.g. burial rites versus tool manufacture) at rock art sites might not allow us to comment on the actual 'meaning' of the art itself, it can tell us what types of activities were deemed appropriate to conduct at rock art sites, and potentially the range and numbers of people they involved. With respect to the anthropology of art, Gell considers "the social context of art production, circulation, and reception" (1998:3) to be of primary importance. Likewise, this is arguably the aim of an archaeology of art.

Interestingly, the investigation of spatial aspects – place, landscape – can be seen to respond to Gell's definition of an anthropological theory of art as "social relations *in the vicinity* [or '*neighbourhood'*] of objects mediating social agency" (Gell 1998: 7, 26, my emphasis). Though space is probably implied in more metaphorical terms in this definition, archaeologists too can explore the potential relevance of rock art as archaeological sites or places since the activities that took place there formed part of "the network of relationships surrounding particular artworks in specific interactive settings" (Gell 1998: 8). In her 'typology of contexts', Conkey (1997: 346-7) defined three major categories with reference to European Palaeolithic art, each of which has tended to have its own campaigners: immediate and proximal context at the internal and site level; inter-site or cultural landscape context; and stylistic context. Thus within a 'social geography' of rock art, it is possible to investigate, for example, 'stylistic geography' (ibid). Rather than narrowing the focus to one alone, each of these contextual layers is under scrutiny in the present research via the combination of diverse methodological approaches, and it is the dialogue *between* these different contexts that is of particular interest.

The present study commenced at the end of a significant decade for rock art research in Britain in particular, and Ireland to a lesser extent. The 1990's saw a major leap forward for rock art studies with the impact of the wider interest in 'landscape', and ways of investigating it, coming in to play within the sub-discipline. This is openly acknowledged as part of the 'constituting context' underlying the present approach. Across a broad range of disciplines research has sought to reveal both ancient and contemporary ways in which people have connected with their landscapes, and embedded and derived meaning in and from them. These objectives are inevitably 'entangled' (Conkey 1997: 352-8) with the actual practices of landscape archaeology. As archaeologists, we clamber over, explore and interpret landscapes attempting to identify significant places and urging them to reveal their meanings to us. This drive may be motivated by the sense that contemporary western society is in danger of losing some of its soulful attachment to, and intimate understanding of, place and landscape in a rapidly changing urban world (Knapp and Ashmore 1999: 3, 6; Sherratt 1996: 14; see also Evans 1997; Lemaire 1995: 30-1), though those interested in contemporary urban through to contemporary rural landscapes may beg to differ (e.g. Schama 1995; Jarman 1993; Caulfield 2001). The current literature certainly places great value on being able to identify the impact of the landscape on the cognitive and spiritual life of people in the past and their interpretation of, and interaction with, the world around them. It could be argued, then, that by assuming that landscape is embedded with meaning, a landscape approach is *inherently predestined* to identify 'meaningful' relationships between people and their landscapes. Thus, we need to take care that we do not over-interpret the significance of rock art's associations with particular landscape features and that we take into account alternative explanations, including taphonomy and survey biases. For instance, a study investigating the views from rock art panels, in isolation, or their association with water features alone, without considering the potential biases or alternative explanations that may have influenced the distribution of sites, is in danger of leaping to compelling, yet potentially flawed conclusions. Hence, a critical and cautious approach is required, and it is here that the use of converging lines of evidence might prove useful. Particular patterns and concerns might, or might not, echo and resonate across the various strands of evidence, highlighting more promising areas for discussion.

We also need to be aware of the potential interpretive restrictions and assumptions that our own constituting contexts might impose. Our understanding of rock art is also informed by our understanding and perception of artists today, both on the basis of ethnographic studies as well as, I would argue, the western artistic tradition. Typically these worlds are perceived (though not always correctly) as ones that are removed from the everyday, and are in many ways out of reach of the ordinary person and his or her daily life. It is telling that, as discussed further below, recent Neolithic and Bronze Age texts have placed rock art at the limits of the everyday, lived landscape, despite the dearth of corroborative archaeological evidence. Bradley has stated that "abstract art is often associated with remote locations in the landscape, where few people could have seen these images at the same time" (2000: 71). This view fits in with ideas as to how Neolithic people interacted with the related tradition of passage tomb art, where access to the confined tomb interiors is thought to have been highly restricted to an elite group (e.g. Richards 1993: 151; Cooney and Grogan 1994 55-8; Barrett 1994: 15). Without getting into the definitions of art here (see Layton 1991: 4-41, Gell 1998: 5-7, 12-27), it must be remembered that this notion of seclusion for rock art sites, potentially carrying with it exclusivity, is not necessarily inherent in all artistic production and its associated activities. It is therefore not a 'given' for all artistic practices during prehistory, but a question yet to be answered. In making reference to contemporary art I do not wish to suggest that prehistoric rock art can be equated to modern definitions of 'fine art', and prehistoric social systems to the modern art world. However, though there are obviously major distinctions between rock art and fine art (see Morphy 1994), there are also many aspects of these two traditions that are closely related in terms of the questions we (as art historians, anthropologists or archaeologists) seek to answer (see Gell 1998: 1-11; Renfrew et al 2004).

Gell (1998: 73) has noted that 'high-status ritual art' has traditionally received more anthropological attention than 'decorative art' applied to the surfaces of artefacts, linking this to the tendency to view the former as roughly equivalent to Western notions of fine art. Both ritual art and fine art have, until recently, conventionally been stereotyped as a "gender-exclusive [i.e. male] cult ritual" (ibid). In this way prehistoric rock art provides an interesting arena. It does not fall into the decorative arts category, yet a broad range of ethnographic studies suggest that we cannot *assume* that the practice was linked to a specific age, gender or class group (though there are examples of this; e.g. Whitley 1998: 18-21). For instance, various art practices in Australia, Africa and America, including rock art and sand drawings, involve widely varying social groups *within* individual communities as direct or associated participants, or are conducted in places accessible to varied groups and whole communities (e.g. Taçon 1992; Watson 2003; Martin 2003; Smith and Blundell 2004). Some sites may be gender-exclusive to either males or females, and others may relate to life events for groups of very different ages, including children (e.g. True and Griset 1988 on girls' puberty paintings in California). In some cases different communities used the same sites on different occasions (e.g. Taçon 1994: 120). Thus, whilst on an individual basis these groups may be restricted to particular types of people on particular occasions, together they frequently involve people from the full social spectrum within a given community. It is also worth remembering that prehistoric children's footprints have been discovered at several Palaeolithic rock art caves in France (Bahn and Vertut 1997:10-11). These examples are obviously considerably distant in geographical and / or chronological terms from Atlantic rock art. Nevertheless they demonstrate that rock art sites were, and are, accessible to people of varied ages, genders, and social classes.

If archaeologists reflected more openly on the motives and politics underlying their own theories we would probably learn a great deal more about their own ‘constituting contexts’, both personal and professional. One of my own preoccupations, and one that undoubtedly derives from my own experience, is the extent to which rock art, as an aesthetic practice, was intertwined with people’s everyday life in the past. This interest is closely entangled with my personal childhood experiences in and around my father’s ceramic, and later sculpture, studio. Here there were crumbling and ruinous brick kilns, thick silky layers of ceramic and glaze dust, mysterious found objects entirely out of context, luscious raw materials and cobwebs all available for perusal and play. This world was at once enigmatic yet part of our daily existence. Much of the exact meanings of the artworks remained largely unspoken (such was their emotional clout), but broadly understood. As children we were free to play and even create our own art in the studio. The family circumstances, histories and interactions directly impacted on the work, and the work was and is a part of our family identity, relationships and negotiations (though not all members may necessary agree to what extent!). Indeed the details of our family’s history and relationships were, and are, sometimes passed down and worked out *via* the artworks. This is quite a different picture from the somewhat sanitised view of art presented in the modern gallery setting – polished art objects against a pure white background, disconnected from the dust, sweat and sticky-handed young critics of their primary context (see Figure 1.1).

It is this tension that underlies the research presented here. How did the world of ancient ‘art’ work, and relate to the everyday, in terms of some of the earliest ‘public sculpture’ in Britain and Ireland? Does our understanding of western art, as presented by galleries, and our interest in the ethnographic ‘art’ practitioner, colour our interpretations of early aesthetic practices? Was rock art an exclusive and restricted practice accessible only to elite groups, or did it embrace the ‘family’ (whatever form that may have taken in prehistory) and the wider community? This is not to negate the potential power of artistic practices in the creation of social difference, simply to question the manner in which this might have been achieved. This project is therefore not so much a search for the meaning of rock art motifs themselves, but is motivated by the desire to explore how rock art interacted with the world beyond its own symbolism. A contextual approach recognizes that the significance of rock art cannot be understood in isolation from the specific social formations and conditions within which it was produced (Trigger 1989: 349-50).

As Knapp and Ashmore state with regard to landscape studies, “while we may never know the precise content of stories told from ancient landscapes, we can increasingly infer some of the contours of their telling and the social impact that they had” (1999: 8). Why might particular locales have been significant and therefore embellished with rock art? Why might people have found this way of inscribing their landscapes so important or useful? What was the nature of the wider social setting within which these motifs were made, the locales visited and used, and the meanings of these places shaped and transformed? Such an approach ultimately seeks to investigate the “interactive, communicative, productive, and even cosmological context within which the practices and products of imagery were meaningful, which informed the art” (Conkey 1997: 359).

This is perhaps an ambitious project considering the incipient stage at which Atlantic rock art research finds itself. Our forays into the context of prehistoric art in Britain and Ireland are still relatively embryonic. As a result, there is still much to be established, not least of which include the precise chronology of the art and the lifestyle of the communities and individuals who produced it. In my view, the investigation of context is an important precursor to the more direct use of ethnographic analogy to help flesh out our interpretations in an appropriate and critical manner. We are still learning about the precise nature of the relationships between rock art and landscape in Britain and Ireland. In many ways, therefore, the present work sets out to establish a springboard from which further discussion may develop. Without this further discussion the present study remains a stepping-stone, but one that is essential to future work, and one that should strengthen the kinds of possibilities presented in studies such as that by Martin (2003) comparing Irish and Australian aboriginal rock art via ethnographic analogy. Though ambitious, on the basis of the results presented here, it is argued that a contextual approach to Atlantic rock art is already proving fruitful.

Writing rock art, writing landscape

Rock art is thought to denote a *place* as significant or special and therefore seems especially well suited to landscape-oriented research. The intended permanence of its connection to specific locations on ‘living’ outcrop or large erratic boulders, means that it (usually) does not move around like other types of embellished material culture: its ‘place’ is important. In this way rock art differs from the study of other aesthetic phenomena such as pottery decoration or mobiliary art (Bradley 1997:8). On a global scale, rock art is often (though with numerous notable exceptions; see below) a feature of mobile or semi-mobile societies who may not have built a wide range of permanent structures and monuments, the usual units of analysis in traditional settlement studies. Thus, rock art can be an important source of information as to how such peoples interacted with the landscape. However, landscape approaches have perhaps proven especially attractive in areas such as Britain and Ireland because we cannot rely on ethnographic information about, or directly analogous to, the communities that created the rock art. Furthermore, the abstract nature of the motifs in the Atlantic tradition largely defies traditional approaches to ancient art, such as symbolic interpretation, and arguably even the kind of structuralist analysis employed by Tilley (1991) at Namförsen, whereby binary characteristics (wet / dry, male / female) can be associated with different motifs. Whilst some authors (see Morris 1979: 18-19) have made connections between the kinds of abstract or geometric forms seen in Atlantic rock art and gender, these are extremely difficult to substantiate. Likewise, whereas interpretations based on the images seen during altered states of consciousness (see Lewis-Williams and Dowson 1998) have provided exciting new ways of exploring passage tomb art (e.g. Dronfield 1995, 1996), notably few *rock art* motifs have been found to be diagnostic of these entopic forms, which include grids, zigzags and spirals (see Evans 2003: 163-70). As Layton has pointed out, there may be motives for using concentric circles other than trance inspiration (2001: 325, 1988).

In this way, landscape archaeology is advantageous as it opens alternative avenues for investigation, drawing directly on the ‘evidence’ (in very much inverted commas) available to us. The appeal of a landscape-based approach is also undoubtedly linked to the aspiration that rock art studies should be treated as an integrated part of, and make significant contributions towards, more ‘traditional’ or ‘mainstream’ archaeological research (Bradley 1997: 7-8). Thus, more recently, emphasis has been placed on the importance of understanding how rock art relates to other archaeological material and monuments (e.g. Waddington 1996, Bradley et al 1995; Bradley 1997: 113-120; Jones 2005a).

The history of an interest in ‘landscape’ can be traced back to the tentative inklings apparent in nineteenth century rock art studies. Whilst their work displays the general disinterest in the spatial aspects of these ‘sculptured rocks’ typical of the time, some of these early authors speculated about issues that are still in circulation. Tate (1868: 143-4), for example, incorporated a consideration of the landscapes across which the rock art of Northumberland is distributed, summarizing the geology and topography much as landscape archaeologists continue to do today. Interestingly, these observations led Tate (ibid) to entertain a Neolithic date for the carvings, suggesting that the “intractable” porphyry in areas devoid of rock art had precluded the use of stone tools for carving. As explained in Chapter 2, in raising this possibility Tate was ahead of his time. Later, James Graves (1877: 291-292 and 295) reprinted and critiqued a discussion by Charles Graves (1854) proposing that the concentric rings and central cups that form the bread-and-butter of these compositions were perhaps representations of multivallate and other types of ringforts. By comparing rock art and ringfort distribution, James Graves concluded that the two site types were seldom in direct spatial association, and therefore viewed the interpretation with considerable scepticism. Recent work has continued to refine comparisons between rock art and other monument or artefact distributions (see below and Chapter 3).

By 1946, MacWhite had published his seminal paper on Irish rock art, and the broad spatial patterning of Atlantic petroglyphs had taken on a new significance. This trend was in keeping with the interest in identifying cultural markers and their origins, which had developed over previous decades under the project of Culture History. MacWhite (ibid) used distribution maps to argue for the diffusion of a homogenous art form from Galicia to Britain and Ireland. These broad canvasses might have been devoid of the richness and texture of ‘landscapes’, but they took the potential implications of spatial relationships more seriously than ever before. Aspects of the culture-historical approach have continued to be played out in later work, including contributions by archaeologists from non-academic backgrounds (e.g. Van Hoek 1997: 5-6), though the degree of emphasis on spatial aspects varies.

From the 1950's onwards, archaeologists reacted against the culture historians' propensity for amassing and describing data and its distribution without developing adequate explanatory theories. This contributed to an increased concern with spatial analysis. During the advent of New Archaeology, and the subsequent processual approaches of the 1960's and 70's, rock art is conspicuously absent from the mainstream academic discussions of settlement patterns in Britain and Ireland. It is possible that the centrality of ecological and economic aspects to the processual concerns of the time rendered the enigmatic 'ritual' phenomenon of rock art a less suitable subject of mainstream enquiry. The supposed isolation of rock art within the wider settlement pattern, and the inherent difficulties in dating the sites would also have contributed to its marginal academic status. Meanwhile, behind the scenes, non-academic researchers were documenting hundreds of panels during their surveys of northern Britain and parts of Ireland (Beckensall 1991, 1992a, 1992b; Morris 1977, 1979, 1981, 1989; Clarke 1982), and some were beginning to relate the location of the art to landscape perception, notably views from rock art sites (Morris 1977: 12). At one site in Argyll, Morris (1977: 44) noted the alignment between a carved ring, a nearby standing stone and a notch in a distant range of hills, foreshadowing later phenomenological approaches to archaeological landscapes. Several studies at this time also began mapping and comparing the distributions of cup marked versus cup and ring panels (Stewart 1961; Morris 1977: 26), and the occurrence of various individual motifs (Morris 1977; 1979), a trend that continues today.

At the same time, some thoughtful overviews were surfacing (Hadingham 1974, 1975), and a very small number of studies began to look more closely at the relationship between rock art and its landscape setting (Stewart 1961; Walker 1970, 1977). The few examples of work from this time, not surprisingly given the capitalist rationalism that processual approaches applied to space, focus on linking rock art to economically viable zones of the landscape (Walker 1977, Bintliff 1988). In what he termed a 'geographical approach', Walker (1977: 458) presented one of the first consciously landscape-oriented approaches to British rock art. This was essentially a predictive modelling exercise using comparisons between rock art and other monument and artefact distributions, as well as broad 'palaeoecological modelling', that drew on place name studies and general landscape observations to reconstruct past environments (ibid: 465, 467, 468). By comparing rock art regions and control regions Walker focused on how rock art might inform us as to "man-environment relations", concluding that rock art would have co-occurred with domestic or agricultural activities (1977: 458, 464).

However, it was not until the late 1980's that the types of spatial studies, such as catchment analysis, that had routinely been used to investigate the spatial patterning of other site types, were applied to British and Irish rock art in more detail. Johnston's (1989, 1991a) important study of the distribution of petroglyphs in the Republic of Ireland (excluding Cork and Kerry) focused on traditional environmental variables such as soil, geology, elevation and water sources. By employing statistical techniques and selected landscape variables to test hypotheses and theories regarding the function of rock art, and its relationship to the settled landscape, Johnston (1989, 1991a) investigated rock art distribution in a more explicit, complex and scientific way than before. Rock art was found to occur in close spatial association with arable soils, water sources, and intermediate elevation zones, again suggesting its proximity to areas suited to prehistoric settlement (ibid). Rather than simply relying on the functionalist rationale of processual approaches however, Johnston took the results of this essentially positivist approach a step further, exploring the idea that the link between rock art, arable soils and water sources could suggest a role for rock art within ideologies associated with maintaining the fertility and productivity of the natural world (1989: 272-3; 1991: 94). While such an explanation might be seen as ultimately relying on ecological and economic factors to explain rock art, it also highlights the futility of any attempt to separate ‘ritual’ and ‘economic’ prehistoric practices (see Brück 1998: 32-33, 1999; Bradley 2005). As later work indicates, Johnston’s tentative proposals were still being echoed a decade on (Waddington 1998: 35; see below). In line with the techniques and theoretical trends of the time, Johnston’s work approached rock art sites as a group and looked for broad regularities in the spatial patterning of the sites. Theoretical shifts since then have perhaps inevitably led the present study to question this idea.

Recent approaches to rock art landscapes

> “Landscapes are culture before they are nature; constructs of the imagination projected onto wood and water and rock…but…once a certain idea of landscape, a myth, a vision, establishes itself in an actual place, it has a peculiar way of muddling categories, of making metaphors more real than their referents; of becoming, in fact, part of the scenery” (Schama 1995: 61).

In the recent literature two distinctive (though not necessarily mutually exclusive) ways of dealing with landscapes are commonly recognised; “an ecological approach explains behaviour as a response to external causes, while a cultural approach aims to understand behaviour as meaningful” (Layton and Ucko 1999: 2). Over the last decade, in tune with shifts in post-processual theory, rock art research has been increasingly geared towards social and ideological explanations - how people perceived, felt about, and shaped their landscapes (e.g. Goldhahn 2002; Tilley 2003). In rejecting the processual concept of landscape as natural resource, archaeologists, as well as anthropologists, geographers, philosophers, historians and others, have acknowledged the shadowy and slippery character of our definition(s) of landscape (Knapp and Ashmore 1999, Layton and Ucko 1999). Landscape is described as ambiguous (Gosden and Head 1994), unstable (Tilley 1994: 37), a “concept in between” (Morphy 1993: 205), “moving to and fro along a natural-cultural continuum” (Knapp and Ashmore 1999: 6), and a “seamless web of the cultural and natural” (Bender et al 1997: 165). Landscapes are now recognised as phenomena that played an active role in the social lives of past communities and individuals, and that in turn were actively shaped and transformed by them (Knapp and Ashmore 1999). Rather than an inert blank canvas for human action, the dynamic and heterogeneous nature of landscape, and the degrees and kinds of significance with which communities and individuals imbue its different parts, have been of key concern.

The backlash against the processual approaches of the 1970s and 80s has arguably resulted in a subsequent swing of the theoretical pendulum towards the social and ideological, privileging these over the ecological. However, numerous authors have been attempting to find a common ground between the two approaches that integrates both the 'natural' or 'real' environment and 'cultural' or 'experienced' landscapes, emphasising their inextricably interwoven character (e.g. Cooney 2000, Barnes 1999; Brady and Ashmore 1999; Bergh 2002). Rather than allowing one to dominate the other, these holistic approaches aim to break down these rigid categories in a way that is thought to be more in tune with the ways people experienced these post-Enlightenment concepts during prehistory. Some authors have therefore seen attempts to distinguish between the real and perceived landscape as irrelevant. Johnston (1998: 56) has stated that it is not what landscape *is* that should be of interest, but "what it can be"; it is "contextual" rather than strictly definable.

The inscribed landscapes of rock art traditions around the world can be defined as falling within Knapp and Ashmore's (1999: 11) 'conceptualised landscapes' and the 'associative cultural' landscapes defined by UNESCO (Cleere 1995). These include landscapes based in religious and artistic practices rather than the construction of built monuments. Rock art landscapes also relate to 'ideational landscapes' where the emphasis is on beliefs and ideas rather than physicality (Knapp and Ashmore 1999: 12-13). Landscape approaches to rock art acknowledge the unique nature of this aesthetic phenomenon as connected in a very intimate way to locales in both the 'cultural' and 'natural' landscape. Nash and Chippindale (2002) have emphasised the importance of interaction between people, landscape and rock art, and the human experience of 'place' as fundamental to our understanding of these sites. Social practices such as rock art are now also understood as being specific to particular historical conditions, allowing for idiosyncrasy and intention on the part of different social groups. These studies have challenged the "faint-hearted" (Bradley 1997: 216) approaches to landscape that tended to separate the 'domestic' and the 'ritual'. As Knapp and Ashmore (1999: 15) note, "studies of rock art…have helped to break down the distinction between an economic archaeology based on settlements and land use, and a social archaeology based on monuments and material culture".

Landscape research often draws upon multiple lines of enquiry, incorporating a range of evidence in order to better establish a more meaningful context for archaeological sites. Thus, the relationship between rock art and settlement evidence, monuments, and other archaeological material, as well as topographic and other 'natural' features and characteristics, are all valid subjects in attempting to paint a broader and more subtly nuanced picture of the context within which rock art was created. Most frequently, rock art research has sought to identify why particular places were selected for embellishment with carved and painted motifs, in order to understand the potential ways people experienced and interpreted the landscape in the past (e.g., Bradley 1993a). In reacting against the positivist and scientific nature of processual models, these types of rock art studies have perhaps tended to be more inductive than deductive in their approach to investigating the landscape context of rock art. This has resulted in a degree of multiplicity in terms of the range of landscape features and variables thought to be associated with Atlantic rock art (see below). Not surprisingly, there does not appear to be a single landscape variable capable of explaining the distribution of all sites at either the intra- or inter-regional level, and each new study area has tended to add further associations to the list.

Nevertheless, a series of recurring and intertwined themes can be identified in recent landscape studies of Atlantic rock art, though many spring from the earlier ideas and theories outlined above. These themes are readily accessible to landscape archaeologists, and they represent means of addressing some of the concerns of post-processual theory. As discussed below, the distribution of rock art sites is currently interpreted as being linked to pathways of movement through the landscape, viewpoints affording wide or specific views across the surrounding terrain, distinctive parts of the landscape such as valley entrances or water basins, and differential access and audiences. Yet these theories are inevitably entangled with our broader interpretations of, and assumptions about, the role of rock art sites and the lifestyles of those who carved the panels.

As described below, several recent case studies, notably the work of Bradley (1997), Waddington (e.g. 1996, 1998) and Purcell (2001), have been of key importance in the development of our current interpretations. This work marks a shift towards less functionalist landscape interpretations that attempt to incorporate people's experience and perception of the prehistoric landscape as they moved through it, gazed over it, and interacted with various monument types. Bradley was one of the first academics to concentrate seriously on British rock art, and has been instrumental in developing a landscape approach to this material, focusing mainly on areas in Scotland, England, Portugal and Spain. In doing so he influenced a number of later postgraduate researchers (Purcell 1994; Nolan 1999; Long 2002; Evans 2003). Central to Bradley's work is the recognition that rock art research has the potential to enrich other aspects of archaeology, if it is conducted in a manner that dovetails with, rather than sets itself apart from, the wider debate (1997: 7-8).

Underlying Bradley's work is an approach based in the structuralist method (following Lévi-Strauss 1970) whereby regular patterns that reflect universal oppositions are sought out (see Layton and Ucko 1999: 13-14). Over the course of several case studies Bradley has emphasised a series of binary oppositions in terms of landscape and the activities conducted across them; upland versus lowland; hunting versus agriculture; mobile versus sedentary; grazing lands versus home base; unproductive versus fertile; intermittent contact versus regular interaction; insiders versus outsiders;

centre versus periphery. Similarly, on the Iveragh Peninsula, County Kerry, Purcell (1994, 2001) identified a distinction between accessible panels along routeways and inaccessible (even dangerously located) sites at viewpoints. In doing so, Purcell and Bradley have proposed that different panels may have been visited by different social groups, primarily focusing on broad versus restricted audiences.

Pathways of movement

The idea that Atlantic rock art was not only produced by people on the move, but by social groups that incorporate a degree of mobility in their lifestyles, is widely embedded in the recent literature (e.g. Bradley 1993: 129, 1996: 87, 1997: 91). Drawing on ethnographic studies, Bradley developed a model for understanding rock art that was based explicitly on a mobile lifestyle for the Late Neolithic in Britain. This model envisaged rock art as a practice that “would not be appropriate to entirely sedentary communities, for the essential feature is that particular locations should have been visited in sequence by quite different groups of people”, and emphasises that rock art tends to be found in “the kinds of places that seem to be fundamental to hunter gatherers’ definition of territory” (1993: 270). This draws on the theory that mobile and semi-mobile societies interact with and perceive the landscape, as well as issues such as ownership and territory, in a different way from sedentary societies. Such societies are thought to perceive the landscape as a set of networks and pathways linking significant places, rather than bounded territories (Ingold 1986: 146-7, 153). Thus, in Kilmartin (1991) Bradley proposed that rock art demarcated important thresholds along pathways of movement through valleys towards monument complexes. In a study of the rock art in Galloway Bradley et al (1993b) drew inspiration from Australian (Layton 1986) and North American (Hartley 1992) research, where communities were known to be relatively mobile, to develop a model for rock art locales as information sources for varying audiences on the move. He also used the idea that rock art marks pathways to explain the somewhat linear distribution of panels in Counties Louth and Monaghan towards a group of upland monuments on and around the Cooley Peninsula (Bradley 1997: 119-120). In Galicia (Bradley et al 1995) the rock art was also demonstrated to follow natural pathways through the landscape leading to and from water basins, and concentrate at junctions along these routes, even depicting animals in such a way as to echo these patterns of movement. Influenced by Bradley’s work, Purcell (2001) developed a systematic approach to characterising rock art locations on the Iveragh Peninsula, County Kerry. In doing so, Purcell identified a dichotomy between panels located at viewpoints in the landscape (see below) versus those located along the natural routeways across the mountainous peninsula.

The means of identifying ancient pathways, in the absence of actual archaeological remains such as wooden trackways (e.g. Raftery 1996), has always been problematic. The identification of likely pathways through the landscape has generally been topographically determined using elevation and contour data, general landscape observations, or by following present-day routeways including modern roads (e.g. Purcell 1991: 74; Long 2002: 45), and those used by herd animals (Bradley et al

1994: 379-83). Inevitably, this relies on the theory that prehistoric social groups operated on the basis of the law of diminishing return and the path of least resistance through the landscape would therefore have been preferred. Similar assumptions underlie approaches using cost surface analysis to establish general models of movement across digital terrain models (e.g. Llobera 1996, 2000). As has been shown by ethnographic, ethnohistoric, and even archaeological research this is not necessarily always the case, particularly in terms of 'ritual' activity (e.g. Corlett 1997; MacNeill 1962; Bell and Lock 2000). These studies also run the risk of relying on circular explanations, with rock art understood as being located along pathways, and the identification of pathways reliant on the presence of rock art. The question also arises as to what exactly we mean by a 'routeway' (e.g. how spatially defined should they be, and could people stop along the way?), and whether the existence of these proposed prehistoric paths can be verified via any other means.

Recent proposals that rock art sites were situated on the margins of the lived landscape, and were visited only periodically, are closely intertwined with our broader ideas of Neolithic lifeways. The settled-versus-mobile lifestyle issue has been hotly debated for the British and Irish Neolithic (Thomas 2001, Cooney 2001), and the current interpretations of rock art need to be viewed against this background. With all the 'contemporary baggage' (Cooney 2001) of their colonial histories inevitably coming into play, there has been something of a standoff between the sedentary (Irish) and mobile (British) camps over the last decade. Cooney (ibid) has argued that in breaking down the former orthodoxy of the 1920s-1980s, which had equated the Neolithic directly with settled agriculture, recent (British) accounts have all but established a *new* metanarrative in their pursuit of a nomadic Neolithic. This metanarrative fails to take into account both well established, albeit once rather exceptional, evidence for sedentism such as the Céide Fields, County Mayo, and Scara Brae, Orkney, as well as the ever-increasing assemblage of Neolithic structures that may point to regional diversity in settlement practices (Darvill and Thomas 1996; Grogan 2002; Armit et al 2003).

These structures have long been recognised in Ireland (e.g. Ó Ríordáin 1954; ApSimon 1969), but they have also been uncovered with increasing frequency in parts of England and Scotland (e.g. Garton 1991; Oxford Archaeological Unit 2000; Waddington and Davies 2002; Barclay et al 2002; Pitts 2004) and are readily interpreted by many of their excavators as 'houses'. The proposal that these structures, and even those epitomising the European *Linearbandkeramic* sites (Whittle 1996), should be understood as forms of communal monuments that were visited intermittently seems to be one that is more concerned with maintaining the now well-established concept of a mobile Neolithic, than allowing current theories to respond to new evidence as it arises (see Rowley-Conwy 2003, 2004). What is now emerging alongside these ideas is a more flexible and inclusive view of the Neolithic as a period that possibly embraced a wide range of regional settlement practices (Cooney 2000a: 52-85, 2000b, 2003). In terms of rock art in Britain and Ireland however, this subtlety has yet to come into play in many of the current interpretations. The current shift towards a wider spectrum of Neolithic lifeways for Britain and Ireland, incorporating varying degrees of settled and mobile practices, therefore calls for a re-think of current theories. Certainly, the well established evidence for a rather more sedentary lifestyle in many parts of Ireland, including the site of Monanny (Walsh 2004a) just six kilometres west of Drumirril, the application of Bradley's model explicitly linking rock art and mobile lifestyles to the Irish material becomes rather more problematic (see Chapter 3).

Bradley has stated that "Once the landscape was divided into a network of enclosures and fields, natural places [i.e. rock art sites] would have been far less important" (1996: 96). However, this line of thinking is at odds with evidence that traditional agriculturalists possessed an intimate knowledge of the land they worked and traversed, one more than capable of rivalling that held by nomadic peoples (e.g. Roe and Taki 1999). Such a view is much more likely to be linked to current images of agriculture that reflect modern (mechanised) farming practices, and perhaps the trend towards non-residential land tenure. In contrast, Neolithic farmers, whose diet after all incorporated an important wild component (Rowley-Conwy 2004), were probably well aware of the locations of subtle landscape features such as localised wetland, rocky outcrops, minute variations in the soil, vegetation and so on. A rigid segregation of nomadic and sedentary lifestyles in terms of their relative mobility is probably also rather artificial, perhaps based on the kinds of extreme contrasts apparent between traditional agricultural societies in the west and contemporary hunter-gatherer groups that have formed the focus of many ethnographic studies (e.g. Gamble and Boismier 1991; Wiessner 1983). Much of the contrast between the two may relate to misconceptions, even parodies, of hunter gatherer and sedentary communities – in this way rock art is conveniently, but uncritically, conceptualised as an intrinsically 'hunter gatherer' practice (e.g. Muir 1999: 288-9). Even if full sedentism proves to be widespread in Ireland this does not mean that these communities were literally static (Cooney 1997: 30; 2000: 70-77; 2003). This is a simplistic view of sedentary peoples' interaction with their 'artificially bounded' landscapes, and it could be argued that pathways of movement and viewpoints would also have been important to communities engaged in partly or largely sedentary lifestyles. We ought to take a more imaginative approach and allow these communities the freedom to have moved around and known their local landscapes as intimately as hunter-gatherer communities.

The association between rock art and mobility is also linked to the assumption that rock art sites, as ritual locales, were situated on the margins of the 'secular' landscape (i.e. that in regular use). Although this may well be true in some areas, or for some sites, this is puzzling considering the recent emphasis on the interwoven nature of 'ritual' and 'domestic' life in prehistory (Brück 1999; Bradley 2005). In fact, there have been few attempts to explore the actual spatial relationships between settlement sites and rock art panels (although see Bradley 1995; Waddington 1996). This is perhaps understandable given the inherent difficulties in identifying these low visibility sites, and the complexities of working with non-structural settlement evidence (e.g. lithic scatters) as spatial entities. In many cases the foundation trenches and floors of Neolithic structures, and major concentrations of occupation activity (e.g. pit clusters), are only identified fortuitously during pre-development excavation projects (Grogan 1996: 41). What is more puzzling, however, is the treatment of the relationship between rock art and megalithic or other ceremonial monuments. In fact, in several areas (e.g. Kilmartin, North Northumberland, Loughcrew) rock art sites are broadly spatially associated with these ‘ritual’ monuments (e.g. Bradley 1997: 113-120; Shee Twohig 2001). These are the same structures that have been conceptualised, in the proposed absence of the house (or *domus*), as the *foci* within the shifting nomadic rounds of British Neolithic groups; people who lived ‘amidst the tombs’ (Thomas 1991; Hodder 1994). This interpretation apparently contradicts a framework that characterises rock art in terms of its marginality, as sites that were visited relatively infrequently and only momentarily, whilst on the move to a destination elsewhere.

The connection between rock art and mobility also dovetails neatly with widespread preconceptions as to how people used rock art sites in the past that are essentially based on ethnographic studies of nomadic peoples. Though there are numerous exceptions (see below), at an international level rock art is widely associated with hunter-gatherer or gatherer-hunter-fisher communities. As a result, much of our broad understanding of rock art as a practice has been formed on the basis of ethnographic observations of hunter-gatherer societies. Thus we view rock art sites with a broad set of underlying assumptions as to the ways in which people interacted with the panels, and the types of activities they conducted. In comparing Australian aboriginal and Irish rock art, Martin (2003) used ethnographic analogy as a ‘tool for thinking’ about the possible associations shared by the sites. Both traditions exhibit similarities in design and landscape terms. This led Martin to propose a range of interesting ideas based on ethnography that might be readily applied to petroglyphs in Ireland; rock art as classroom, signposting system, and markers of spiritual routeways. However dreaming tracks - ancestral spiritual routeways - are closely associated with the nomadic lifestyle of the Australian aborigines, playing a key role in their understanding of both the surrounding landscape and their own identity (Taçon 1999: 42-5). The assumption that rock art and mobility are intimately connected negates the numerous examples of sedentary agricultural societies around the world that painted and carved living rock surfaces, from Scandinavia to the Pacific (e.g. Cox and Stasack 1970; Lee 1992; Sognnes 1998; Bostwick 2001).

The commonly unquestioned idea that rock art sites were places visited only periodically and for short durations by people on the move, and whose visits left little material trace, most likely originates in this set of assumptions. Despite the fact that many of the best known rock art concentrations in Britain and Ireland are in fact spatially associated with significant built monuments and other site types, the notion of the rock art panel as the product of a transient encounter between a small social group and their intimately understood world, persists. As a site type, so modest, sensitive and empathetic to its landscape setting, rock art fits neatly into romanticised western notions of hunter-gatherer practices and worldviews. Ironically, this is perhaps a contributing factor in its low profile within mainstream Neolithic research; as a practice it sits somewhat uncomfortably within the dominant narratives of the Neolithic in which particular social groups were supposedly engaging with and impacting upon their environment, and their own communities, in a domineering and forceful manner (e.g. Tilley 2004: 204; Thomas and Tilley 1993: 227).

Taking a slightly different approach, but maintaining a connection with mobility, Waddington (1995, 1996, 1998, 1999) has developed a model to explain both the origins of British rock art, and two subsequent phases during which panels were incorporated into Later Neolithic monuments and then Early Bronze Age burials. In a study based on the archaeology of the Milfield Basin, Northumberland, Waddington (1996) identified what he termed ‘Inscribed Grazing Areas’, where rock art occurs on sandstone moorlands, characterised by thin, poor soils, and defined by waterways. Drawing on palaeoenvironmental data, Waddington proposed that these areas would have been characterised by relatively open woodland clearings, and would therefore have been suitable for non-intensive grazing by wild and / or domesticated herds. In this way he suggests that they may have acted as the destination locales within a mobile transhumance cycle, where animals were herded into different areas to feed during different parts of the year. This study makes fewer assumptions as to the nature of settlement practices, though still places rock art somewhat on the margins. Building on this interpretation, Waddington developed an ideological explanation whereby rock art may have acted as a means of negotiating an emerging (Neolithic) way of life that entailed a new relationship with the natural world. In this way, rock art could be seen as a way of formalising people’s relationship to place, and signifying the life-giving status of particular locales:

“Carved outcrop rocks in glade-like locations created a liminal place where dialogue between people and the ground, however personified, could take place. If the earth was perceived as an entity whose fruits could not always be ensured, the need to propitiate such a force may have prompted regular contact in an appropriate liminal place, where an encounter between the physical world and the spirit world could be managed” (Waddington 1998: 35).

In the new spirit of inclusiveness and flexibility in our conception of Neolithic life, we ought to at least allow for the possibility that some rock art panels were located in quite close proximity to everyday settlement (in the broadest sense) and agriculture-related activities, in some areas. On the other hand, selected rock art sites might well have been somewhat removed from everyday life due to the particularities of their role. In the latter case, if we broaden our interpretations of the potential movement of largely or partially sedentary groups, allowing them more room to move around their local and regional landscapes (e.g. Waddington 1996), the link between rock art and strict mobility becomes less necessary. The relationship between rock art panels and a broad range of settlement evidence is considered in further detail for the three Irish study areas in Chapter 3.

Landscapes of perception

The idea that the views offered by rock art locales may have played a significant role in their selection as carving sites has also been a major theme in recent landscape-oriented studies of Atlantic rock art. Bradley et al (1993a) were instrumental in bringing this approach to the attention of rock art researchers. This approach addresses the fact that although rock art distribution is partly linked to the availability of stone surfaces, its actual distribution is much more restricted. Methods based on those developed for megalithic monuments by Fraser (1983, 1988) and Ruggles et al (1991) were used to assess the views from carved panels, and the results were tested against a systematically selected control sample of uncarved rock (Bradley et al ibid). In a series of studies particular types of views, sometimes in particular distance bands (immediate, intermediate, distant) have been identified as being characteristic of rock art locations.

For example, at Millstone Burn, Northumberland (Bradley et al 1993a), rock art panels were found to overlook valley entrances, with generally wider views than uncarved panels. The results for Dod Law, Northumberland, again indicated that the carved panels frequently offered wider views of the surrounding landscape than uncarved rocks, and especially good views of valley entrances (ibid). Here, panels in close proximity offered views of complementary, rather than overlapping, parts of the landscape (1993a: 133). These views exhibited a particularly varied spectrum of views in different directions in the farthest and immediate distance bands (Bradley et al 1993a: 133-4). The rock art in the Galloway (1993b) study area was also shown to occupy locales with particular views; those with comparatively wide fields of vision, but often focusing on a restricted range of directional values. Here, this directional focus appeared to emphasise different parts of the landscape (the coast or sea, the Galloway hills, and water bodies). A distinction was made between simple panels favouring views of the coast and valleys, and complex panels demonstrating wider views, particularly of the coast, but also focused on basins and water features on the higher ground (ibid). At Kilmartin, Mid-Argyll, the panels favoured views over routes into valleys (Bradley 1991). Here, as well as in the Milfield Basin, the panels were also intervisible in a way that suggested that series of complex and simple panels might have demarcated different prescribed pathways of movement through the landscape, and towards monument complexes (Bradley 1997: 120-3). Bradley et al continued to explore the idea that the siting of rock art was significant in a series of articles, extending this research into northwest Spain (Bradley et al 1994), and Galicia (Bradley et al 1995). The interpretations presented in these visibility studies have frequently emphasised an association with ecological productivity, often demonstrating that rock art privileged views of fertile lowlands, valleys and basins (ibid 129), as noted earlier by Johnston (1989: 272-3).

One of the problems with visibility studies is that the significance of the results can be somewhat difficult to assess in a rigorous manner. Though the studies outlined above have argued that the views from carved panels are different from those available from uncarved rocks within the immediate vicinity, there is also a great deal of variation evident across any given rock art corpora, and there are frequently exceptions to the expected visual ‘rules’. Let us take the case study by Bradley et al (1993a) as an example. When we look at the results (ibid 134-5, 139-141) it becomes somewhat unclear just how significant the distinction between rock art panels versus uncarved rock really is. This is because many of the control sample rocks in fact exhibit similar views to the carved stones. For example, the views from uncarved rocks sometimes share the directional characteristics of the views from carved rocks (such as the binary views shown in 1993a: see Figure 1.3). In other instances (ibid see Figure 1.2), although it is true that some of the rock art panels have wider views, some of the control samples also have very wide views, and some of the rock art has very narrow views. In other cases the views seem to be primarily a function of the local topography – that is, certain views are available from groups of panels simply because they lie on a localised slope (1993a: 134-5, 141). In these cases it seems possible that factors other than views may have governed the selection of these particular carving locales.

In addition, because these studies tested more control sample locations than there were rock art locations, this has increased the likelihood of there being more variability in the views from the control samples. For example, though the Millstone Burn study found that the rock art was more likely at 75-92% to overlook the valley entrance, whilst the control was only 63-72% likely to do so (1993a: 138), this may relate to the differing sample sizes employed. In other cases, where the greatest contrast is evident between the views from rock art panels versus the surrounding uncarved rocks, it appears that the rock art in fact extends across the full extent of available surfaces *within an immediate area* (Bradley et al 1993a: Figures 7-9). In other words, within these immediate locales there were few uncarved rocks, and therefore few other options as to where carvings could be positioned. In these ways it is frequently very difficult to identify clear patterns of association in terms of the views from rock art panels versus control panels. Thus, although the distribution of rock art panels is undeniably more restricted than the suitable geology, and views may have been important factors in particular cases, it is not always entirely clear whether these alone are capable of explaining *all* rock art distributions.

Purcell’s (1994, 2001) important study of the Iveragh peninsula rock art developed ideas introduced by Bradley et al (1993a) and applied them to the Irish context. This work identified a straightforward dichotomy between panels at relatively inaccessible or hidden viewing points, and those along routeways, with the former characterised by restricted views where the viewer’s gaze is directed to specific landscape features such as local lakes. In this way, Purcell proposed differential access, and therefore differential audiences, for the two types of panels (this aspect is discussed below). However, unlike some of Bradley’s studies, these two types of panels were not found to correspond to any differences in motif types, raising questions as to the validity of the model. The dichotomy between frequently visited parts of the landscape and those to which access was more restricted is a relatively straightforward one to make in landscapes that are characterised by sheer mountain ranges and restricted passes, such as the Iveragh Peninsula. What is not clear is how patterns of differential social access might operate in a more open landscape, such as the rolling lowlands of the Louth / Monaghan area or the open moorlands of Northumberland. If such restrictions were based on knowledge and social rules rather than physical access, the question remains, is there any way of identifying such restricted sites through the motifs or context? The idea that the messages conveyed by rock art panels, and the audience receiving these messages, may have been context specific deserves rigorous exploration across more varied landscapes. These types of models are therefore, to an extent, dependant on the type of landscape that is investigated. As we shall see, not all landscapes are amenable to the identification of topographically determined categories of panels, sometimes because the terrain is simply less dramatic, in other cases because the carvers appear to have avoided particular zones.

One means of dealing with the unruly data that results from traditional visibility studies is to employ a consistent means of quantifying, comparing and testing the results via a GIS. Gaffney et al (1996) investigated Bradley's ideas further in this way using the Kilmartin study area. This time they used GIS to widen the scope of the study and explore how rock art relates to the distribution of other site types by investigating levels of intervisibility between different site, including cairns, henges, stone circles, standing stones, cists, burials and barrows, as well as rock art. In this way the study sought to explore how visible the builders of different monuments intended them to be in the wider landscape. Both rock art and chambered cairns were found to exhibit low intervisibility compared to other site types. This is not surprising considering the fact that rock art panels largely occur at ground level, or close to it, and so may not have been intended to be highly visible monuments. This contrasted with the burials in the area, which appeared to privilege visual contact with a henge monument. This demonstrated that rock art seems to be positioned in the landscape in a more intimate way than other monument types. Again the study highlighted an emphasis on views of lowland areas. The location of carved panels at the boundary between lowland and highland was also seen as suggestive of an integrative role for rock art. As Gaffney et al explain, it may have acted "to express, communicate, authorize and guide action at boundaries and other ambiguous areas of social interaction…perhaps to groups who utilize a diverse range of economic zones" (1996: 152).

A further example of the use of GIS technology to assess the role of visibility in rock art distribution can be seen in an American case study by Hartley and Vawser (1998). This study incorporated both cost surface analysis and viewshed analysis to investigate the rock art of the Colorado River drainage in western North America. Hartley and Vawser were interested in explaining the variation in complexity of rock art sites and how their distribution related to nearby habitation and food storage sites. They hypothesised that complex rock art with repeated imagery ('redundancy' in economic terms) might be explained as a form of highly visible advertisement of ownership and territorial claims within areas leading to food storage sites (ibid). They investigated accessibility by using slope values to calculate a friction (or cost) surface. Again, the landscape in this area, characterised by distinctive canyons, was particularly suited to this type of study. Because physical access varies so dramatically in this type of terrain, it will always affect the ways people interact with the landscape on foot. Again, the landscapes archaeologists investigate tend to influence the types of analyses (and therefore interpretations) applied and developed.

The interest in the visual is partly a function of our ‘constituting context’ as landscape archaeologists, exploring, getting lost in, and gazing over the landscape. Discovering sites and admiring the views from them are perhaps some of the most exciting and enjoyable moments in a landscape archaeologist’s career. It is also a function of the emphasis on the visual in contemporary western culture (Ouzman 2001). Whilst some innovative recent studies (e.g. Goldhahn 2002, Boivin 2004) have sought to extend our sensual analyses to investigate the ‘soundscapes’ of rock art sites, these are few and far between, and tend to be driven by their specific landscape contexts or direct ethnographic evidence for audio-related ritual practices. While some rock art panels clearly are positioned at natural vantage points in the landscape, this aspect cannot necessarily be used blindly to explain the majority of cases. Visibility studies would benefit from a critical approach that assesses whether views and visibility really governed rock art distribution, or are more to do with our perception of sites as landscape archaeologists, and our own culture’s emphasis on the visual. Chapter 3 presents a study that integrates a wide range of landscape variables, of which visibility and views form just a part.

As discussed further in Chapter 3, the interpretation of palaeoenvironmental data also poses a major problem for viewshed analysis, whether field or GIS-based. The emphasis on viewsheds is reliant on the idea that the late Neolithic landscape consisted of open grasslands similar to many of the present-day landscapes in which rock art is found. However, this idea is not necessarily supported across the board by palaeoenvironmental evidence (e.g., see Chapman and Geary 2000). As we shall see, this is suggestive of a mosaic of different vegetation zones, with forested areas still playing an important role in Neolithic landscapes and lifeways (though see Lock and Harris 1996). Taking this into account, it is interesting to consider the alternative possibility that some outcrop panels were intentionally created in small clearings within dense woodland (see also Cummings and Whittle 2003). If rock art locales were selected within a forested landscape this puts an entirely different perspective on the choice of location altogether. The dramatic effect of suddenly encountering a panel within a small brightly lit clearance can be experienced today at the Rivock Edge plantation, in West Yorkshire (Figure 1.4). This idea might explain the seemingly unexplainable distribution of many carvings where the apparently plain, unassuming, and relatively low visibility panels were selected for embellishment. This idea requires further exploration (largely beyond the scope of the present research) in terms of the collation of palaeoenvironmental evidence. However, Chapters 3 and 4 offer preliminary investigations into whether some panels are situated in areas where the underlying geology is sufficiently shallow to induce a natural clearance within a once-forested area.

Landscape and audience

The key implication of studies drawing on pathways of movement or visual perception of prehistoric landscapes is that the rock art was structured according to the different audiences that had access to it. As noted above, the idea that different groups may have had differential access to certain locales, or used different pathways in different ways, prompted further analyses as to whether contrasts in the motifs corresponded to different parts of the landscape (e.g. Bradley 1991). Improving on earlier approaches that distinguished only between cup marked and cup and ring panels, Bradley defined two categories - 'simple' versus 'complex' panels - on the basis of the forms of the motifs and their interaction with one another (see 1997: 128-31; see also Chapter 6). In this way, Bradley (1996) has rightly emphasised the importance of integrating motif studies and landscape analysis, something he saw as lacking in many previous studies (e.g. Tilley 1991). Using studies in three areas; Kilmartin, Mid Argyll, Milfield Basin, Northumberland, and Rombalds Moor, West Yorkshire, Bradley was able to identify shifts in the complexity of the rock art that seemed to respond to both topographical features and prehistoric monument complexes, a factor he in turn connected to changing audiences (1991). He proposed that motif complexity intensified with larger and / or more diverse audiences. This idea developed out of theories put forward by Conkey (1980, 1989) and Gamble (1991) in relation to Continental Palaeolithic art, and Morphy (1989, 1991) in relation to ethnographic studies. In this way, Bradley also connected the increasingly complex information conveyed by rock art to the increased frequency of visits to, and multiple uses of, particular areas (1993: 270).

Audience-related theories rely on the fundamental proposition that there are areas of the landscape that can be divided between 'domestic' (stable, local) audiences and more varied (including non-local and specialist) and intermittent audiences. In Bradley's view (1996) non-local and varied audiences would have required rock art compositions whose meanings were more clearly defined, using more elaborate compositions, whilst local audiences would have been capable of responding to simpler motifs that could invoke multiple interpretations (based on Conkey and Hastorf 1990). In a range of different study areas it was demonstrated that the motifs changed according to their location within the wider landscape, and interpretations of varying prehistoric landuse across different areas. For instance, at Strath Tay, cup marked panels tended to occur on the lowland river terraces, whilst cup and ring motifs were more common at the valley edges and around the basins on higher ground (Bradley 1996: 93). The seasonal snow cover in the higher areas featuring cup and rings suggested intermittent use, fitting in with the proposal that a 'non-domestic' audience used the area. Evidence from worked quartz and flint collected across the landscape also supported the dichotomy between a local stable audience in the lowlands and a shifting, varied and potentially specialist audience utilising more elevated zones (Bradley 1995, 1996: 94). Higher quality lithic material was found to be associated with low lying areas around cup marked stones and earlier prehistoric monuments, and increasingly less material was recovered further into the uplands where the cup and ring marked stones were located. Bradley argued that the complex panels might have signalled a boundary to people entering the area from outside (1996: 94). By documenting the shifts in motif complexity in response to the locations of monument complexes (e.g. Bradley 1996: 93-96) he also links complexity of design to places that probably attracted large gatherings of social groups. It is in these areas, where a wide spectrum of people met, though on a less frequent basis, that the art may again have been required to be more specific and less ambiguous. Thus, rather than featuring simple motifs which could have held multiple meanings, the more complex motifs are thought to have been more restricted in their symbolic associations.

These audience-based models can be critiqued on a number of points. Since settlement evidence was usually scarce across each of these study areas, the models rely largely on ‘reading the landscape’, and drawing on modern day observations as to its varying productivity levels and accessibility. Usually this results in invoking the types of lowland-versus-upland, or coastal valley-versus-hinterland models noted above. However, open settlements have recently been documented in both the upland and lowland coastal regions of the Galicia study area (Bradley 1995: 367-8). Thus, such a strict dichotomy between landscape zones is possibly too simplistic. Another problem is that this broad model for motifs reflecting audience differences based on landscape zones does not necessarily apply neatly to all rock art distribution. In fact, as outlined below, the data varies from one locality to another, even within regional rock art distributions (Bradley 1996: 93). In spite of these variations, what is essentially the same line of argument regarding mobility and audience has been used to explain quite disparate results.

For example, at Strath Tay, it was in fact the simple cup marked, rather than complex, panels that were associated with earlier prehistoric monuments in the lowland valley (Bradley 1996: 93-4). This contrasts with the Kilmartin Valley, where complex compositions appeared to herald the presence of monument complexes, with simple panels occurring in both the uplands and lowlands (Bradley 1997: 122). Thus, though the motifs increased in their complexity towards the monuments in Kilmartin, (1997:113-119), the opposite was the case in Strath Tay (ibid1996). The same types of contractions can be seen in North Northumberland (ibid 1997) and Louth (ibid 1997: 119-20). Thus it is not always the concentrations of complex art that are associated with major monument complexes. The fact that both simple and complex panels are seen in association with monument complexes in different areas, sometimes in combination, would seem to undermine the theory that these two categories of rock art panels reflect differing audiences. Opposing patterns of motif distributions can also be observed, for example, between Galicia, northern Spain, where there are complex panels in settlement areas, and simple cups in the uplands, and in northern Spain and Portugal, where there are cups in lowlands and complex motifs in uplands (2000: 68; Sanches et al 1998; Bradley et al 1995). Given the amount of variation evident in these studies, can we be sure that the audience-based model, as opposed to some other variable, explains the variation we see?

Whether the proposed rules in terms of motif complexity and audience are *always* the case therefore remains problematic. In the study by Purcell (1994, 2001) on the Iveragh Peninsula, it was not possible to link a motif or stylistic distinction to the landscape dichotomy she identified despite the highly detailed nature of her investigation. Rather, Purcell (ibid) found that individual groupings of panels within the valleys of the Iveragh Peninsula tended to exhibit their own peculiar styles. Thus, while motif complexity has been employed as a means of corroborating the validity of the landscape observations, this does not always incur a positive result. This may also demonstrate that the classification of panels into 'simple' and 'complex', though useful in particular areas, may be too crude to document the wider variation seen across the Atlantic rock art tradition. Similarly, when Johnston (1989: 59-97, 1991a: 89; 1991b: 2-3) divided Atlantic motifs into just four categories - cups, cup and rings / circular, linear / rectilinear and 'other' - intelligible patterns failed to emerge. It is suggested here (see Chapter 6) that this is related to the application of overly simplistic classificatory systems rather than the random nature of the motifs and compositions. Detailed observations indicate that, rather than a strict dichotomy, variation that seems to represent a continuum of panel types can potentially be discerned within the classic rock art repertoire. Bradley started to work with these finer grained distinctions by classifying panels on the basis of the compositional relationships between the motifs (1997: 128-131), and it is this type of approach that is pursued in more detail here (see Chapter 6). Whether these types would have been recognised by those who produced the rock art, however, is far from clear. Whilst Bradley (1997: 129) emphasises their potential association with varying audiences, here they are acknowledged as providing a means of tracing variations that may reflect a whole gamut of issues including chronological change, individual, group and regional identity, as well as the potentially varying roles and audiences of different panels. As ethnographic studies have demonstrated, these variations also reflect aspects of life to which we, as prehistorians, seldom have access, such as linguistic identity (e.g. Taçon 1994: 121-22). As a result, we need a more rigorous means of testing these patterns and cross-checking them with alternative influences such as taphonomic biases, archaeological evidence, and multiple landscape variables.

The series of associations made between how people used different parts of the landscape, who had access to these zones, and the inferred social status of these groups is also problematic. The models propose or imply that herders or hunters, groups composed of diverse people from the surrounding region, and restricted (high status) audiences visited complex rock art sites. This contrasts with simple art, which is most commonly associated with the 'stable domestic' context, i.e. one that implicitly includes women and children (for critique see Brück 2001: 652-3; see also Cooney 2001: 171-3). Admittedly, by associating particular rock art sites with secluded locations, isolation and elite groups there is not necessarily an *explicit* gender association being made. Yet, where it *is* made, it is male (Bradley 1994, 1995). For example, Bradley has interpreted Galician art, with its weapons, stags engaged in "aggressive displays" and other "masculine activities" such as hunting, as presenting a "male-centred view of the world" (1994: 384-5). Even further, Bradley suggests that by employing this “unambiguously male” imagery, “Galician rock art seems to exclude women altogether” (1995: 366, see also Bradley 1997: 202, 207). Similarly, Boivin (2004: 45-7) has postulated that a binary division based on gender may have been in operation during the Neolithic of southern India. This division distinguishes between durable male-oriented imagery, produced by men, in inaccessible non-settlement locations, and female-centred non-durable artforms in ‘domestic’ contexts (ibid). Again, does this reflect the archaeological evidence, or modern images of art practitioners from both ethnographic traditions and the western art world, and wider gender stereotypes?

In addition to acknowledging the problems associated with traditional interpretations of gender based on artefacts, images and other archaeological data (Gero 1996; Conkey and Spector 1984; Bailey 2005: 16-19; Brück 2004), we should also take care not to let the exclusivity of a single social group in selected ethnographic cases (e.g. the male shamans in Whitley 1998: 18-21), and our preconceptions as to the identity of artists in the fine art world, sway our interpretations of prehistoric art practices. These interpretations seem to hark back to ‘post-Enlightenment gender relations’ that restrict the movement of women and children to the supposedly profane, and mundane, world of the settlement (see Brück 2001: 652). The archaeological evidence does not always corroborate these ideas in straightforward ways. After all, supposedly female game animals are also depicted in the Galician panels featuring stags (Bradley 1995: 351, 1997: 195-7). Also interesting is the case of the side-slab from a cist at Kilbride in Kilmartin, which, although featuring pecked axe motifs that might traditionally be conceived of as intrinsically masculine objects, accompanied an adult female cremation and flint knife (RCAHMS 1999: 38). Ironic too is the occurrence of vulva motifs and female figurines in other rock art traditions around the world (e.g. Lee 1992) where their ubiquity has not necessarily led to interpretations that the carvers or audiences themselves were female (but see also McDermott 1996). Again, these views seem to speak as much of our own preconceptions as the archaeological evidence itself. The range of styles and local idiosyncrasies apparent in Atlantic rock art, and the relatively dense concentrations of panels across some areas, could be used to argue that the sites were not restricted to a small group of specialist individuals. As Bailey has noted, rather than asking what the art is an *image of*, we should ask what it is an *image for* (2005: 18 original emphasis, referring to Haaland and Haaland 1995).

As noted above, one of the problems with making clear-cut distinctions between different audiences is that a lot more variation in the composition of audiences at rock art sites is suggested by ethnographic research. For example, groups of women and young boys in Northern South Africa are known to have walked for relatively long distances to rock art sites for initiation observances (Smith and Blundell 2004: 259). Between Los Angeles and the Mexican border, young girls produced particular types of rock paintings as part of their puberty initiations in order to acquire spirit helpers, while in the Mojave Desert, rock art was associated with young boys’ nasal septumpiercing ceremonies (Whitley 1998: 15). These social groups would not traditionally be distinguished from the stereotypes of 'local' and 'domestic' audiences. So perhaps it is the way that the 'specialised' audiences are defined or conceived that needs to be broadened? If so, it becomes difficult to distinguish the types of people making up these restricted audiences in a black-and-white way. That is, men, women and children in particular groupings or combinations may well have made up both the various specialist groups, *and*, in various combinations, the wider audiences. What is perhaps more at stake then in terms of 'restriction' is the purpose underlying the engagement with the rock art panels, and the size of the group.

A critical approach to rock art landscapes

As in other areas of archaeological research, 'landscape' is a concept that runs the risk of becoming a 'bandwagon' onto which rock art research can leap. For rock art research to successfully mature and play an active role in broader archaeological debate in general, and in landscape archaeology in particular, it is crucial that the lessons learnt through studies of other archaeological site types are taken into consideration and built upon. Some of the studies presented here suggest that the combination of rock art and landscape research is potentially a highly fruitful one. However, research following the standards set by landscape approaches to other site types is still relatively rare, and disappointingly simplistic interpretations are still commonly found in rock art literature. Ramqvist's (2002) explanation of rock art distribution in Fenno-Scandinavia, for instance, directly equates distributional patterning and motif style with different 'tribal entities' without considering the problematic issues underlying this theory. In other instances the reliance on direct visual interpretations of meaning lacks sufficient evidence in support of the theories presented – such is the case for the 'topographical maps' supposedly depicted in the rock art of alpine Italy (Fossatti 2002; see also Arcà 2004: 341-2). Further studies are needed which question and explore the basis of our current interpretations of the role of rock art, as are interpretive frameworks which allow research to move beyond elaborate systems of symbolic decipherment. A more critical landscape approach will not be an easy road, but in order for the findings of rock art studies to be of value to the wider archaeological debate we must acknowledge the inherent limitations and pitfalls (see Smith and Blundell 2004).

One of the major problems highlighted above is the potentially impressionistic and subjective nature of landscape approaches to rock art. This 'gaze and guess' tendency has been criticised by Smith and Blundell (2004:259), and it is argued here that the problem continues to limit the integration of rock art research into mainstream landscape studies (see Chapter 3). As they note, the patterns of association that are presented as influencing rock art distribution must be 'striking' in order for them to be significant, rather than simply noticed and described in a speculative manner at a few sites (ibid: 254). Where systematic methods are employed, these need to be rigorously assessed in terms of their significance, and any alternative explanations for the proposed patterns need to be explored and evaluated. In this regard, the use of GIS technology can provide a means of systematically assessing the accuracy and significance of impressions gathered in the field. For instance, the technology allows impressions, for example the size and location of visible areas of the landscape, to be readily quantified and compared. One of its major advantages is that it allows landscape archaeologists to cross-reference multiple factors, from landscape variables to taphonomic and survey biases, in order to assess their combined impact on site distribution. Where environmental variables do appear to have an impact on site distribution, the variables are frequently found to interact in complex and dynamic ways. As a result, studies investigating just a single variable run the risk of missing what may be a key factor underlying site location. GIS analysis employs specialised software to manipulate spatial data, and integrate non-spatial attributes to investigate complex distributional patterns. This approach is used here to investigate factors influencing petroglyph distribution via numerous variables, including the distribution of other prehistoric site types, palaeoenvironmental zones, elevation, location of water-features, geology, soil type and visibility.

GIS also allows us to look at the bigger picture in a relatively objective way. Because people in the past would have been responding, both directly and indirectly, to a complex and interwoven series of landscape characteristics, and ones operating at a whole range of different scales, we cannot expect to be able to identify all of these factors simply through a site visit. For instance, few archaeologists would have the necessary knowledge and skills to identify subtle changes in soil and geology types over vast regions as successfully as other specialists, and certainly not via the usual site visits. It is also difficult to establish the impact of historic patterns of landuse on site distribution without the aid of historical mapping which, using GIS, we can overlay onto current surveys of archaeological features. For these reasons I believe it is crucial to combine cartographic evidence, archaeological evidence and field observations.

Of course, GIS approaches are not without their own challenges and controversy. GIS-based landscape studies have come under increasing criticism with the development of post-processual approaches to archaeological landscapes. Its most obvious ancestral lineage within archaeological applications is linked to the spatial analyses of the 1950s and 1960s, and as a result, those using the technology have had to try harder, perhaps more so than other aspects of archaeology, to shrug off the preconceptions held by the wider academic community as to the theoretical implications of employing a GIS. Any critique of GIS is necessarily a critique of landscape modeling and distribution studies in general, analytical approaches that predate the advent of GIS technology. I would like to emphasise here that many of the criticisms lie more with the archaeological approaches themselves, and the data they employ, than with weaknesses in the technology. If applied in a critical and sensitive manner GIS studies can make inroads in terms of dealing with the many challenges they face.

Probably the most serious issue raised to date is the problem of environmental determinism, that is, the over-reliance on environmental factors in explaining the choices and actions of people in the past (Gaffney and Van Leusen 1995; Kvamme 1999). Traditionally GIS is comfortable dealing with the physical aspects of the terrain – elevation, geology, water bodies etc. - but is less so with social and, in particular, ideological apects of the landscape. Settlements and agricultural or subsistence based site types are therefore commonly investigated. The tendency towards environmental determinism is partly linked to the reliance on existing datasets, and on modern western categories in selecting and classifying relevant landscape variables. Social questions often focus rather narrowly on establishing the hierarchy of political and / or visual dominance in the landscape at the intersite level, and these have frequently been explained in terms of territory and resource control (e.g. Lock and Harris 1996; Hartley and Vawser 1998).

Reaction to such criticism within the GIS community has seen the introduction of a new way of thinking and writing about the environment. Nyerges and Green's (2000) case study in ecological anthropology discussed ideas such as political ecology, ecology of practice, social life of forests and the ethnography of landscape. They also refer to the social life of resources (ibid) in reference to Appadurai (1986) and Kopytoff's (1986) concept of the social life of things. Whilst this study is certainly still strong on the environmental aspect, the language employed signals the interest on the part of GIS researchers in beginning to address some of the key concerns of post-processual archaeology. They recognise that, in their case, the process of deforestation in Guinea must be understood in terms of the social hierarchy, age and gender of the individuals making up the communities in question (ibid: 274). In this way they integrate sociocultural (ethnographic) and technological (GIS and remote sensing) analysis.

Although GIS approaches to landscape have been widely critiqued as being over-reliant on functionalist and environmental explanations, in some instances, archaeologists have been able to turn this issue on its head by ruling out the effects of the natural environment. For example Ladefoged et al (1996) investigated the effects of elevation, slope, rainfall, temperature, and sunshine hours on the extent of a fieldsystem on Hawaii Island that exhibited varied levels of intensification. Whilst explaining the *extent* of the fieldsystem, these factors failed to explain the variations in intensification of labour involved in building the walls and other structural features making up the fieldsystem. This indicated the influence of an apparently non-environmental variable, and suggested new avenues of research into the nature of the string of associated coastal villages in order to test theories on the potential influence of social and political factors. This has provided a fruitful way of pushing existing theories further, one that asks archaeologists to be more imaginative in developing explanatory frameworks. Thus, rather than GIS technology limiting the archaeologist to environmental explanations, it can sometimes be used to identify patterns that then require the archaeologist to work harder with his or her social datasets in order to develop theories for further phases of exploration.

In this way GIS should be recognised as a tool like any other the archaeologist uses (see Wright et al 1997; Pickles 1997). As with geophysical surveys or radiocarbon dating programs, if these tools are used unthinkingly they can produce dubious results. It should also be acknowledged that in some cases, environmental factors actually do play a crucial role in site distribution. It would be unfortunate to label all studies that investigate their role as environmentally deterministic. Few archaeologists would argue that environmental factors entirely control human action. Rather, recent landscape theory has emphasised that social and environmental factors are inextricably interlinked (Van Dommelen 1999: 278). Thus, to ignore one side of this equation would be absurd. Although GIS research has been heavily criticised for its environmental bias, we also need to be careful that this does not incur an equally problematic backlash in the form of research purporting to be concerned directly with ideology and social factors in an similarly unthinking manner (e.g. Chapman 2000).

The problem of environmental determinism derives partly from the types of data commonly used in GIS analyses. The datasets that are most widely available are ones that have usually been collated for other industries – soil data, geological data, hydrological data, elevation data and so on. It goes without saying that few other disciplines would be interested in collating, and making available, maps of ancient political boundaries, religious affiliations, or cultural taboos, much less maps of material culture; this is the job of the archaeologist. Unfortunately, just as a geologist must invest years of survey, field testing and data collation and processing to establish a reliable and detailed map of bedrock geology, the creation of detailed and accurate qualitative datasets for archaeological use also requires considerable work, and ideally a long history of excavation. Thus, it has been much quicker and easier to simply use the datasets more widely available, together with a simple dots-on-maps approach to archaeological site data, not necessarily backing these dots up with a rich tapestry of qualitative data in database form. Such work takes time.

There are two immediately accessible and positive ways forward. Firstly, we can re-think the ways we use the readily available datasets. This is attempted here in the form of a series of landscape modeling exercises investigating the relationship between rock art and the kinds of significant landscape features identified by Taçon (1999), in order to test whether the ‘striking’ patterns of association required in Smith and Blundell’s (1998) strict critical approach to rock art landscapes can be identified. Though employing several traditional cartographic datasets, the theoretical framework used, and the potential interpretations, are by no means restricted to the environmental and economic. Rather, this work acknowledges that what is more likely is that both ideological / social and environmental / economic aspects would have influenced rock art distribution. This is born out in the ethnographic studies of communities still producing rock art. Their choice of location for embellishment via carving or painting has repeatedly been shown to reflect, for instance, the availability of particular resources, *and* the historical narratives and traditions of the communities simultaneously (Whitley 1998; Layton 2001). Secondly, we can address the fact that what has been lacking is for archaeologists themselves to roll up their sleeves and get their hands dirty in collating new and rich datasets capable of addressing social and ideological questions. A pilot study into the possible ways forward for an enriched rock art dataset, which deals with variations in motifs, compositions, techniques and 'styles', is presented in Chapter 6.

Tilley (2004: 218) has criticised the application of GIS, amongst other methodologies, as "far worse" than alternative means of representing the past (see also Thomas 2004: 198-201). In reviewing a recent book (Nash and Chippendale 2002) concerned with rock art and landscape, and expressing some dissatisfaction with the success of recent studies, Tilley defined a series of seven thematic questions he deemed of relevance to a "broadly phenomenological" (2003: 138) research approach. This approach argues that the ways people experienced certain aspects of past landscapes played a strong role in determining the location of rock art, including:

1. the aesthetic characteristics (colour, shape, texture) of the stones themselves;
2. the relationships between the panels and those in the surrounding landscape;
3. their relationship to landscape setting and associated topographical features;
4. the experience of approaching panels from different places along different paths and the relationship to visual fields of panel(s), their accessibility and intervisibility;
5. the tactile experience of the stone, and associated 'soundscapes';
6. the relationship of each of these issues (1-5) to variation in motifs;
7. the relationship to other contemporary or earlier monuments or artefacts built or deposited in the surrounding landscape.

Yet, it is exactly some of the features listed by Tilley (ibid) as relevant avenues of enquiry or observation for landscape-oriented rock art research that the present study endeavours to investigate using *both* GIS, and field observations. Chapter 3 investigates whether significant spatial, visual and kinetic patterns of association between groups of rock art, and between the panels and the 'natural' features of the surrounding landscape can be identified (themes 2, 3, and 4). Chapters 3, 4 and 5 discuss the relationship between rock art and other 'cultural' features of the landscape (theme 7). Chapter 6 relates to the dialogue between the 'style' of the panels and the surrounding landscape (theme 6). In this way, though the project brings a range of traditional archaeological techniques to the table, it attempts to do so in an innovative way, and seeks to address similar issues to those central to more strictly phenomenological approaches.

As Roughley (2004: 156-7) has noted "There is no contradiction between a contextual interpretation of prehistoric landscapes and the utilisation of scientific data analysis techniques". However, it is also argued here that GIS and field observations should be used in a complementary manner, in order to overcome some of their own inherent limitations. The limitations of a purely digital approach to the visual perception of the landscape has been discussed at length in specialist studies (Witcher

1999; , many of which have explored possible ways of enriching viewshed and other digitally-based perception analyses (e.g. Fisher 1994; Wheatley 1995; Gillings and Goodrick 1996; Wheatley and Gillings 2000; Tschan et al 2000; Llobera 2003).

Study areas

As discussed further in Chapter 3, rock art sites are widely dispersed across Ireland (see Johnston 1989). Major concentrations are known in the southern counties of Kerry and Cork, across County Louth and into County Monaghan, and in northern Donegal. A growing number of panels have also been documented in County Carlow (Lucey 2004). Smaller numbers of panels have been recorded in Mayo and Sligo in the west of the country, and along the eastern seaboard, in Waterford, Kilkenny, Wicklow, and Meath (Johnston ibid). Further inland, rock art has also been identified in Kildare, Westmeath, Cavan, and Fermanagh (ibid). Sites are also known from the Northern Irish counties of Derry, Tyrone, and Down (ibid). The large concentrations of rock art in Donegal, Louth / Monaghan, and Kerry, and the fact that these areas had been comparatively well surveyed (Finlay 1973; Clarke 1982; Lacey 1983; Cuppage 1986; Van Hoek 1987, 1988; Buckley and Sweetman 1991), made these ideal counties in which to situate three comparative study areas. The areas selected include the Inishowen Peninsula, the northern-most peninsula in County Donegal, and one that features the majority of the County's rock art, an area traversing northern County of Louth and a small section of eastern Monaghan, known as the Mhuirthemne Plain (Buckley and Sweetman 1991: 5), and the Dingle Peninsula, the western-most peninsula in County Kerry (see Figure 1.5).

Whilst the decision to focus the field elements of this research in Ireland was partly a response to practical issues, I was also mindful of the fact that since Johnston's (1989) landmark study, several detailed landscape studies had already been conducted and published for various regions in Britain (as discussed above), whilst only one comparable study (Purcell 2002) had been published on a single peninsula in Ireland. This peninsula, Iveragh in County Kerry, is perhaps the best-known and largest concentration of rock art in the country, and features some of the most complex compositions in the Irish rock art corpus (O'Sullivan and Sheehan 1996). Whilst this is perhaps the obvious place for landscape studies to start, it is important to remember that we cannot simply extrapolate our interpretations for all Irish rock art from this one locality. Focusing on Ireland has thus enabled me to collate new data for comparison with key studies of the British material. However, it should also be pointed out that, as this regional study demonstrates, it seems to be more relevant to compare the rock art in certain regions of Ireland, southern Scotland and northern England, than to think of the Irish corpus as a single entity.

Defining the boundaries of a landscape study area is never an easy task. In this case though, the study areas were largely defined by the highly regionalised nature of the rock art distribution in Ireland. The two peninsula study areas, in addition to being readily definable in geographical terms, also featured distinctive concentrations of rock art panels that could be easily separated from sites further inland or on adjacent peninsulas simply on the basis of distance, as each distribution thinned out towards the base of the peninsulas, and the resulting ‘gaps’ in the distribution were larger than the greatest distances between individual panels within the study areas. Currently in Donegal only a small number of scattered panels is located outside the Inishowen peninsula, with a marked concentration at Mevagh. This made the Inishowen a readily definable area for analysis. Having said that, it should be remembered that the seaways between the two peninsula study areas and their neighbours - Dingle Bay, south of Dingle Peninsula, and Lough Foyle and Swilly, which flank the Inishowen Peninsula - probably presented means of movement and communication rather than impenetrable barriers. The Louth / Monaghan group also represented a markedly self-contained and continuous band of panels covering a distance of c.19kms. The nearest County Louth panel outside this group lies c.20kms to the south (though according to a record by Tempest (1939) at least some of the motifs appear to belong to a much later tradition). There is just a single example recorded to the west of the study area in County Cavan, and currently no known examples from County Armagh to the north (Johnston 1989: 494-6).

In each of the study areas the issue of preservation and survey remains problematic. These issues are discussed further in Chapter 3. In the case of the Louth / Monaghan area, county boundaries potentially biased the data, in that the pioneering survey work by Jack Clarke (1982) did not extend outside the Republic of Ireland and north into the Northern Ireland County of Armagh. However, as demonstrated in Figure 1.5, the rock art panels also thin out dramatically towards the border, suggesting that any undiscovered panels in Armagh might be very few in number. The Dingle Peninsula has been the subject of an extensive archaeological survey (Cuppage 1986), and here again the rock art thins out towards the east where the peninsula joins the mainland. However, even recent detailed studies, such as that by Ó Coileáin (2003), have dramatically increased the number of known panels *within* the known distribution. The Inishowen Peninsula has also been the subject of a major survey (Lacy 1983). However, more recent specialist surveys (Van Hoek 1987, 1988; Coulhoun 1995) have revealed that this dataset is far from complete. Of the three study areas, the vast Inishowen Peninsula is probably the area where future surveys will most substantially increase the number of known rock art sites.

Inishowen Peninsula

The Inishowen Peninsula stretches northwards from the city of Derry (which lies at the mouth of the River Foyle, which in turn spills into Lough Foyle) and ends in Ireland’s most northerly point at Malin Head. The landscape is rugged, rocky and windswept, ranging from gentle lowlands to a mountainous interior encompassing a series of small lakes. In the north of the peninsula the small Isle of Doagh headland, and the larger finger of landing leading to Malin head, curl around Trawbreaga Bay creating a sheltered and shallow inlet, into which the Ballywilly Brook, and Straid, Glennagannon and Ballyboe Rivers empty (Figure 1.6). Around the western coast are a series of headlands and islands. Of these, the Isle of Doagh forms the most obvious former tidal island, now joined to the mainland by low-lying silted marshland, and the long sandy beach of Pollan Bay.

Currently, 167 rock art panels are known on the Inishowen Peninsula (Figure 1.7). These include panels that have been identified in a series of intensive specialist surveys, notably those by non-academic archaeologist Maartin Van Hoek (1987, 1988), and a lifetime’s work by Mabel Colhoun (1995), and occasional individual finds, both recent (e.g. Crumlish 1991) and historic (e.g. Boyle Somerville 1929). As with the other two study areas, the identification of new panels was not an objective of the study presented here. However it soon became apparent that the Inishowen Peninsula as a whole, and even the Isle of Doagh, which has been so extensively surveyed by Van Hoek (1987, 1988), still have many previously unpublished sites to offer within the current distribution, and potentially beyond it. During routine visits to panels at Altashane, Magheranaul and Meendoran, new panels were readily identified (Figures 1.8 – 1.10). The large number of little known cup-marked stones also suggests that there are probably still many of these simple motifs yet to be identified across the County (see Colhoun 1995).

A significant concentration of panels is located on the Isle of Doagh, where two townlands, Carrowreagh and Magheranaul, feature panels that are both spatially and stylistically distinctive (see Chapter 6). This former island also features a high concentration of complex motifs and compositions (Figure 1.11), as well as cup-marked panels. Beyond the Isle, the majority of panels are scattered between the shores of Trawbreaga Bay in the northeast, and Inch Island in the southwest, with a handful of panels known from the more mountainous interior, around the shores of Lough Fad (Figure 1.12), and the eastern parts of the peninsula. Two outliers are distinctive in their spatial location, and their complexity of design. The heavily decorated standing stone at Ardmore lies on the eastern coastline, and is described in more detail in Chapter 2 (Figure 1.13). This stone is isolated from the main rock art distribution, lying over 10km from its nearest neighbour. Although in secondary context, it remains unclear how far those who erected the standing stone might have shifted the carved outcrop from its original quarry site. At Drumcarbit, the most northerly panel, save for some possible cup-marked mobiliary panels at Ardmalin, features an unusually complex motif consisting of a large ten-ringed design on a horizontal rock surface (Figure 1.14). A small number of the Inishowen panels are associated with built monuments. These generally feature simple cup-marks, such as those on an outcrop that supports a boulder monument at Cloontagh (Boyle Somerville 1929), on a standing stone at Glebe (Van Hoek 1988), and on a series of megalithic tombs, such as those at Maghernaul and Sharagore (Colhoun 1995). Only occasionally do these feature more complex designs (e.g. the standing stones at Altashane and Ardmore). By far the majority of the compositions on the peninsula are pecked onto outcrop exposures (e.g. Figure 1.15).

The Mhuirthemne Plain, Counties Louth and Monaghan

Currently 73 carved panels are known from the Louth / Monaghan area (1.16). The majority of the carved stones from this group also lie on outcrop exposures. These outcrops frequently form ridges and small hills across the rolling lowlands of the Mhuirthemne Plain, which runs from Dunleer in the south to Dundalk in the north (Buckley and Sweetman 1991:5). This makes for an undulating archipelago-like terrain (Figure 1.17), almost a miniature version of the more dramatic drumlin topography (or 'basket of eggs' landscape) further to the west. The panels are clustered in a linear band that runs diagonally across the centre of the distribution (SW-NE). Over half of the entire corpus is situated in the single townland of Drumirril, in the southwestern extent of the distribution. This townland lies to the west of the River Fane, while the northeastern-most panel lies just east of the confluence of the Kilcurry and Castletown Rivers, in the townland of Carn More. Immediately to the south of Carn More, the rivers empty into Dundalk Bay.

The panels that do not consist of *in situ* outcrop exposures tend to occur in relative isolation around the edges of the distribution. Five of the stones (Carrickrobin, Killin, Newtownbalregan 1 and 2, and Tateetra), as discussed further in Chapter 2, are classified here as megalithic art or passage tomb art and therefore may be from former megalithic monuments (Tempest 1931; Evans 1939; Bayley and Roycroft 2003; O'Connor 2005a, 2005b). Though these panels fall outside the main focus of the present study, their presence within the Louth / Monaghan area has enabled the research to address some of the similarities and contrasts between rock art and megalithic art in terms of landscape distributional and other trends in a useful manner (see Chapter 3, 6 and 7). At Crumlin, in the east of the distribution, two carved slabs were recovered from a cist grave (Lynch 2002). These both appear to have been carved specifically for incorporation into the burial (Figure 1.18; see Chapter 2). At Carn More (O'Connor 2005a), an unusual carved motif, possibly depicting an axe, was identified on the capping boulder of a boulder monument within a Bronze Age cemetery (Figure 1.19). As we shall see, this carving also represents a separate tradition from classic rock art. Immediately adjacent to this monument, a cup-marked stone representing a reused piece of quarried outcrop rock art was recovered from a burial cairn (ibid; see Figure 1.19). In the north of the region, in the townland of Edenakill, is a standing stone (Figure 1.20) that features a possible truncated double ring motif, identified by Gerard Miller (pers.comm.; see also Nolan 1999). The grooves are shallow, thin and faint, and it remains a slight possibility that they are either natural (though this site was admittedly visited in overcast conditions that may not have done the possible motif justice) or derived from a related tradition, possibly megalithic art. At Ballybarrack, a carved panel that had been reused as a souterrain doorjamb was recovered during an excavation (Buckley and Sweetman 1991: 82). This also features slightly unusual motifs, and is located some distance from the main band of panels. The carving bears broad similarities to classic rock art, but the shallow depth of pecking, lack of true cup marks, repeated arcs, and unusually saturated composition, perhaps indicate that the stone belongs to a separate tradition, possibly megalithic art (Figure 1.21; see Johnston 1993 for a comparison of the two traditions).

Unlike the Donegal corpus, there are few simple cup-marked stones from the Louth / Monaghan assemblage, with the exception of the Carn More stone. Interestingly though, there are large numbers of natural solution hollows in the outcrop exposures of the area, many in close proximity to, or incorporated into, the rock art compositions (e.g. Figure 1.22). In contrast, the majority of the Louth / Monaghan panels feature one or two cup-and-ring style motifs. Much as in Donegal, there is a marked concentration of complex panels in the townland of Drumirril. Also notable are the distinctive locations of two of the most complex motifs in the region, both featuring seven-ringed motifs. The first is located at the centre of the Drumirril cluster (Figure 1.23), whilst the second is located at Miskish More on the extreme north-western periphery of the regional distribution, quite isolated from the majority of the panels (Figure 1.24). As in the Inishowen study area, new panels were identified during fieldwork in this area (Figures 1.25 – 1.26).

Dingle Peninsula

A total of 56 panels has been identified on the Dingle Peninsula (Figure 1.27). Much as in the Louth / Monaghan group, they predominantly cluster in a linear band running from the north-eastern uplands down across the southern valley system to the southwest coast. The major exception to this pattern is the tight cluster of panels in the Loch an Dúin Valley, on the northern slopes of the peninsula. Within this valley the panels run alongside the Scorid River in a linear arrangement from the gentle terraced foothills up to the lough, itself almost enclosed within the steep corrie slopes of the inland mountain ridge (Figure 1.28). In contrast to the other two study areas, the majority of the Dingle Peninsula panels consist of medium to large erratic boulders. This is not surprising given the dense moraine deposits apparent across many parts of the peninsula.

In some cases the boulders have been incorporated into built monuments, including the stone alignment at Ardmore (as described in Chapter 2), and the wedge tomb and standing stone at Ballyhoneen (Figures 1.29 - 1.31). In two cases, the stone pair at Ballyrishteen (Figure 1.32) and the unclassified megalithic tomb at Glanmore (Figure 1.33), panels feature hollows recorded by Cuppage (1986) as cup marks. Field observations suggest that these may be natural solution hollows, and the sites are therefore included here as possible panels only. At Ballintlea, what appears to be a massive outcrop features a line of six cups (Figure 1.34). At Kildurrihy East a bullaun stone, now situated alongside the road in a small village, features a series of cups on its reverse face (Figure 1.35). Many of the boulders may be in slightly secondary positions, having been cleared to the edge of fields during recent land improvement (e.g., at Lougher, Ballinasig, Ballyglasheen and Kinard East). At Kilmore (Figure 1.36), the panel lies atop a prehistoric field boundary wall (see Chapter 3). Nevertheless, it is likely that the original locations of these panels were only a relatively short distance from the edges of these small cleared fields.

The character of the motifs and compositions is again somewhat distinct from those of the other two study areas. As in the Louth / Monaghan group there are relatively few panels featuring only cup marks, contrasting with the Inishowen corpus. However this time, the most complex panels (notably Ventry, Milltown, Kinard East, and Aghacarrible: Figures 1.37 – 1.40) are widely scattered across the distribution, with the distinct cluster of panels in the Loch an Dúin valley featuring rather simpler compositions. Again a small number of new panels, here with simple cup motifs, was identified during the site visits (Figure 1.41 – 1.42).

Structure of the thesis

As the concept of landscape has come to play a key role within rock art studies, we have sought to understand these sites within both their wider setting, and more recently within their immediate archaeological context, as places in the prehistoric landscape. As a result, the question of the date of rock art as a practice has become increasingly crucial. The next chapter gives critical consideration to the complexities of current theories on British and Irish rock art chronology. Current evidence, though problematic, lends support for a date at least as early as, if not earlier than, the later Neolithic for the origin of 'classic' or 'quintessential' rock art, a practice whose characteristics are elaborated alongside the dating evidence. Either side of this however, there is evidence for the marking of stone surfaces as a longer-lived tradition, with related practices that were likely to have commenced during the earlier Neolithic, and continued into the later Bronze Age.

Having considered the dating dilemma, a series of landscape-oriented explorations is then presented. Whilst each is characterised by its own unique methodology and operates at a specific scale, it is hoped that the intimately interwoven nature of the evidence gathered in each chapter can be conveyed. First, Chapter 3 presents a series of map and field-based studies that investigate the apparent patterns of association between rock art panels and features of the surrounding landscape. These analyses are conducted for each the three study areas. The research brings together what are perhaps very traditional cartographic variables such as geology and soil types, with more experiential aspects of landscape based both on geographical information systems (GIS) analysis and field observations which consider issues such as the visual perception of, and pathways of movement across, the landscape. In this way, a more holistic and 'human-scaled' approach than that which is sometimes presented in GIS-based studies is attempted.

Second, having identified some key issues using this broader scale of analysis, Chapter 4 deals specifically with a particularly dense cluster of panels within the Louth / Monaghan group, in the townland of Drumirril. As explained in Chapter 3, this cluster was probably of special significance within the surrounding region, a pattern that also seems to be echoed in the rock art on the Inishowen and Dingle Peninsulas, each of which has its own 'regional cluster'. In Drumirril, this local level is subjected to investigation via geophysical survey to explore a series of questions: could human activity other than the carvings themselves be identified around the rock art panels; if so what types of activities were represented, and how did these vary between contexts immediately adjacent to the panels and those on the surrounding hilltops devoid of rock art panels? This work was the first of its kind to be applied specifically to outcrop rock art in Ireland and Britain, as opposed to other site types (e.g. enclosures, promontory forts) that feature rock art panels. As detailed, the survey identified a surprising range of archaeological features, and this lent momentum to the idea of using excavation as a means of investigating rock art sites. Chapter 5 presents the results of the first systematic excavation of an outcrop rock art site in Britain and Ireland (as opposed to a monument featuring or enclosing rock art), for specifically rock art-related aims. The test excavation at Drumirril confirmed the existence of traces of human activity around several different clusters of rock art panels within the townland. This activity has been dated to a range of periods including the early and middle Neolithic, the late Neolithic to early Bronze Age, and an early Christian horizon. Whilst raising numerous unanswered questions, this aspect of the present study represents a considerable step forward for Atlantic rock art research, demonstrating that excavation is both an appropriate and fruitful means of investigating these sites.

The study shifts gear in Chapter 6, by considering what is both an ever more intimate scale of analysis, but also one that relates back to the broader-scaled ideas developed in Chapter 3; motif and stylistic variation across the landscape. With the exception of Bradley's work (see 1997 for a summary), this is perhaps the most under-developed area of Atlantic rock art research, primarily because it presents such a difficult task. Unlike the art of other parts of the world, where traditions can be broken down into instantly recognisable phases or regional styles, Atlantic rock art consists of abstract forms that can be, and are, combined in an endless range of possible variations that seldom superimpose one another (see RCAHMS 1999: 42-51 for a rare example). Thus, even attempting to distinguish whether there are 'types' of panels that differ in 'style' or content from one another, let alone investigating their relationship to different parts of the landscape, is challenging to say the least. Chapter 6 experiments with possible ways forward, and endeavours to reintroduce stylistic analysis in an integrated way by linking this complex qualitative data to landscape analysis. It experiments with classificatory methods that aim to allow the subtleties of this rock art tradition to shine through in more detail than before. The exciting possibilities for investigating the dialogue between varying panel types and motifs, and the landscapes within which they were created, are discussed using worked examples. As a pilot study into the potential for this area to open up and enrich our understanding of Atlantic rock art, this Chapter suggests that this line of enquiry ought to, and can be, pursued further. Finally, Chapter 7 attempts to bring the results of these separate strands together to, as Conkey says, explore how the "patterns of each inflect upon the other"; the "resonances" and "dissonances" (1997: 360) between them.

CHAPTER TWO

Petroglyphs in Ireland & Britain

Reassessing the dating dilemma

In his influential book on Atlantic rock art, Bradley stated that "rock art research must contribute directly to archaeology if it is to achieve anything of value" (1997: 8). The lack of contribution implied in this statement is directly linked to difficulties in determining the chronology of rock art. The question of chronology is a controversial one for the British and Irish material, particularly in terms of the evidence for a Neolithic versus a Bronze Age date for the practice. As argued below, the Atlantic rock art phenomenon is apparently one with considerable chronological depth and longevity. As a consequence, it cannot be easily or neatly pigeonholed into a convenient archaeological timeframe, and is currently widely viewed as a multi-period tradition: Late Neolithic to Early Bronze Age. Part of the difficulty in determining a precise date range seems to be derived from the conflation of what actually appear to be several interrelated yet distinct traditions into a single phenomenon. As discussed in further detail below, the existence of these distinct traditions has been acknowledged to varying degrees within the rock art literature (Mac White 1946: 59; Walker 1970; Morris 1979: 13; Bradley 1997: 136-50). Cup marks, for instance, are recognised as a particularly long-lived motif. They are known from Early Neolithic through to Early Christian contexts in Britain and Ireland, and as a result are sometimes excluded from rock art studies (Shee 1981; Morris 1989; Johnston 1989). However, this complexity is less frequently acknowledged in mainstream archaeological texts (though see Waddell 2000: 168).

The traditional view held that the coincident distribution of rock art, copper sources, food vessel pottery and bronze axes, and the presence of panels in Early Bronze Age funerary monuments provided proof of an Early Bronze Age date for the practice (MacWhite 1946: 62, 68-9) and this has been echoed in later literature (Herity and Eogan 1977: 137; Morris 1977: 15; 1981: 76-7). At this early stage in the archaeological interpretation of rock art, passage tomb art was also considered to belong to the Bronze Age, although even then this was considered problematic (MacWhite 1946: 65). Meanwhile, with the exception of the Loughcrew area, the distribution of rock art and passage tomb art was seen as mutually exclusive, implying a lack of association between the two traditions (Herity 1974: 109; Shee Twohig 1981: 122). Passage tomb art has since reaped the benefits of modern scientific dating programmes demonstrating its Middle Neolithic, if not earlier, origin (Herity 1974: 151-3; Shee Twohig 1981: 103-6; ApSimon 1985-6: 8-11; Johnston 1989: 182-219; O'Sullivan 1999: 302-3). In contrast, the early view of rock art chronology has been perpetuated, often without due critical thought, particularly in much of the non-specialist literature. As a result, this somewhat unconsidered association with the Early Bronze Age (EBA) has been difficult to shake (Beckensall 1983; Twohig 1988: 45).

However, as explored here, there is now a growing case for a Neolithic date (at least in origin) for what might be referred to as 'quintessential' or 'classic' cup and ring rock art, as defined above and elaborated throughout this chapter. Though this case was championed some time ago (Simpson and Thawley 1972; Burgess 1990), it is only more recently that it has taken effect in a wider range of literature. This is reflected in the more confident attitude towards chronology in recent rock art research (Evans 2004; Waddington 1996; 1999; Beckensall and Frodsham 1998: 68; Waddington *et al.* in press). Indeed, Evans' (2003, 2004) titles even refer directly to 'Neolithic rock art'. This new found confidence has prompted some authors to suggest that a closer relationship existed between megalithic and rock art (Corlett 1999: 55; but see Waddington in press), whilst others have argued more controversially for an Early Neolithic origin for rock art (Waddington 1998; 1999). This contrasts with the investigation of this relationship presented in Johnston's (1993: 278) important paper published over a decade ago, which concludes that the evidence is insufficient to determine the relative chronology of these two traditions.

Key publications dealing with rock art chronology in considerable detail include those by Simpson and Thawley (1972), Burgess (1990), Hewitt (1991), Beckensall and Frodsham (1998) and Bradley (1997). In relation to the Irish material, Johnston (1989: 98-128; 1993) and Corlett (1999: 52-7) have written most critically on the issue. Though recent interpretations have gained confidence in dealing with chronology, all of the evidence gathered to date ultimately remains circumstantial, with no absolute proof of chronology provided by any one of the sites in question. Chronology remains the biggest hurdle for rock art research, particularly in terms of its integration into 'mainstream' archaeology. However, ambiguities and reliance on dating via association are not uncommon features in discussions of dating issues for many site types, even where the most 'scientific' methods are employed. Therefore, there appears to be no reason to further delay bringing rock art 'into the fold', and asking in what ways it might contribute to our understanding and interpretations of prehistoric landscapes, and Neolithic landscapes in particular. This change in perception has already seen some of the most recent work on rock art really start to grapple with the relationships between rock art and a wider spectrum of other Neolithic and Early Bronze Age sites, notably large 'ritual' site types (Evans 2003: 115-45; Bradley 1997: 113-20).

In contrast, the treatment of rock art in key texts dealing with the Neolithic in particular, and prehistory in general, remains highly variable. Due to the inherent difficulties in slotting rock art neatly into a specific time period, the practice seems to have suffered what Hewitt (1991: 9) has termed an "identity crisis". Apart from the obvious exceptions of work by those with a special interest in the phenomenon (Bradley 1992; 1993; 1997; Waddington 1998; 1999), the inconsistent treatment of rock art sites is telling of the difficulties inherent in relating them to their wider archaeological context. Whilst general texts should not necessarily be expected to deal with all site types relevant to the period, it is interesting to note the way in which rock art is, or is not, incorporated into general overviews.

A survey of general texts indicates that the acceptance of rock art as a relevant and valuable aspect of early prehistory is a relatively recent trend, with some volumes mentioning these sites only briefly in concluding chapters, as a new line of evidence with which to investigate Neolithic landscapes (Cooney and Grogan 1999: 233; Malone 2001: 253-6). One of the reasons underlying this is probably the scarcity of rock art in regions like southern Britain, where so much Neolithic research has traditionally focused (e.g. Barrett 1994; Tilley 1994). Rock art is frequently entirely absent from Neolithic texts (Thomas 1991; 1996; 1999; Whittle 1996; Topping 1997; Edmonds 1999), largely or entirely absent from Neolithic chapters within general overviews (Whittle 1999; Waddell 2000), and totally absent from entire volumes on prehistory (Darvill 1987, Hodder 1990a; Desmond *et al.* 2000). These overviews sometimes mention rock art within the Bronze Age chapters (Herity and Eogan 1977: 137), but usually in just one or two paragraphs, and sometimes with cryptic comments as to the possibility of an earlier date (Parker Pearson 1999: 91). Elsewhere, rock art gains membership within a broad group of "enigmatic" Bronze Age site types (Waddell 2000: 166-8; see also Bradley 1995a).

Cooney's recent book on Neolithic Ireland is rare in its (albeit brief) incorporation of rock art into a general discussion of the period, no doubt partly inspired by the presence of a notable concentration of sites in one of his key study areas (Cooney 2000a: 16, 19, 118, 135, 142). Rock art also gains status in volumes dealing with regions exhibiting especially well known concentrations of rock art (O'Sullivan and Sheehan 1993). Only more recently has rock art - though not necessarily the British or Irish material - become more acceptable for inclusion (Alves, 2002; Scarre 2002a) or brief mention (Fábregas and Ruíz-Gálvez 1998; Edmonds and Richards 1998) in edited volumes presenting broad surveys of earlier prehistory in Western Europe. Before evaluating how rock art might further contribute to our understanding of prehistoric, and particularly Neolithic, landscapes in the study areas specifically investigated here (see Chapters 3-6), the dating evidence deserves rigorous investigation. In order to evaluate the dating dilemma, the following discussion presents the evidence for rock art as a Neolithic, and as a Bronze Age, practice.

The evidence from funerary monuments

As noted above, the Bronze Age argument initially gathered superficial support in Ireland by highlighting the apparent distributional associations between rock art and Bronze Age monuments and artefacts. Since then, the distribution of Irish rock art has been found to be more widespread than originally thought (Cuppage 1986; Clarke 1982; Van Hoek 1987; 1988), incurring greater inconsistencies in these distributional associations. Together with the recognition that the Bronze Age sites might simply represent later developments in these regions, and that distributional association does not necessarily equal chronological association, these issues have weakened the case for a Bronze Age date (Johnston 1989: 122-8). This has left the *terminus ante quem* based on funerary monument data as the primary line of evidence for rock art as an EBA practice. The numerous cairns and cist burials featuring cup and ring petroglyphs, along with stones interpreted as being derived from such monuments, have been discussed in detail elsewhere (Simpson and Thawley 1972; Beckensall and Frodsham 1998; Johnston 1989: 102-115; Beckensall 1999: 117-150). The archaeological context and dating of many examples remains tenuous, or entirely unknown. For instance, the majority of decorated stones published as Scottish cists slabs (Morris 1981: 170) have not been definitively linked to cist burials (Johnston 1989: 137). The validity of the EBA *terminus ante quem* argument in general is also open to critique (see below), and the potential implications of a particular selection of sites deserve further comment.

Classic examples of EBA funerary contexts for rock art include the burial cairns of Southern Scotland and Northern England, particularly Northumberland, where much of the debate over evidence used in promoting the Bronze Age date has focused (Beckensall 1999, Hewitt 1991; Waddington *et al*. in press). Bradley refers to this distributional concentration as the 'Northern Tradition' (1997: 136). Here we see monuments where *in situ* panels are employed as kerbstones, as seen at the cairn excavated by Canon Greenwell at Weetwood Bank (HELICs database; see also Beckensall 1999: 147; see Figure 2.1), and several where small mobiliary stones are incorporated into the body of the cairn, as occurs at Weetwood Moor and Fowberry (Beckensall 1999: 142-7). There are also examples where the cairn structure is built atop outcropping stone featuring rock art, including Fowberry and Hunterheugh Crags (Beckensall ibid; Waddington in press; see Figure 2.2 and 2.3). In other cases the decorated stones are employed within burial cists, themselves sometimes - but not always - within cairn monuments, and often with the carvings facing inwards towards the cist chamber (Morris 1981: 170; 1989: 47; Simpson and Thawley 1972). As a result of the occurrence of rock art in these sealed contexts, and their general association with these monuments, the practice of carving the motifs initially came to be understood as being contemporary with the building of the funerary structures.

There are, however, a number of problems with this argument. When viewed critically, this 'old school' view of rock art as purely Bronze Age in date was plagued by an obvious circularity of argument. Support was drawn from the northwestern Iberian material, where circular motifs bear intriguing similarities to the Irish and British repertoire (Childe 1935: 116-7; MacWhite 1946; and, though more cautious in tone, Herity and Eogan 1977: 76). The Iberian motifs are sometimes associated with carvings of Bronze Age metal artefacts, which has been used to lend this date to both the abstract and artefact carvings themselves (Peña Santos 1980; see Figure 2.4). However the latter make up only a small percentage of the general corpus, and the relationship between the two motif classes is poorly understood (Bradley 1997:203; Burgess 1990:167). Furthermore, there is no independent dating evidence available which might have supported a single date for the entire tradition (O'Sullivan and Sheehan 1993: 84; Johnston 1989: 160; Burgess 1990:167). Carvings of metal artefacts in association with cup and ring rock art are in fact rare in the British corpus (Piggot 1939; Atkinson 1956: 178-9). At Nether Largie (Figure 2.5), the superimposition of motifs suggests that they actually postdate the cup marks on the panel (Morris 1977: 109; Bradley 1993: 91-3). Lacking direct dating evidence of its own, the Iberian material benefited from the apparently EBA date for the British corpus (MacWhite 1946; Peña Santos and Vásquez Varela 1979:25 cited in Burgess 1990: 167). Even more ironic, and highly circular, is the tendency to point to the mere presence of rock art in British funerary monuments as evidence for a Bronze Age date for the burial itself (see Burgess 1990: 166-7).

In the case of the Irish material, the highly problematic line of argument based on the British material has simply been borrowed and (uncritically) superimposed onto the Irish corpus (e.g. Lacy 1983: 98). This has led to proposals of possible Early Bronze Age dates for some pre-bog field systems in the southwest of Ireland on the basis of their spatial association with rock art panels and 'other' EBA monuments (Cuppage 1986: 17). In Ireland there are some key differences that need to be taken into consideration when dealing with the dating dilemma. As discussed in further detail below, there are very few examples of rock art in Irish Bronze Age monuments in comparison to the British material. Furthermore, where we do have examples in burial cists the motifs are usually quite different to those of 'quintessential' cup and ring rock art, as illustrated below.

The major opposition to the EBA date comes in the form of numerous broken and weathered stones within funerary monuments, apparently providing evidence that these stones are in secondary contexts (Simpson and Thawley 1972: 86; Burgess 1990: 163-4; Bradley 1992: 169-71). The incorporation of these stones has been described as 'clumsy' (Simpson and Thawley 1972:86), and the placement of the motifs on the panels themselves 'eccentric' (Burgess 1990: 163). In some cases it has been demonstrated that the fragmented sections of these stones can be reassembled into more complete compositions (Hewitt 1991: 44-5; see Figure 2.6). This evidence suggests a distinct shift in the meaning and symbolism with which these stones were imbued. The act of quarrying a former monument - a decorated outcrop and significant place - and the use of the truncated designs in an entirely new context represent a significant form of appropriation. Such major shifts are generally interpreted as having occurred over an extended time period. Proponents of this argument would view as unlikely the possibility that the rock art and the secondary funerary contexts were equivalent in date. Therefore, it has been argued that this shift implies a Late Neolithic *terminus ante quem* for carvings with demonstrable breakage and / or weathering. Furthermore, it presents the possibility that those lacking breakage may also represent re-used stones that simply fared a little better during the construction process.

It must be remembered, though, that many of these funerary contexts have not been dated with precision, or remain entirely undated. Many were excavated rather early on, or simply lack diagnostic finds, and radiocarbon dates are few and far between. Of the examples listed and illustrated by Simpson and Thawley (1972) only three of the sites feature both 'quintessential' rock art and diagnostic pottery vessels. The decorated cist at Balbirnie, Fife, was associated with a second cist containing a Food Vessel; the stone from Ford West Field, Northumberland, covered an urn; and the cist slab at Maughanby, Cumberland, was associated with an urned cremation (ibid: 100-101). The latter two sites were published in 1865 and 1902 respectively, whilst Balbirnie was published in 1970. Across the remainder of the sites listed, despite their art style, those containing diagnostic pottery include four with Beaker vessels, seven with Food Vessel pottery, and six with urns (ibid). As Simpson and Thawley note (1972: 86), the current evidence does not indicate that the burials with either megalithic or classic rock art motifs can be distinguished chronologically. However, none are listed with pottery types of the later Bronze Age. These pottery associations thus represent a chronological spread across the last centuries of the Late Neolithic through to the end of the Early Bronze Age, and possibly into the Middle Bronze Age.

On these details alone then, it is not possible to determine just *how early* in the Bronze Age these sites might have been created. Arguably, on the funerary context evidence alone, it is still *possible* that the motifs were carved, fell into disuse, and were later reused all within the several centuries making up the earlier Bronze Age. However the wider body of evidence linking rock art to the later Neolithic is compelling. It is probably time for the issues that were so clearly documented by both Burgess (1990) and Simpson and Thawley (1972), to be revisited in the form of a reassessment of primary sources (i.e. the excavated material itself) and the integration of new evidence, though this obviously falls beyond the scope of the research presented here. For instance, the more recently excavated decorated slabs from Knappers and Witton Gilbert, discussed in further detail below, came from cists incorporating Neolithic axes (Ritchie and Adamson 1981; Wright 1996: 3, 7). Clearly the danger of circularity in interpreting the date of the cists through association alone is high, and the forthcoming radiocarbon dates for Witton Gilbert are eagerly awaited.

As a consequence of the interpretation that 'classic' rock art in EBA burials is potentially in secondary contexts, the key debate has been reduced to simply whether these stones were 'unthinkingly' or deliberately incorporated into the monuments (Morris 1981: 3; Burgess 1990: 163-4; Bradley 1997: 136-150; Waddington 1998:42-3). For instance, Bradley (1992; 1997: 141) and Morris (1989: 47) see the re-use in cist burials as deliberate, based on the low frequency of cup marks in comparison to the surrounding landscape and the tendency for complex motifs to face inwards. However, Burgess (1990) has argued that the carved surface most commonly faces the internal chamber simply because it was flatter, thus suiting the purpose. Hewitt (1991) has also emphasised the need for caution in relying on funerary monument data, and points to the low percentage of rock art occurring in burials as weakening the idea that the production of carvings was an integral part of the funerary process. The very origin of the cairns at Fowberry and Weetwood has also been questioned (ibid: 61-3), and concerns have been raised that they may represent relatively recent field clearance (Burgess 1990: 164). During the excavation of Fowberry, Hewitt (pers.comm.) also noted what he considered to be modern plough marks, apparently running beneath the cairn. The cairn also appears to be carefully positioned between a series of outcropping rocks – a likely spot for the deposition of stone so that it was clear of the more arable surrounding area. Just how old such agricultural activity may be remains uncertain. Recent reinterpretations of such combinations of features have suggested that agricultural clearance and burial activities may in fact have been closely linked in a symbolically significant relationship during prehistory (Johnston 2000).

In order to proceed along a more critical line of interpretation for rock art in burial contexts, Hewitt (1991:60-1) defined a series of criteria that would be required to provide evidence for contemporaneity between the carvings and the funerary monuments of Northumberland. Firstly, the carved stones must be derived from a sealed context; secondly they must feature cup and ring motifs rather than less clearly diagnostic designs; and lastly they must be in an unbroken condition. Numerous stones from funerary contexts feature cup marks only, which as discussed above do not provide a date for cup and ring art. Using the sample investigated by Canon Greenwell, Hewitt's statistical study determined that only 6.3% of the barrows featured carved stones from sealed contexts, and of these each is discounted by the second criterion (ibid: 50-54). In cremation burials the evidence is even scarcer, with only 1% of stones featuring rock art (ibid: 54). As a result, though the British corpus features numerous examples compared to the Irish material, these statistics render the idea that the carving of these motifs was an integral part of Bronze Age funerary practices difficult to sustain. As is the case in the megalithic monuments discussed below, the small sample size supports the idea that these stones are in secondary contexts. Yet, as noted below, it is quite possible that rock art panels were both intentionally *and* incidentally incorporated into burial monuments.

Though a potential radiocarbon date is yet to be published (Niall Hammond pers.comm.; see Wright 1996: 5), the decorated capstone from Witton Gilbert in County Durham (Figure 2.7), has been presented as perhaps the best proof yet for an EBA date for rock art (Beckensall 1999: 136-8). Both sides of this stone feature motifs; the upper surface features several cups and grooves, whilst the underside, placed so as to face inwards towards the interior chamber of the cist, features numerous *fresh and unbroken* cup and ring motifs. The Gainford slab presents a similar case (Beckensall and Frodsham 1998: 56-7), but here the status of this stone as a cist slab has not been demonstrated. However, in both cases only one face can be described as exhibiting the cups and rings of 'quintessential' rock art. The other two faces feature simple cups, and cups and grooves. Thus, whilst at first glance the occurrence of rock art motifs on two faces of a cist capstone seems to point towards an EBA date, with the 'less fresh' cup marks on the upper surface representing possible re-use at Witton Gilbert, there are some complicating factors. Two carved packing stones were also recovered during the excavation of the site, but again, only one featured quintessential cup and ring motifs, and these were in a broken condition (Wright 1996: 5-6).

In addition, whilst this is a rather subtle point, the composition of the cup and ring motifs on the Witton Gilbert stone is not in keeping with that typically seen in 'quintessential' rock art. Rock art compositions tend to be irregular and idiosyncratic with the arrangement of the motifs appearing uneven or random in character, often incorporating large zones of undecorated stone. The motifs often interact with one another via connecting grooves or natural fissures. Mixtures of different motif types rub shoulders, and the identical repetition of single motif types *en masse* is rare except for dense concentrations of cup marks. These characteristics are not seen in the Witton Gilbert stone, which features a repeated series of identical cup and ring motifs evenly and consistently arranged across the entire panel surface. In one corner the rings overlap, forming a complex rosette design not seen elsewhere in the rock art repertoire. Whilst this observation is unavoidably subjective, the composition simply does not 'feel right' as a piece of rock art, and is much more in line with the characteristics of megalithic art. As such, this renders the stone less convincing as an indicator for an EBA date for 'quintessential' rock art.

In the absence of examples of megalithic art in the area that might have been readily available for re-use in later burials, it seems *possible* that the Witton Gilbert stone may form part of a distinct carving tradition specific to EBA burial capstones. The question remains however as to why this tradition is so infrequent, as demonstrated by Hewitt's (1991) statistical appraisal. To complicate matters further, a polished Neolithic axe of Welsh gabbro had been wedged working edge up into the capping stones, and a plano-convex flint knife and flint scraper were also recovered from sealed contexts (Wright 1996: 3-5, 7). Though these may represent 'heirloom' objects (ibid: 7), they raise the possibility that the burial itself is Late Neolithic in date. The cist at Knappers near Glasgow presents a similar scenario, featuring both a carved capstone, though again the motifs are not diagnostic cup and ring designs, and a Neolithic flint adze that was sealed within the cist (Bradley 1992: 171; Ritchie and Adamson 1981: 174, 189-91, Plate 9b). Whether these represent Late Neolithic monuments, or whether the artefacts represent something akin to heirlooms whose manufacture substantially predated their deposition, the burials points to two important issues. Firstly, the Neolithic-Bronze Age transition is replete with ambiguities and overlapping traditions. Secondly, where we do see carved motifs in burials and other monuments, these can frequently be shown to be part of a related but distinct tradition that may well have post-dated the practice of pecking quintessential rock art motifs onto living rock outcrops. This second point is well illustrated by a recent find from Beauly in the Scottish Highlands (Carter 2005; Dutton and Clapperton 2005). Here the internal surfaces of three slabs from the cist of a cairn containing Food Vessel pottery were decorated with cups, and in one case an unusual symmetrical motif composed of gently curving grooves. There are currently no parallels for this unusual design in either 'quintessential' rock art or megalithic art.

Compared to Britain, there is a distinct lack of funerary evidence for rock art chronology in Ireland, and we need to be mindful of this rather than simply imposing the British date onto the Irish material (O'Sullivan and Sheehan 1993: 84). Furthermore, as Shee (1968: 144; 1972: 231) has noted, the motifs incorporated into the few decorated burial cists in Ireland are predominantly closer in form to those of megalithic art. As shown in Figure 2.8, examples of decorated slabs from Irish cists include those from Hempstown Commons, County Kildare (Harnett 1950), Moylough, County Sligo (Morris 1929: 114-4, Plate iv), and Ballinvally, Meath (Shee 1972). The scalloped design from Moylough is similar in form to the design on tomb 51 at Carrowmore, County Sligo (Curran-Mulligan 1994: 15), the Ballinvally slab features cup-less rings more characteristic of passage tomb art, and the Hempstown commons stone exhibits a lozenge, a triangular design and areas of surface pecking. Thus, in each of these cases the motifs are not typical of cup and ring rock art (though see below for further discussion of the Ballinvally slab).

In contrast, cup and ring motifs with radials are known from a rectangular slab recovered from the body of an undated (and now destroyed) cairn with a central cist grave at Teeromoyle, County Kerry (Macalister 1939: 23; Connolly 1991; see Figure 2.8). The motifs appear to have been broken, as both feature short radials that appear truncated by the edges of the stone. This is one of very few Irish examples that is comparable to the British funerary material, and suggests that here too carved panels were re-used in later burial monuments. However, the slab also features carvings on four faces, of which two of the opposing surfaces exhibit cup and ring motifs. This would be atypical for, though not entirely negating its *possible* status as, a quarried and reused rock art panel (e.g. an *in situ* panel from Drumirril features carvings on three faces and natural cups on a fourth). As such, this stone is unusual and, though a close examination of the carvings, and any weathering and breakage evidence could not be conducted within the context of the present study, it may provide significant information in terms of its ‘life history’ in future work. A very recent example where evidence for re-use *can* be argued is the quarried cup-marked panel from the cairn at Carn More, Co. Louth (see O’Connor 2005a; Figure 1.19). Again though, these motifs are not representative of classic rock art. Again, what is notable about this material is that so few examples are known from EBA burials in Ireland compared to Britain.

Another recent find is that at Crumlin, County Louth, where a large decorated capstone was recovered during the excavation of a site featuring a cairn and a cist burial (see Figure 1.18; Lynch 2002). The internal face of the eastern side stone from the cist also featured rough and superficial circular areas of pecking. The capstone featured a range of motifs from simple cups and a rough arc through to an unusual curvilinear design quite unlike anything in the rock art repertoire. The latter motif is executed in extremely fine and carefully pecked grooves, contrasting sharply with the more dispersed pecking defining the other motifs. Lynch (ibid: 216) interprets the motif as being weathered, indicating re-use. This could not be verified with any certainty upon inspection. The peck-marks were clearly visible, particularly in the arc motif (Figure 1.18). The pecked surfaces did exhibit the same patina as the rest of the stone, which might be interpreted as weathering, but this was consistent across the entire stone including the quarried surfaces, suggesting that it built up after the quarrying process. This leaves two options; as the motifs do not fit in with the rock art repertoire, they could represent re-used megalithic art, or the carvings could date to the construction of the burial. The particular configuration of design elements making up the complex motif described above is also unknown from the megalithic art repertoire, suggesting that the latter is more likely.

Most of the designs fall along one narrow side of the capstone. The geological and weathering evidence clearly indicates that this surface once formed the exposed upper surface of an outcrop. This surface is weathered, and its form corresponds to others in the local area, where long narrow exposures are common in the east-west oriented outcrops of the region. The other sides appear to have been cleaved away from a larger outcrop and feature freshly broken faces and stepped surfaces caused during quarrying. Crucially, two of the cups fall along one of these cleaved surfaces, opposite the main decorated face. These are not noted by Lynch (2002) and were not recorded in the illustration of the carvings as part of the excavation report (Ursula Mattenberger pers.comm.). The location of the cups supports the idea that the motifs date to the construction of the burial, and strongly indicates that such motifs were still being produced during the Bronze Age. Again though, these simple motifs cannot be used to date the majority of outcrop rock art, and the more complex motifs appear to be part of a tradition that was distinct from cup and ring rock art. Thus within the Irish corpus as a whole we have some evidence for re-use, and we have some evidence for EBA carving. However, these both fall within a distinct tradition or practice that exhibits an entirely different set of contextual characteristics to that of petroglyphs on living rock.

'Weathered' versus 'fresh' motifs

As noted above the evidence for weathering and breakage has presented the strongest line of opposition to the EBA date. To counter this, the apparently 'fresh' appearance of some stones from funerary contexts has been used to bolster the idea that these designs were created specifically for use in burial monuments, and as such were protected from weathering from day one (Bradley 1992: 171; Beckensall and Frodsham 1998: 53). This argument rests on shaky ground however, since it relies on negative evidence for a process that we know very little about. There is considerable debate as to exactly how vulnerable petroglyphs are to weathering, with particular controversy over the impact of acid rain (see Coles 2004 for a discussion of conservation concerns). Recent studies have proposed that laser scanning should be implemented as a means of measuring weathering rates against an established baseline (RAPP 2000: 127), but such analysis has yet to be realised.

As with any taphonomic process, stone weathering is a complex issue. It is difficult to assess how changes in local vegetation and soil deposits may have influenced the extent and duration of differential exposure within individual panels through time. The protection provided by vegetation and soil cover has long been recognised as a positive preservative measure for cases of at risk or particularly special panels; the Gardom's Edge stone, for instance, was buried for conservation reasons (Barnatt *et al.* 1996: 13). One of the effects of this means of protection is that the stone surface is 'cleaned' of any micro-vegetation living on the panel, since this decays after burial. Based on field observations, this appears to have a major impact on motif appearance, as described below (see also RAPP 2000: 124-6). This ought to be kept in mind when considering the identification of motif phases based on differential weathering, for instance at Achnabreck and Roughting Linn (RCAHMS 1988: 87-99; Johnston 1991a: 94; Bradley 1997: 64-5). The dramatic effects of differential weathering based on differential turf cover have been noted on a single panel at Ormaig, Kilmartin (RCAHMS 1999: 65-8, panel number 179[1]). Here, there is a remarkable contrast in appearance between those motifs that have been exposed "for many years", and those just a few centimetres away uncovered in 1974 (ibid: 65).

In Drumirril, County Monaghan, two panels illustrate this point further. These panels, situated at ground level, have been well documented since their ‘discovery’ by Clarke (1982; see also Van Hoek 1997) during his extensive survey in the 1970’s. Clarke also spent time clearing and cleaning the Drumirril panels, and maintaining them in this visible state (Noel Ross pers.comm.). Considering their (current) ground level positioning, it is likely that these panels have undergone different degrees of protection via natural burial since their initial creation. Parts of the panel surfaces that are now buried exhibit the remains of former lichen patches, and it is likely that much of the panel surfaces were exposed to the elements for considerable lengths of time; that is, some weathering is likely to have occurred. Now though, the panels are currently almost entirely covered by turf, which must be lifted to enable the motifs to be viewed. In spite of their previous period(s) of exposure, the fine condition of the motifs is immediately apparent, with individual peck marks clearly visible both within the motifs themselves, and as an area of dispersed pecking across a lower section of one of the panels (see Figure 2.9).

For all intents and purposes the motifs on these *in situ* panels can be described as very crisp and fresh in appearance, particularly when compared to neighbouring panels, which consist of raised and exposed outcrop surfaces, encrusted with lichen and other micro-vegetation. This evidence therefore calls into question the validity of relying on freshness of appearance as a sign that funerary panels had been safely entombed in the protective environment of the burial monument from day one. As Johnston (1989: 152) has also noted, the freshness of motifs at Greta Bridge, County Durham, were observed by Beckensall (1986: 28-9; see also 1999: 138) despite his acceptance of this as a re-used stone owing to its occurrence in a Roman burial. The dispersed pecking (or ‘diffuse picking’) noted at Drumirril is an unusual motif type in the rock art repertoire, and is more usually associated with megalithic art (O’Sullivan 1988; Eogan and Aboud 1990). Dispersed pecking was also noted in the smaller panel at Drumgonnelly, visible only by raising the mat of turf now protecting it (see Figure 2.10). These two panels suggest that dispersed pecking may in fact be more readily identifiable across other panels if their surfaces too were clear of micro-vegetation. That these markings are so rarely noted on exposed panels seems to further demonstrate the significant impact of micro-vegetation on the general visibility and apparent ‘freshness’ of motifs.

Freshness of motifs has also played a role in identifying ‘cist quarries’, as claimed at Fowberry and Dumbarton, Greenland (Bradley 1995b: 123; 1997: 140; MacKie and Davis 1989). A few hundred metres from Fowberry cairn, in North Plantation, lies a stone that provides “vital dating evidence” in Bradley’s (1997: 141; Figure 2.11) argument that the practice of rock art continued into the EBA. The outcrop, interpreted as a possible cist quarry, features numerous weathered motifs, and a quarry depression where a rectangular slab appears to have been neatly removed. One side of this void runs parallel with a natural fissure, which would have served as an obvious point of removal. Pecked into this quarried surface is a fresh looking cup and ring motif with a radial groove running to the edge of the stone and down a series of stepped surfaces. This slab has been interpreted as having possibly featured a weathered motif, and having been removed for use in an EBA funerary monument, after which a new motif was carved to replace the old one. On the basis of this evidence together with the multiphase carvings at Dumbarton, which also featured relatively fresh motifs on quarried surfaces that truncate weathered motifs (MacKie and Davis 1989), Bradley concludes that it is “no longer possible to argue that [rock art] was exclusively Neolithic in date” (1997: 141). As such this stone, among others, plays an important role in Bradley’s stance on chronology; that though rock art originated in the Neolithic, it continued to be created into the Early Bronze Age (Bradley 1997; 1995a).

There are several obvious problems with the interpretation of the Fowberry stone as a cist quarry. First, we do not know if there originally was a weathered motif on the quarried slab. Second, we do not know if the slab was used in a Bronze Age funerary monument. Third, we cannot prove that the quarrying act was not performed during the Neolithic. Lastly, we know little about the potential taphonomic processes that might account for the differential weathering of this stone. The less weathered motif is positioned on a surface that is lower than the rest of the decorated stone. This surface is usually covered with soil, whilst the upper parts of the outcrop remain exposed. This situation highlights the caution required when considering whether differential weathering infers chronological differentiation. Furthermore, if we are comparing a Neolithic versus an EBA date based purely on differential weathering, is it really the interval of say 1000 years that incurs the difference in appearance, when we are already as much as 4500 years on from the creation of the most recent carvings? Surely this situation is much more to do with the particular preservation conditions that the stone has been submitted to since that time? Whilst the Fowberry stone is a very interesting case, and might well be correctly interpreted as a cist quarry, these problems demonstrate that it cannot be used to argue unequivocally for a Bronze Age date for rock art, as suggested elsewhere. Recent discoveries by Waddington *et al.* (in press) at Hunterheugh Crags provide more convincing evidence than the Fowberry or Greenland petroglyphs, though along a similar vein. This site is discussed in further detail below.

Passage tomb art

It is widely recognised that ‘rock art type motifs’ occur in many of the decorated passage tombs in Ireland (Figures 2.12). The similarities between rock art and passage tomb art motifs are cited as evidence for a broad contemporaneity between these two traditions (Johnston 1989: 214; Cooney 2000a: 16). The rock art motifs lie directly alongside ‘passage tomb art motifs’ in some sites, but are entirely absent from others. The extensively decorated backstone C6 from the passage tomb at Sess Kilgreen, County Tyrone, features a classic rock art motif, a central cup with five concentric rings (Shee Twohig 1981: 203, Fig. 209). This motif is centrally embedded within two sets of multiple and overlapping concentric arcs, reminiscent of the repetitive curvilinear designs of Iberia. Within the chamber, stones C3, C4 and C8 feature single cup and ring motifs, and the standing stone here also exhibits further cup and rings, including a gapped motif on the latter stone (ibid: Figs 208-9). Again, these motifs are adjoined by repeated curving arcs, a feature of megalithic art that tends to be absent from rock art compositions. In each of the Sess Kilgreen stones, the motifs feature relatively small central cup marks, contrasting with the deeply pecked forms commonly encountered in the rock art repertoire. Indeed the general technique, where the designs are formed using shallow surface pecking, is quite distinct from that usually seen in rock art panels (as discussed by Johnston 1993). The same is true of the rock art motifs in the passage tomb of Knockmany, County Tyrone, where chamber orthostats C3, C9 and C11 feature cup and rings, sometimes employing the natural cup-like depressions that occur in the stone (ibid: Figs 210-12). The consistency in carving techniques across the panels supports the interpretation that the rock art motifs are contemporary with the passage tomb motifs, as opposed to re-used or later rock art designs (cf Burgess 1990; Waddington 1998).

Several stones from the Loughcrew passage tombs feature rock art motifs, including stones in Cairns H, I, L, S, U and V, while by far the majority occur in Cairn T (Shee Twohig 1981: Figs 216, 218, 224, 225, 231-8, 240-2). These motifs range from designs surrounded by and sometimes adjoining passage tomb motifs, to those that are compositionally isolated. Based on the motif plans recorded by Shee Twohig (1981: Figs 216, 233, and 242) the motifs and composition of three stones, Cairn H's C5, Cairn T's L5, and Cairn V's C3, are particularly in keeping with those expected of rock art panels. That is, they combine a range of different rock art type motifs in an irregular composition, with some motifs interacting with or responding to the natural depressions and fissures of the stones. Meanwhile rock art motifs are also entirely absent from some of the decorated tombs at Loughcrew (Cairns F, K, R_2, W and X_1). Of course, in the case of Loughcrew it must be remembered that several decorated stones have yet to be published (O'Sullivan pers.comm.), and an unknown number undoubtedly remain undiscovered in hidden contexts within the unexcavated tombs.

At Knowth there are a small number of stones exhibiting rock art motifs, such as Corbel 54-1 and Kerbstone 83 from Site 1 (Eogan 1986: 154, 164). Elsewhere cup and ring motifs can be seen at the Mound of the Hostages, Tara (C2 Shee Twohig 1981: Fig. 245), on stone C9s recorded by Wakeman at Clover Hill, Sligo (ibid : Fig 282), and on two stones at the probable passage tomb at Ardmulchan, County Meath (ibid: Fig 255). At Knockroe, County Kilkenny, there are some cups with partial rings, and Stone 23 features a triple ringed motif with a dot and three radials, similar to rock art forms in Donegal (O'Sullivan 1987: 85, 89, 93). The eastern chamber also features a large number of ring motifs (O'Sullivan pers.comm.), singling out this tomb as distinctive from the other decorated zones of the monument. Whether this significance is related to symbolic or chronological aspects remains unclear. However, on the whole, the decoration from each of these sites shares little with the rock art repertoire.

The evidence from Newgrange provides a uniquely different scenario, since here the rock art motifs occur on hidden and less prominent surfaces within the architecture of the tomb. The placement of rock art motifs in hidden positions in passage tombs could in theory be used to support the idea that rock art had fallen out of favour by this point, and therefore predated passage tomb art, fitting in with Waddington's (1998) theory that rock art originated in the Early

Neolithic. Certainly at Knowth, Eogan (1997: 221; 1998: 166-8) noted that the art of re-used stones tended to be hidden, but here there were fewer examples of rock art type motifs. The excavators of Newgrange have not identified any evidence of re-use, such as weathering (O'Kelly 1982). Johnston (1989: 214) has suggested that the hidden Newgrange art might represent the symbolic replication of rock art, though actual re-use is not implied.

Meanwhile, Burgess (1990:160) and Waddington (1998: 31-2) have argued that 'rock art' motifs broken during (and therefore predating) quarrying can be identified on kerbstones K13 and K17 at Newgrange, though they do not identify the precise motifs in question. Whilst such evidence would indeed provide securely dated proof of re-use in a very early context, this is far from clear in the drawings provided in O'Kelly's (1982: 156, 163, 168) corpus of decorated stones. At Newgrange the carvers seem to have fully appreciated the three-dimensional quality of the stones they decorated. As a result, in several instances motifs and areas of carving continue over edges and around corners, thus crossing two faces. Such is the case in K13, where, viewed from the back, the lower edge seems to feature a truncated cup and ring, as some photographs *appear* to suggest (O'Kelly 1982: Pl.66; Coffey 1912: 92). In fact, these motifs are complete – the other half simply lies on the underside of the stone, as shown in the corpus drawing (O'Kelly 1982: 156). This face also features a small ring which abuts an edge, but could certainly not be described as being truncated. Again, in the drawing of K17 (O'Kelly 1982: 163) the outer ring of a motif appears to be truncated by the upper edge of the stone, but in a second drawing (ibid: 168) the motif is shown to continue on the upper surface. In contrast, Stone 5 from Site K at Newgrange has certainly been broken, and its upper motifs are roughly truncated (O'Kelly 1978: 320). However, these motifs are not commonly seen in the rock art repertoire.

A considerably more compelling example is a little cited stone from the unusual burial monument at Millin Bay, County Down (Collins and Waterman 1955: 30, 33). Stone 38 comes from an oval setting of orthostats that defines the inner extent of a shingle retaining bank, and surrounds a central 'long cist'. The stone features a series of pecked arcs and curvilinear designs that bear some resemblance to the 'three-sided void' motif discussed further below. Above this, Collins and Waterman's illustration shows two cups and a design consisting of three concentric rings and a radial groove, which the authors identify as classic rock art motifs by describing their links to 'Galician' rock art (1955: 33, 40). The latter motif has been clearly truncated demonstrating its (at least) secondary context. Together with the cups, the design is illustrated in such a way as to display the very different techniques used in its production, in comparison to the other curvilinear designs. Collins and Waterman describe the technique as "lightly pecked and smoothed" (ibid: 30), which would fit in with the idea that these may represent reused outcrop rock art motifs that had been subjected to weathering in their primary context. Whilst the authors note the "demonstrably secondary" context of the stone, the significance of this in terms of the dating of the wider rock art tradition is not discussed. The implications of this stone were realised later by Van Hoek (1997: 15), but appear to have escaped further attention.

Though the excavators define the monument as dating to the later Neolithic, unfortunately there are no radiocarbon dates for the site and the morphology and finds assemblage render its date somewhat ambiguous. The monument is unusual on a number of counts. There are few Neolithic counterparts that share its unusual morphology of a long cist or blocked passage and oval stone setting sealed by a mound. It also features numerous decorated stones where only some of the motifs are consistent with the better-known passage tomb art designs from the 'Boyne Culture tombs' (Collins and Waterman 1955: 40-3). However, as is discussed in more detail below, it is argued here that some of the Millin Bay motifs, including the curvilinear designs on Stone 38, fall into O'Sullivan's proposed 'northern style' of passage tomb art (O'Sullivan 1988: 160-61). Thus, this still allows for a Neolithic context for the art. Frustratingly however, there were few diagnostic finds from secure sealed contexts. A fragment of a polished flint axe was recovered from the stone fill overlying the cist, and could thus be in a secondary context. Carrowkeel pottery sherds were recovered between two of the outer standing stones of the last phase of the site. Several of these sherds were recovered from "clean sand at about the presumed pre-cairn surface" (Collins and Waterman 1955: 43). However others were from a disturbed area adjacent to one of the standing stones, and all of the sherds were only just overlaid by the disturbed and ill-defined outer margin of the lower sand mound covering the monument. Thus, even the authors note that the scattered sherds cannot be used to infer a date for the monument (ibid: 43).

The authors (Collins and Waterman 1955: 49-56) compare the structure of the monument to a series of burial sites finding numerous parallels: the long cist in one of the Carrowmore passage tombs in Sligo; the oval settings in the stone circle and cairn at nearby Ballynoe; at the chambered cairn Ballyedmond, County Down; and in both the stone circle and a satellite tomb kerb at Newgrange. Numerous structural parallels were also found in a series of British cairns or barrows. Significantly these featured Bronze Age pottery - food vessel, beaker and urn - but only in association with *secondary* burials. More recently, Cooney (2000: 99-103) has compared the long rectangular cists or passages in a series of Neolithic burial monuments in Ireland and Britain, finding strong parallels between the two regions. These structural features are not dissimilar to that at Millin Bay. As a result of the difficulties in dating the Millin Bay monument precisely, the site is discussed in some more recent literature as hovering somewhat uncertainly between the later Neolithic and Early Bronze Age (e.g. Murphy 2003: 14). However, in line with Collins and Waterman's (1955: 49-56) conclusions based on structural comparisons as well as the finds and decorated stones, Cooney (2000: 121-4) whole-heartedly includes this site in his discussion of Neolithic burial practices. It is ironic then that what is possibly the best evidence yet for a Neolithic date for rock art has received so little attention in the rock art literature. Along with the other decorated stones from Millin Bay, several featuring cup marks, Stone 38 certainly deserves further inspection to determine its 'life history' via weathering and breakage evidence.

In terms of the proposed contemporaneity between rock art and passage tomb art, whilst we certainly do have mounting evidence for a Later Neolithic date, and even evidence for a Late Neolithic *terminus ante quem* for rock art, we have little independent evidence that rock art was in full swing during the Middle Neolithic. On its own, the evidence from passage tomb art in itself provides only weak support for the Neolithic date for rock art. Taking the other strands of evidence into consideration though, this idea does form an acceptable hypothesis. If the rock art and passage tomb art traditions were indeed contemporaneous, this fits in well with our general interpretations of the Middle Neolithic as a time that saw increasing regionality in a whole range of social practices (Cooney 2000b). It also dovetails smoothly with the acknowledgement that Neolithic traditions tended to be long-lived. In other words, seeing rock art as a tradition that possibly spanned the Middle and Late Neolithic, with some continuity into the EBA, is well in tune with the general longevity of Neolithic practices.

In Britain there are notably few motif parallels in the megalithic art corpus. Examples from Orkney include Eday Manse, where two cup and triple ringed motifs are incorporated into a spiralled design, and Pickaquoy, where a stone features a cup with five rings and three plain cups (Shee Twohig 1981: Figures 259 and 260). One of the Calderstones panels (Di) features three gapped cup and ring motifs (in Shee Twohig 1981: Fig 264). Whether this lack of motif parallels implies broad chronological differences is unclear, but it certainly suggests that the interrelatedness being argued for the Irish material on the basis of motif similarities does not occur in Britain. The relationship between rock art and passage tomb art could potentially offer unique and important clues to rock art chronology. If the transformation of passage tomb art through time can be pinned down in more detail in the future, it may be possible to identify just where rock art motifs fit into the sequence. Though dates remain unavailable for many sites, as we gain a better grasp on the chronology of passage tomb art, this may offer additional (circumstantial) clues as to the details of its chronological relationship with rock art.

Turning to the issue of ‘passage tomb motifs’ occurring on rock art panels, a small number of examples are known, such as those in Ayrshire (Stevenson 1993), Argyll and Galloway (Morris 1977: 61, 121, 1979: 100). Overall though, the occurrence is relatively rare. A series of the densely carved panels in the Kilmartin Valley, Argyll, provides interesting examples. At Creagantairbh, scalloped designs reminiscent of passage tomb art lie at the edge of a classic rock art composition, whilst at Poltalloch, rayed motifs similar to those at the Loughcrew tombs occupy a central position within a panel dominated by cups and rings (RCAHMS 1999: 60, 70). At Achnabreck, motifs associated with megalithic art, including triskele spiral designs reminiscent of the Boyne tradition, form part of a proposed earlier carving phase superimposed by and / or more highly weathered than classic cup and ring motifs (RCAHMS 1999: 42-51). This panel deserves further close inspection, keeping in mind the ambiguities associated with observations based on weathering discussed above. Though there are occasional observations of superimposed motifs in Atlantic rock art (e.g. Shee 1972: 225-6), these occur so seldom that they tend not to offer clues as to chronological changes in style, and hence the wider dating debate (see Armit and McCartney 2005 for a possible exception where linear motifs reputedly related to cordoned urn traditions overlies classic rock art). The Achnabreck panel may support the idea that rock art post-dates megalithic art in broad terms, but it also highlights the close relationship between the two; broad contemporaneity between them could also have resulted in this palimpsest. Furthermore, at nearby Cairnbaan (RCAHMS 1999: 59) a panel features a rayed cup and ring motif at the edge of a composition of cup and ring designs where one of these classic rock art motifs superimposes another, indicating multiple carving events within the classic rock art motifs themselves. The occurrence of several outcrops at Kilmartin that exhibit passage tomb and rock art motifs alongside one another makes this area a special case, but one that again reinforces the blurred nature of the boundaries between these two traditions.

Motifs and multiple interrelated traditions

In addition to the incorporation of rock art panels into Bronze Age funerary monuments, as discussed above, there are also examples of rock art motifs in sealed contexts within later Bronze Age sites (see Figure 2.13). These cases seemingly support the Bronze Age date by extending the practice of rock art well into this later timeframe. These include the stone recovered from Middle Bronze Age deposits at the Street House ritual enclosure in Yorkshire (Vyner 1988: 189-92), beneath the hearth of a Middle Bronze Age hut in Cornwall (Nowakowski 1991: 86-96, 166), from the Late Bronze Age pit dating to c.1250-900 BC at Haughey's Fort in Armagh (Aitchison 1998, Mallory 1991), from a pit beneath a mound at the stone circle complex at Bohonagh, Cork (Waddell 2000: 169), and within the Late Bronze Age ring-barrow at Ballygroll in Derry (Williams 1981-2 cited in Corlett 1999:52). The deposition of these stones is usually interpreted as being votive in nature, rather than incidental. However, with few exceptions, such examples tend to consist of notably small stones featuring cup marks, and often just a single motif. As a group the corpus fails to represent the wider tradition of complex and elaborate compositions on larger, sometimes extensive, boulders and outcrops. This suggests that a distinct but related tradition, quite different to the pecking of cup and ring motifs on living rock, may have been in operation during the later Bronze Age. Similar cases are also known from Late Neolithic contexts, such as the cup marked stone from a pit at Knockaulin, County Kildare (Waddell 2000: 344), indicating that this too was probably a long-lived tradition.

Indeed the tradition of making individual cup marks generally seems to have been one of considerable longevity. A cup and ring motif appears on a carved stone ball from the Early Neolithic settlement at Eileen Domhnuill, North Uist, Hebrides (Waddington 1998:32). Single cups also very occasionally feature on the surfaces of Neolithic axes, such as the ground shale axe from a flat cemetery featuring both early Neolithic pottery and finds of Middle to Late Bronze Age date (Read 2000: 29; Irish Stone Axe Project Database No. 20652; Carelli 1997: 406-7). A cup mark was also noted on a rubbing stone from a pit in an Early Neolithic settlement at Thornhill, County Derry (Logue 2003: 151). As presented in Burgess' (1990: 158) in-depth review, cup marks are known from numerous Neolithic monuments throughout Europe, though these are not often from sealed contexts. Sites where the cups do seem to predate the construction event include the Carnanmore passage tomb, County Antrim, which also features megalithic motifs on other stones (Herity 1974:79; Burgess 1990: 158), the Bohonagh boulder burial (Waddell 2000: 172), and numerous sites from passage tombs to ring cairns in Clava, north-east Scotland (Burgess ibid), though these sites span the Neolithic and Early Bronze Age periods. At Dalladies, in Kincardine, a cup-marked slab was recovered from beneath a Neolithic long mound in a weathered and broken condition (Piggott 1971-2: 44; Burgess 1990: 158; Waddington 1998: 32). At Milfield South henge, Northumberland, a stone with a single cup mark was recovered from a central pit where primary deposits were dated to 2900-2000 BC (Harding 1981: 93-100; Burgess 1990: 161; Waddington 1998:54).

Examples of cup marks are also known from sealed Neolithic contexts, right through into early Christian contexts (Figure 2.14; Hadingham 1974: 95-8; Lacy 1983: 282-3; Van Hoek 1987: 43). The presence of cups on Early Christian monuments also raises the question of the extent to which cup and cross-marked boulders may even be entirely Early Christian in date. These sites do however need to be treated on a case-by-case basis, as demonstrated by the outcrop at Ballintlea, Dingle, which does seem to be a genuine example of combined prehistoric and historic carvings (Figure 2.15). Clearly, cup motifs exhibit a particularly long chronology, as noted by Waddell (2000: 168). Once again, contrary to the argument proposed elsewhere (Waddington 1998: 32), the cups alone cannot be used to infer a date for cup and ring rock art.

A brief consideration of some of the other problematic stones also reinforces this idea that multiple interrelated traditions can be teased out of the overall corpus of prehistoric carved stones encompassing both megalithic and rock art. The decorated stones at Cloghanmore court tomb of Malin More, Donegal, and at the Clover Hill megalith in Sligo, are considered by Shee Twohig (1981: 235) to be Iron Age in date, based on the nature of the motifs. The Cloverhill motifs share similarities with those at Listoghil, Carrowmore (Curran-Mulligan 1994; O'Sullivan 1994). Similar chronological implications have been proposed for the Newtownbalregan stone (Figure 2.16; Shee Twohig pers.comm.). This conclusion is drawn on the basis of the presence of unusual motifs reminiscent of the *La Tène* style associated with Iron Age decorative traditions. The stones feature the swirling and top-and-tailing tendril forms akin to the 'comma leaf', 'birds head', 'three-sided voids' and 'trumpet curves' of *La Tène* style carving and metalwork (Duignan 1976).

Problematically however, whilst the basis of the motif designs is broadly similar, there are notably few parallels for pecked designs on stone panels from secure Iron Age contexts. In contrast, the rare examples of decorated stones from the period represent altogether different approaches to stone sculpture, including sophisticated three-dimensional compositions such as that of the Turoe Stone from County Galway and the Corleck head from County Cavan (Waddell 2000: 361-365). These stones make use of false relief and what amounts to a kind of *trompe-l'œil* whereby the viewer is challenged to determine whether the forms are continuous through space or made up of separate parts. What is more interesting is that some designs from secure megalithic sites also exhibit examples of '*La Tène*-style' motifs. At Knockmany, County Tyrone, there is a motif that exhibits broadly similar morphological characteristics to the *La Tène* forms described above (Figure 2.17). It corresponds to the 'comma leaf' form and doubles back on itself, both characteristic features of the *La Tène* design. The motif is deeply carved in comparison to some of the other motifs on the stone, but it also impacts on the morphology of a serpentine motif by bracketing one end and causing the design to taper off. This relationship suggests that the motif is either contemporaneous with, or predates the serpent, a classic megalithic motif. Secondly, at Pierowall passage grave, Orkney (Davidson and Henshall 1989), a multiple spiral motif bearing strong resemblance to those in other Late Neolithic contexts (Temple Wood stone circle, Achnabreck's rock art panels, the Knowth macehead and Barrow Hills grooved ware) features both the 'comma leaf' and 'trumpet curve' or 'three-sided void' (see Bradley 1997: Figure 7.3).

These are admittedly rather rare examples, but nevertheless they are cases that prove the point that stylistic similarities do not necessarily equate to chronological equivalence. Making chronological assumptions *purely* on the basis of motif morphology arguably risks resuming the kind of theories put forward decades ago (Anati 1963; Coles 1965), suggesting similarities between the Derrynablaha motif and Late Bronze Age shield designs (see also Shee and O'Kelly 1971). This is dangerous ground indeed. As with the other 'Iron Age' candidates, in technical and morphological terms, the Newtownbalregan stone is much more in line with the megalithic decorative tradition. These feature simple pecked designs, the forms of the motifs outlined in regular grooves, and the focus is on a single flat face (though additional designs are present on the side surfaces of the Newtownbalregan stone). As is so common in megalithic art, combinations of techniques on single surfaces can be seen in the varying degrees of 'finish' evident on the Newtownbalregan stone. As O'Sullivan (1988: 160-1; 1994; pers.comm.) has hinted, these unusual designs may point towards a possible 'northern tradition' within the Republic of Ireland, which varies in stylistic terms from the better known passage tomb art of the southern regions.

This complexity of traditions is also evident within the rock art repertoire – in Monaghan and Mayo there are several examples of stones with circular motifs lacking any central design element. This is normally considered to be a feature of megalithic art, but the large outcropping surfaces at Drumcoggy, County Mayo, provide sound evidence that this need not always be the case (Corlett 1999; Figure 2.18). There are however very few double rings without cups in rock art, let alone triple rings, as seen in the Ballinvally stone. There is one quadruple-ringed example from Meath (Clinton 1983). In Cork and Kerry there is a series of panels with cup-less rings. Gortnagulla and Ballybane feature single 'empty' rings (Finlay 1973: 54, 103), and the latter features one double ringed example. Both stones also exhibit other slightly unusual motifs, very large enclosure motifs in the former, and rectangular motifs in the latter (ibid) as discussed further below. There are also occasional single examples elsewhere, such as Derrynablaha 17 and Coolnmaharagill Upper (ibid: 87, 52). This creates considerable difficulty in interpreting the Ballinvally cist, with its composition possibly truncated through breakage (Shee 1972: 229). If one accepts the breakage as evidence for re-use, this cist cover could just as easily be considered to be re-used rock art, or re-used passage tomb art. If the 'possible' breakage is not accepted as evidence for re-use, then this stone could alternatively be interpreted as part of a distinct but related decorative tradition associated with cist burial. These examples again point to the blurred nature of the divide between the passage tomb and rock art traditions.

Interpreting motifs in monuments

As well as occurring in passage tombs and EBA funerary contexts, rock art motifs are also found on other megalithic monuments of the Neolithic and Bronze Age. This topic has received rather less attention in the wider rock art literature to date, particularly in terms of chronology (though see Waddington 1998 and Burgess 1990). Some are seemingly from sealed contexts within Neolithic burials, though again these include cup marked stones such as that at Drimnagh, Dublin, where a cup marked stone was recovered from beneath a mound over a Neolithic Linkardstown Grave (Kilbride-Jones 1939; Waddell 2000: 103). This site has been interpreted as dating to the Late Neolithic (Waddell ibid). However, in a thorough appraisal of the radiocarbon dates for Linkardstown burials they have consistently been shown to be Middle Neolithic (c. 3525-3350 cal BC) in date (Brindley and Lanting 1989-90: 3-5). As an example from a securely dated Middle Neolithic context, this stone is of considerable significance, and to date represents the earliest known carved stone in Ireland. Linkardstown monuments also have much in common, in terms of architectural design and construction, with passage tombs. Thus the occurrence of decorated stones in both monument types is well in keeping with these broader trends.

In addition to the cup marked examples however, two cases also feature actual cup and ring motifs. At Cairnholy I, a Neolithic chambered cairn in Kirkcudbrightshire, a cup and ring marked stone was recovered from the internal chamber. The stone was spatially associated with a small deposit of cremated bone and some unidentifiable pottery sherds (Burgess 1990: 166-7; Morris 1981: 170; Johnston 1989: 137). Burgess (ibid) argues that due to the ‘default’ EBA date assigned to rock art, the pottery came to be interpreted as EBA in date, and in turn this was used to suggest that a secondary burial had been inserted into the monument. On the basis of the disturbed nature of the chamber deposits, and the practical difficulties of inserting a secondary interment, Burgess (ibid) undermines the association between the ‘EBA burial’ and the rock art slab, suggesting instead that the rock art was more likely to have been associated with the original Neolithic construction phase. Whilst doubt remains, this stone cannot be relied upon as sound defence for the Neolithic date.

Similarly Burgess (1990: 167) argues for a Neolithic date for the multiple cremation burial at Lilburn, Northumberland. This site was unearthed during ploughing in 1883, and only sketchy diagrams of the burial are available (Moffatt 1885). As a result, it is likely that the debate over the Neolithic versus EBA chronology of the site will continue. Furthermore this stone also features spirals, motifs which are much more in line with the megalithic art repertoire than that of rock art. Until a Neolithic site containing ‘quintessential’ cup and ring motifs from an unquestionably secure context can be identified and dated, uncertainty will remain as to exactly how far back into the Neolithic the date for outcrop rock art can be pushed.

The majority of rock art motifs associated with monuments are situated on the exposed stone surfaces of portal dolmens, standing stones, wedge tombs, stone alignments, and stone circles

(Van Hoek 1988: 24-5; Power 1992: 22; Fahy 1959; Cuppage 1986: 20-6, 38-9). As in the case of the funerary monuments, the question here is whether the motifs were designed specifically for the monument, applied after the erection of the monument, or whether the carvings represent re-used rock art from formerly *in situ* living outcrops or erratic boulders. Examples where excavation evidence suggests the motifs were carved prior to the erection of the megaliths are rare (e.g. Ballymeanoch, Argyle; Barber 1977-8; Burgess 1990: 166). Whilst in general these cases do lend weight to the idea of reuse, they do not clarify just how much time might have separated the carving event(s) and monument creation. The majority of pecked motifs in portal and other unclassified tomb types consist of cup marks, and even here, these are frequently on accessible surfaces, rendering their date even more ambiguous. The association between cup marks and megaliths is widespread across Europe (Le Goffic 1997) and again, these simple cups do not cast light on the chronology debate for cup and ring art. In Cork and Kerry alone, Finlay (1973: 167-8) lists fifteen wedge tombs which feature rock art, though again the designs are mainly cups and include 'incised markings', and therefore few can be related to cup and ring rock art. This is also the case at Loughash wedge tomb, Tyrone, where an orthostat features twelve cups (Waddell 2000: 95), and at Ballyedmonduff (Ó'Ríordáin and De Valera 1952: 71). Similarly, cups are known on portal dolmens in western Britain (e.g. Bachwen, Pentre Ifan (Burgess 1990: 158; Waddington 1998:32) and Ratho (Simpson 1867 cited in Waddington ibid)).

Two of the four carved stones in the Ballyhoneen wedge tomb in Kerry feature cups and rings (Figure 2.19). The range of motifs here is interesting. All fit comfortably with the range of motifs on outcrops in the wider Dingle area. All but one of the panels could easily represent re-used rock art on what were once erratic boulders. However one panel stands out from the others. A line of cups runs along a narrow side face of one of the capstones (Figure 2.19). Their position on a side face is more difficult to explain in terms of the (probable) original orientation of the boulder. It is notable then that, unlike the other panels in the tomb, this one features only cups, and that these are unusually roughly pecked and small in size, particularly compared to the line of cups at Ballintlea, where they are deeper, and perfectly formed. This interpretation remains speculative, but it is possible that this panel was specifically carved for the wedge tomb, whilst the remaining stones are reused rock art panels.

Interestingly, there are notably few examples of 'quintessential' rock art in court or portal tombs, some of the earlier Neolithic tomb types in Ireland. Though he states incorrectly that wedge tombs do not feature motifs, Burgess (1990: 160; cf Finlay 1973: 167-8 and Cuppage 1986: 21) has also noted the absence of motifs from specific types of tombs such as court tombs, suggesting that this may indicate an intentional pattern. It remains unclear whether this is a piece of negative evidence for a Neolithic date; that is if rock art was contemporaneous with these monuments, perhaps it simply was not appropriate to re-use active monuments in the construction of contemporary tombs, as we see occurring in later structures. If so, this renders the fact that it was acceptable for rock art type motifs to occur in passage tombs even more significant, creating a stronger link between the two traditions.

As a possible portal dolmen, the case of the monument at Rathkenny in County Meath is a tantalising one, but yet again there are problems in identifying which tradition the decoration falls into (Figure 2.20). The monument consists only of a single orthostat and capstone, both featuring motifs on their inner surfaces, and there are few clues as to its original form. Two motifs on the orthostat have attracted special attention (J. Raftery 1939; Rynne 1972: 94, Note 1; B. Raftery 1984:303; Johnston 1989: 118-9; Shee Twohig 1981: 236). The first is an enclosed triskele and the second consists of a D-shaped ring with a rectangular attachment, interpreted by J. Raftery (ibid) as a representation of a 'mirror case' ornament. The remainder are plain circular or oval rings, cup and rings, and arcs. J. Raftery (ibid: 261) notes that the motifs share the same technique of manufacture (pecking), evidence he interprets as supporting the idea that the designs are entirely contemporaneous. As mirror-case designs are a common feature of the *La Tène* tradition, the Rathkenny carvings (along with the monument itself in the case of J. Raftery) were thus interpreted as dating to the Iron Age.

However, the triskele appears to be much finer and more detailed than the other motifs, though this may be in part due to the touched up nature of the published photograph. Shee Twohig published drawings of the motifs, partly based on Tempest's photographs (1981: Fig. 284). Here the triskele and 'mirror ornament' motifs are somewhat indistinct in form. A parallel within rock art for the latter design can be seen at Ballybane (Finlay 1973: 103) where a circular ring is abutted by a small rectangle. Though Ballybane itself features some unusual designs, this raises doubts over the identification of the Rathkenny motif as an Iron Age 'mirror-case' ornament. Thus, apart from the triskele, and a tendril form on the orthostat, the remaining motifs would be comfortably in keeping with both the traditionally accepted motifs of megalithic art, and the rock art repertoire that now incorporates the cup-less rings of Drumcoggy and elsewhere (Corlett 1999). As at Rathkenny, the Drumcoggy outcrop features adjoining rings, some of which take on more oval forms. As discussed above, there is also a strong argument for tendril forms to be accepted as (rare) components of megalithic art. As it falls outside the study areas dealt with in detail here, the opportunity to inspect the stones has not arisen. However the potential significance of this site suggests that it deserves further scrutiny in the field in order to comment further on its potential role in the chronology debate. A second commentator used the presence of the different motif types to infer that three phases of carving are represented on the monument (Tempest 1939: 254-255). However, if different phasing can be determined through field inspection, then this would open up the possibility that the triskele motif was a later addition to an earlier composition.

As Corlett (1999:51) has noted, the Drumcoggy motif repertoire is unusual. The cup-less rings are more frequently seen in megalithic art, including the Knowth (Eogan 1986), Dowth (O'Kelly and O'Kelly 1983), and Newgrange corpus (O'Kelly 1982). This site could be interpreted in two ways – do the Drumcoggy motifs enlarge the rock art repertoire (keeping in mind that we also see varying cup-less forms in Dingle and Monaghan; see Chapter 6), or are they megalithic art motifs occurring in the unusual context of outcropping rock? The rayed motif on Roughting Linn or the overlapping rings at Greenland, Scotland could also be described in these terms (Twohig 1988: 42, Fig.3; Beckensall 1999: 98). These ambiguities and overlaps again serve to bring these two traditions closer together, reinforcing the possibility that they were broadly contemporaneous, and that they are perhaps best interpreted as interrelated regional variations on a theme, rather than chronological developments in an evolutionary (see Shee Twohig 1981: 121-122) or devolutionary sense (Finlay (1973: 160). If seen in such a light, our interpretations of the role of megalithic tombs can potentially broaden our understanding of how rock art sites functioned in social and ideological terms in the past. That is, the two may simply have been regional variations, at times overlapping one-another, within a widespread ritual tradition.

Waddington (1998: 42-3; 1999) has discussed the possibility that instances where rock art panels are incorporated into megalithic monuments represent intentional reworking and appropriation of an earlier tradition. This line of evidence forms an important part of his argument that rock art, as a practice where living rock is carved, significantly predates the alternative treatment of carved stone in monumental and burial structures. The problem here is that it is often difficult, if not impossible, to establish whether the motifs might have been applied before or after construction, since in many cases the motifs are found on the external surfaces of the monuments. In some cases petroglyphs are present on internal or inaccessible surfaces. However, this situation still leaves the question entirely open as to whether the designs were applied as part of the construction project, or whether they predated the construction activity. As a whole, this corpus of monuments probably has much to offer our discussion of chronology. If investigated in detail, the geological weathering and motif placement evidence may offer subtle (if circumstantial) clues as to the sequence of events leading to the construction of the monument.

The re-use of carved panels in Bronze Age burials, may suggest a continued belief in the importance attached to earlier natural outcrops and earthfast boulders (Hewitt 2001), though it is not clear whether the presence of rock art motifs themselves was instrumental in the selection of locations for these monuments, or whether both the rock art and the cairns simply relate to some deeper significance embedded in the natural landscape. The positioning of motifs within burial monuments exhibits considerable variation even within single monuments. Whilst some panels in the Weetwood cairn (Northumberland) and the Ballyhoneen Wedge tomb (Dingle Peninsula) are displayed on the outer surfaces of kerbstones and capstones respectively, others were ‘hidden’ within their structure. This may indicate that the stone and its provenance were more important considerations than the active display of the motifs themselves (ibid). If so, this is suggestive of a system of meaning deeply embedded in landscape and place.

The ‘Ardmore Effect’

A piece of intriguing evidence that does support the claim for the re-use of rock art panels as megaliths a significant time after the carving event, comes in the form of the inversion of the ‘grammatical rules’ governing rock art motifs. It is well known to students of Irish and British rock art that a distinct set of structuring principles or ‘grammatical rules’ underlies the arrangement of motifs across living stone surfaces. This aspect is discussed in further detail in Chapter 6. A key observation that consistently recurs is the orientation of radial grooves or ‘tails’ running out from a cup and ring motif. Where these motifs occur, the radial groove consistently runs down-slope across the rock surface, either in response to local undulations in the topography of the stone, or in response to the general slope of the surface (Morris 1977:13; Morris 1979: 20, 28; Clarke 1982: 115; Johnston 1989: 80-2). In the case of the latter, where several of these motifs occur, a consistency in orientation can be observed so that all of the radials run in roughly the same direction. This orientation is consistent across stones exhibiting different degrees of slope, from the near-vertical cases at Drumirril, through to those that are virtually horizontal, but with a slight slope. The ‘radial rule’ seems to be slightly altered when a perfectly horizontal surface is carved – in such cases we sometimes see multiple radials, for example at Drumcarbit, Donegal, and Weetwood Moor, Northumberland. Neither does this rule apply to grooves of all types – for instance the gridlike networks of Iveragh feature grooves running in several directions. This rule therefore only applies under specific conditions, but it *does* apply when dealing with vertical surfaces.

This behaviour is an important part of the distinctive sensitivity of rock art to its natural setting. This orientation encourages any water present on the rock surface, which often collects in the cup depressions, to run down the radial grooves. Waddington *et al.* (in press) have noted that the motifs at Hunterheugh Crags, Northumberland, appear to have been intentionally positioned across the topography of the stone in order to facilitate these ‘watery connections’ between the motifs. Such sensitive interplay between the motifs and the topography of the stone surface has also been noted in other rock art corpuses, such as the observation (and documentation via photogrammetry and total station survey) that the skiers depicted on the Northern Russian panel at Karelia actually ski down the slopes of the panels and walk across horizontal and upslope areas, as depicted by their ski tracks and footprints respectively (Janik and Roughley 2003). These observations lend support to the idea that the stone surfaces supplied miniature landscapes across which rock art motifs could be used to construct a narrative that could be retold time and again.

Two examples from Ireland offer important evidence for an apparent cessation in the relevance of this grammatical rule. One example comes from the townland of Ardmore on the Dingle Peninsula, and (coincidentally) the other from Ardmore, Inishowen Peninsula, and both feature ‘quintessential’ rock art motifs. An interesting phenomenon, dubbed here the ‘Ardmore effect’, can be observed in these two monuments. When we look at the two Ardmore examples, the fundamental structural rules governing radial grooves seem to have been quite literally ‘turned on their head’. In the case of the stone alignment on the Dingle Peninsula (see Figure 1.29), the decoration lies on the southwestern surface of the outlier stone facing towards the extensive valley system below. This stone is a former erratic boulder, and its decorated surface is gently convex in form, and smooth in texture. There are no motifs on the opposing or side faces. The geological weathering evidence suggests that, prior to its erection within the alignment, the southwestern surface was most likely to have been the exposed upper surface of the erratic boulder. It is significant then, that here the radials run consistently towards the left side of this face, towards the edge of the stone where the surface slopes away more sharply from the raised central area. In rock art terms this makes no sense – the radials should, by definition, be running downslope towards the base of the erected stone.

Though this interpretation must remain conjectural, it seems highly likely that this stone has undergone two quite separate phases of transformation. Firstly, motifs were pecked into the exposed upper surface of an erratic boulder that lay prone on the ground, and had already been weathered to a smooth convex form, ideal for carving. The motifs were applied according to the traditional structural principles, so that the radial grooves ran consistently down-slope, sensitively acknowledging the natural undulations of the stone surface. At a later point in time, this rock art boulder was selected for re-use in the construction of a stone alignment. This large decorated boulder, being different to the other undecorated boulders, was probably intentionally selected for use as the outlier. The erratic was raised, revealing the relatively rough lower surface that had been lying face down. In its new attitude, the structural rules so sensitively adhered to in the earlier phase were displaced, reflecting a shift in the understanding or significance of these principles in the minds of those constructing the monument (Figure 2.21). This may have been simply in response to the physical requirements of the monument – the long axis of the stone simply needed to be upright in order to most effectively form a standing stone.

At Ardmore, Inishowen, a decorated standing stone again features motifs primarily on one southwestern face (Figure 1.13), though a possible cup mark was identified on the northeastern side. The monument appears to be a genuine standing stone, and was partially excavated in the late 19th Century (Graves 1877). There are few details available for the results of this somewhat informal investigation, but a deposit containing frequent bone fragments, at the time interpreted as non-human, was noted at the base of the decorated surface (ibid). Whether the bone was deposited at the time of the erection of the stone, or some time afterwards, it seems likely that its deposition at the base of the *decorated* face was intentional rather than incidental. Interestingly, cremated bone was also reported from the base of one of the carved standing stones in the alignment complex at Ballymeanoch, Kilmartin (RCAHMS 1999: 73). Again the geological weathering evidence at Ardmore suggests that the decorated surface once formed an exposed horizontal face, but this time as part of a stone outcrop. The upper half of the decorated surface undulates to incorporate a large natural depression that appears to have been formed by the weathering action of water, which probably collected in a natural hollow that slowly increased in size over time. The upper edge of this face features a natural curved notch or lip where the water overflowed out of the depression and down into the surrounding soil. The opposing face is devoid of motifs, and is remarkably flat and even. This is probably due to the panel having been, either by natural or human forces, or both, cleaved away from a larger outcrop.

When we look at the structuring principles here the situation is even more striking than in the Dingle alignment. Here, the grammatical rules for radial grooves have been literally inverted, so that the radial 'tails' now run consistently up the surface of the standing stone (Figure 2.22). Again, this makes no sense in rock art terms. It strongly suggests that this is another case of the re-use of a former rock art panel, rather than a purposefully decorated standing stone, or a standing stone decorated after its erection. Since motifs on the vertical faces of living rock consistently observe the 'radial rule', it seems highly unlikely that the 'inverted' grammar seen in the Ardmore cases was simply an intentional part of the new monument-based context of these motifs. Though the length of time required for the re-use of these stones to have become socially acceptable remains uncertain, this evidence does seem to support an earlier (i.e. Neolithic) date for the original creation of the motifs. Some might interpret this inversion of former rules as the deliberate and powerful subversion of former symbolic systems and their 'normal' mode of use within a new context. However, with just two definite examples from the entire Irish corpus, this is perhaps stretching the current evidence a little far.

Though the Ardmore effect is intriguing, we need to be specific about what exactly this evidence means. These two sites suggest that, at least in some cases, motifs on megalithic monuments represent the re-use of older rock art boulders or outcrops. In these cases the rock art appears to significantly predate the monument construction. It does not follow that this was the case for all decorated megaliths, and each case must be analysed on its own merits. It does however require us to work much harder to identify any cases where the decoration *must* have been associated with either the construction phase or a subsequent phase. This is probably a much more difficult task, and one beset by an unsatisfactory reliance on negative evidence.

There are also examples where the radials *do* adhere to the grammatical rules of rock art, such as the standing stones at Kilmartin (RCAHMS 1999: 73, 76; Figure 2.23). In these cases we cannot glean chronological evidence from the motifs themselves. Neither is it sufficient, for instance, to base a conclusion on the carvings being applied to the most smooth surface, since this could clearly have been chosen after the erection of the megalith due to its suitability for carving. There are also examples where the two main faces of a standing stone are both decorated, usually with simple cups (e.g. Carndonagh in Van Hoek 1988: 21). This suggests that at least some of the decoration either dates to, or post-dates the erection of the stone. It must also be remembered that in by far the majority of cases decorated megaliths feature only cup marks. In addition to the problems of using cup marks to date cup and ring art discussed above, cup marks do not usually exhibit an observable orientation and therefore, in most cases, cannot contribute to this discussion. Where a line of cups is featured on an *in situ* rock art panel though, these generally run horizontally across the surface, even where there is a choice to be made regarding orientation (Figure 2.15). Thus, the occurrence of such formations on standing stones, where they run vertically, could possibly represent re-use. However with cups so widely present in monuments and thus potentially having their own grammatical rules that are unique to these contexts, the chronological implications of this observation are less certain. On the basis of the 'Ardmore effect', we can define a set of criteria for identifying re-use of unbroken rock art panels as uprights (orthostats, standing stones etc.) in megalithic monuments, where ideally:

1) The panel features an undecorated face representing the surface that was formerly the face-down surface of a boulder, or was formerly attached to an outcrop.
2) The geological and weathering evidence supports the identification of what was originally the upper surface of the former boulder or outcrop.
3) The grammar of the motifs appears to have been displaced.

The case of standing stones is interesting since, along with wedge tombs, they represent another monument type that seems to span the late Neolithic to EBA periods (Cooney 2000a: 131-2). If an example exhibiting the 'Ardmore effect' could be found on a definite Neolithic candidate that also featured quintessential rock art, then this would provide support for the late Neolithic *terminus ante quem*. As a means of summarising the key factors in interpreting the chronological relationship between rock art motifs and monument construction, Table 1 demonstrates the main questions that can be applied and resolved on a case-by-case basis.

Once we accept that at least some decorated megaliths represent re-use of rock art panels, we arrive once again at the problem that has been discussed in more detail in terms of the incorporation of petroglyphs into funerary monuments. That is, was this re-use intentional and applied in a 'thinking' manner, or purely incidental and responsive only to the physical and structural requirements of the monument itself? Does this represent evidence for ongoing symbolic significance with some re-working of traditions, or is the presence of the motifs purely incidental? This question also contains two important and separate parts. First, were the stones specifically selected for use in the monuments over other available stones, and secondly were the decorated faces intentionally positioned within the structure of the monuments? Caught up in this discussion is whether the re-use of *in situ* rock art panels also represents the re-use of places in the prehistoric landscape (see Chapter 4). These questions are points of contention for rock art in funerary monuments, and as with so many archaeological conundrums, it is unlikely that we will arrive at a consistent answer applicable to all cases.

It seems likely that in many cases the re-use of these stones *was* sensitive and responsive to the presence of the motifs. The fact that the decorated faces at the two Ardmore sites seemed to be lent additional significance as an outlier, or as the face beneath which bone fragments were deposited, seems to imply intentionality (see also Morris 1977: 14). A similar situation can be seen in recumbent stone circles such as that at Drombeg, County Cork, where it was the single recumbent stone itself that featured rock art motifs (Power 1992: 22). Likewise at Athgreany stone circle, Wicklow, it is an outlier that features several cup marks (Corlett 1999: 52). The only cup marked stone (Stone 10) in the circle at Culdaff, Donegal, lies along the axis aligned to the summer solstice sunset (Boyle Somerville 1929: 152; Prendergast pers.comm.). This may echo an earlier practice, demonstrated by a possible cup mark recently discovered on a tomb at Carrowmore that also exhibits a solstice alignment (Prendergast pers.comm.). These examples reflect a wider pattern that is also evident in Britain. For instance, a decorated stone was positioned at the entrance to one of the later phases of Croft Moraig stone circle (Bradley and Sheridan 2005).

Bearing in mind the continued significance of cup marks into the later Bronze Age such intentionality is not unexpected. Indeed, we might even extend this response to include the use of decorated stone in much later structures, such as souterrains. At Ballybarrack and Newtownbalregan, County Louth, the souterrains featured re-used rock art panels as a doorjamb and passage capstone respectively (Figures 2.16 and 1.21). In both cases the striking and clear decoration would have been visible to those entering or passing though the souterrains. At Newtownbalregan there is even a light alcove positioned nearby in the souterrain passage (Bayley 2005: 12). Clinton has noted that examples where the decoration is hidden on the back face remain infrequent (2001: 67), though this might arguably be to use the flattest face along the surfaces of the souterrains passages, as Burgess (1990) argues for the EBA cist panels. One exception is the megalithic panel from Tateetra, Louth, which was positioned as a souterrain capstone with its carvings hidden (O'Connor 2005b). However, it would seem likely that the presence of the motifs was not lost on the souterrain builders. Hadingham has emphasised that Scottish examples also tend to employ the carved stones in prominent positions (1974: 91). This need not imply that some manner of ideological significance was still attached to such motifs, though this is possible, even if only in the broad sense of significance attached to 'the past' and 'things ancient'.

So far, this discussion has described what can be seen as several distinct yet interrelated rock art traditions; quintessential rock art, passage tomb art, small votive cupstones (often with just a single cup), carved or re-used burial slabs, and carved or re-used megaliths (within which plain cup marks can be separated from other motifs). All at least partially fall within a broad tradition of cup marking which spans an extraordinarily long duration of time. As a means of visualising the relationships between these traditions, Figure 2.24 demonstrates the manner and extent to which they overlap and interrelate with one another. In Figure 2.25, very approximate chronological periods are given for each of these traditions, based on the evidence discussed here. This figure highlights the significant contrast between earlier and later Neolithic carving traditions, partly due to the appearance of traditions involving the re-use of carved stones. Such a broad scale shift is well in keeping with general interpretations of the period, which have emphasised similar divisions for the major developments in material culture and monumental architecture as being more readily apparent in the archaeological record than a traditional tripartite sequence of early, middle and late (Cooney 2000: 17).

Excavation evidence

Recent research has seen a new direction in approaching rock art come into play, in the form of archaeological excavation. As discussed in detail in chapter 5, though findings must be treated as strictly circumstantial, this research potentially offers additional fuel for the chronology debate. As noted below, the excavations conducted as part of this research project in the townland of Drumirril, County Monaghan (O'Connor 2003a), have become something of a turning point, breaking the ice by taking the risk of potentially finding little evidence and setting the ball rolling for others (Jones pers.comm., 2005; Waddington pers.comm.; Waddington *et al.* in press). At Drumirril a modest range of finds was recovered, the dates of which are well in keeping with a Neolithic origin for rock art (though the radiocarbon dates also indicate that a later horizon of Early Christian activity also occurred at the site). In close proximity to two clusters of outcrop rock art, Early and Middle Neolithic pottery fragments were recovered. The former had been deposited in a pit several metres from the rock art panels. The pit also contained minute fragments of flint and cremated bone, and quartz cobbles had been set into its base. The pit was truncated and disturbed by recent ploughing activities leaving the pottery sherds scattered, but more concentrated in the area of the pit feature. These activities appear to have resulted in the mixing of the early Neolithic deposits with charcoal yielding Early Medieval and Iron Age dates (see Chapter 5).

Two fragments of Middle Neolithic pottery were also recovered. One came from the base of the ditch cut of a ditched-and-banked enclosure. This encompasses four rock art panels that are positioned in a remarkably central location within the enclosure. The second sherd was found within a deposit overlying the outer slope of the enclosure bank. The chronology of the enclosure itself remains unclear at this stage. As discussed in Chapter 5, the excavations also revealed evidence for an oak post structure on a small terrace within the enclosure. The radiocarbon dates clearly indicate an Early Christian date for this internal structure. It is possible, therefore, that the enclosure significantly postdates the rock art. In this case, the pottery would seem to have been disturbed and redeposited during later activities. However, this cannot be established without further excavation and retrieval of datable materials.

In addition to the pottery, the excavations also recovered a Late Neolithic-EBA flint round scraper. Specialist analysis suggests that the form of this artefact is more in keeping with Late Neolithic types (G. Warren pers.comm.). This find adds further weight to the Neolithic date for the early use of the site. However the context of its recovery is puzzling. This find was recovered from the very centre of a sealed deposit of burnt material, immediately beside the remains of a central burnt post within a large stone-defined pit. Charcoal from this deposit, as well large fragments of oak charcoal from the surrounding postholes, have consistently produced Early Christian dates. Though this interpretation must remain tentative, the scraper could feasibly have been found on the site during the Early Christian activity, or brought from elsewhere as a recognised cultural object, and deposited appropriately. The complexities of the dating evidence are discussed in further detail in Chapter 5. For the purposes of the discussion on rock art chronology, it is sufficient to note that the evidence of a range of Early, Middle and Late Neolithic artefacts from Drumirril supports the idea that the site was actively used from at least the Neolithic period onwards. Though the associated artefacts cannot be used to date the carved motifs themselves, they raise the likelihood that rock art originated as a Neolithic practice.

In Britain, there have been a small number of excavations at rock art sites. These are detailed in Chapter 5, but some deserve mention in the context of the chronology debate. Until recently, Backstone Beck at Green Crag Slack, West Yorkshire, was probably the most significant excavation to investigate *in situ* rock art in Britain, though the excavation was primarily directed towards investigating a large curvilinear enclosure (Figure 2.26). In close proximity to the rock art at Backstone Beck, areas of burning and scatters of Late Neolithic flint were uncovered, along with pottery fragments that remain unidentified (Edwards 1986; Edwards and Bradley 1999, Bradley 1997: 60).

Since then, Waddington, Johnson and Mazel (in press) have excavated an area around a carved outcrop on top of which a Bronze Age burial cairn, with both a primary and secondary burial, had been built (Figure 2.3). Unlike the Fowberry 'cist quarry', in this case we do have the quarried slab, complete with weathered motifs, and this is incorporated into the EBA cairn. Waddington *et al.* (in press) argue that the site provides evidence for the production of rock art both during the Neolithic and EBA. This is based on differential weathering, and the series of events interpreted as having taken place, including a period of quarrying. The site features weathered motifs (Phase 1) on natural outcrop surfaces, and fresh motifs (Phase 2) exclusively carved on surfaces that were exposed during the quarrying. Thus, as at Dumbarton, these phases are interpreted as respectively post- and pre-dating the quarrying. The fresher looking motifs are exclusively carved on the quarried surfaces, again suggesting that some sort of symbolic 'compensation' or votive thanks was being offered (ibid). The quarrying is seen as directly linked to the EBA cairn construction phase, and the differential weathering is considered to represent a substantial time difference, hence the argument for Phase 1 having occurred well back into the Neolithic. Interestingly, the two phases are also characterised by different styles, the first responsive to the natural topography of the stone, the second less so, and more "crude" and deeply carved in form (ibid). These observations echo those made by Connolly (1991: 37-8) who noted two contrasting styles in the south western Irish rock art; one featuring well-defined, deeply carved, and carefully composed motifs; the other exhibiting broad, shallow, flat grooves that are less carefully defined and composed. This contrast lends us an important insight into the information that style might potentially tell us about the internal chronology of outcrop rock art, as we come to look at this question in increasing detail.

Two quarried segments of stone incorporated in the cairn were identified as having come directly from the outcrop. A large section (Panel 2) had been quarried, and dragged 20cm across the centre of the rock for use in the cairn. This stone exhibited weathered motifs, while the second was undecorated. The cairn had apparently been denuded (probably for construction of a Romano-British field boundary), and so its exact extent is not known. Other than Panel 7, which lies beneath an area of cairn collapse, the existing *in situ* cairn did not seal the Phase 2 motifs, with several recorded by Beckensall (2001) prior to the excavation. During the excavation it was found that the weathered Phase 1 carvings were covered with the same amount of topsoil and turf as the fresher Phase 2 carvings, and this is presented as evidence that the differential weathering equates to chronological separation. Until the new motif plan is published it will be difficult to determine whether other taphonomic processes, and more complex changes in the extent of exposed outcrop might also have, over time, contributed to the weathering process. As discussed above, differential weathering is a complex issue, and though the recovery of a fragment of what *may* be a Neolithic polished axe at the site is in keeping with the interpretation that the Phase I carvings date to this period, there is no independent dating evidence to verify this theory.

The main concern in terms of the EBA date is the certainty with which we can link the quarrying and cairn construction, the two events sandwiching the Phase 2 carvings. For instance, whilst two slabs from the cairn were identified as having been quarried from the outcrop, Waddington *et al.* (in press) state that the destination of the majority of quarried stone remains unknown. If there is a chance that the quarrying was not entirely linked to the cairn construction, then this raises doubts as to the length of time that might have passed between the two, and how the application of the motifs to the quarried surfaces fits into the sequence. Neither is there absolute proof that the weathered Phase 1 carvings were Neolithic in date, just that they predate the quarrying which predates the cairn construction. Therefore, the cairn provides the only secure *terminus post quem* for both phases. In terms of economy of hypothesis however, the authors' interpretation certainly does seem to provide the most elegant explanation. As such, the site presents perhaps the best evidence yet for the practice of rock art continuing into the EBA.

Furthermore, only cup marked mobiliary stones (most described as quarried and with fresh pecking) and a quarried stone with weathered carvings were incorporated into the cairn structure. It is not entirely clear from the report whether the mobiliaries were Phase I or II carvings or whether the cups were applied to quarried surfaces. This makes the interpretation of this site somewhat unique – that in the EBA people carved freshly quarried outcrop surfaces, but only incorporated Neolithic or plain cup marked rock art into the cairn structure. This varies from the situation argued for the other EBA candidates from funerary monuments – that either EBA carvings were applied directly to the stones for use in the structures, or the panels represent re-used rock art motifs.

The overriding difficulty with rock art chronology is that what we really need to provide absolute proof is something that simply may not exist - the presence of classic rock art in an uncomplicated, sealed, and incontrovertibly *Neolithic* context, and / or the presence of rock art that is unquestionably purpose-made for an EBA monument. Millin Bay is a likely, though unresolved, candidate. The 'catch 22' for the former is of course that if these sites were in active use during the Neolithic then it is less likely that they would become reused and incorporated into sealed monumental contexts (i.e. having gone out of original use) during this time. What recent excavations at Drumirril suggest is that it may indeed prove fruitful to search for deposits overlying the art, and that this may be a way forward for testing the Neolithic date (see Chapter 5). In the case of the latter, intentionality appears to be rather difficult to prove. A slab where both sides were carved with quintessential rock art, or a slab where the carving appeared to be definitely designed to fit its placement in the monument would prove intentionality. However, such examples have not come to light. Furthermore, the major problem here is that the funerary context of these hypothetical scenarios would still render the practice distinct from *in situ* rock art outcrops and boulders. Therefore, with the growing evidence for a Neolithic date for the latter, it would still be open to debate as to whether funerary monument carvings could provide a date for the entire rock art phenomenon, and petroglyphs on living rock in particular.

Hunterheugh Crags seems to be a good candidate for exhibiting EBA carving on living outcrop, based on the elegance of the hypothesis that all the quarrying was performed as part of the cairn building process, but there are still some unexplained aspects as detailed above. If we accept the evidence, then this provides further fuel for the idea that rock art was a practice with considerable longevity. Again, this explanation fits right into our interpretations of the Neolithic to Bronze Age transition, when we see so many traditions carried over, re-interpreted and re-worked. This results in a blurred distinction or boundary between the two periods. In this case, rock art potentially has much to tell us about the nature and role of social memory, and about the ways in which places and materials were revisited and reshaped over time, themes explored further in following chapters.

Conclusion

Whilst recent work has focussed increasingly on the spatial aspects of rock art landscapes, as the issues discussed through this chapter demonstrate, they also have much more to offer than has yet been realised in terms of temporal aspects. As Knapp and Ashmore note, "a tangibly marked landscape is memory-enhanced" (1999: 16) so that at rock art sites, as with other prehistoric monuments, "space and time come together in place" (Casey 1996: 36, cited in Knapp and Ashmore 1999: 18). These aspects include the repeated carving of natural stone surfaces over considerable durations, the development of varying traditions and treatments of rock art over time, and the re-use of panels in the Neolithic, early Bronze Age and later periods. 'Classic' rock art itself appears to have been a long-lived practice, and as such probably played a key role in the maintenance and transformation of social memory and identity within the communities that created and used the panels, a theme that will be revisited in later chapters. As explored further in Chapter 3, distinctive parts of the landscape tend to be repeatedly visited, 'socialised' and increasingly intensely marked through the *longue durée* (Knapp and Ashmore 1999: 16, Taçon 1994). Thus, in the practice of rock art we see these aspects of the 'biography' of landscape coming together.

The shifts and transformations evident within the practice and its associated traditions reflect what would have been wider transformations of landscape use and perception (Ingold 1993, Taçon 1994). These shifts would have been linked to wider social changes; tensions, contestations, and negotiations (Bender 1998). Perhaps the most obvious transformation in rock art is the shift from its place on living outcrop to its reuse in Neolithic and Bronze Age monuments, and ultimately in Bronze Age burials. By later periods we even see rock art panels being reused as Iron Age dwelling floors (Armit and McCartney 2005) and souterrains capstones (e.g. Newtownbalregan and Ballybarrack, County Louth), and covered by later prehistoric field walls (Ilkley Archaeology Group 1986), and Iron Age / Romano British structures (Smith 1988-9). Whether this later treatment represents some form of benign neglect (Barrett 1999; Bradley 1996: 96), in turn signifying a wider transformation of landscape perceptions, or whether at least some of these instances demonstrate a continued awareness of these carvings into much later periods remains unclear, and probably needs to be assessed on a case-by-case basis. Chapter 5 presents a further example of the reuse of a rock art landscape at Drumirril, which appears to support the later interpretation.

Viewed as a Neolithic practice, the repeated 'deposition' of carvings onto 'living' stone surfaces was a means of quite literally embedding meaning and significance into places and landscapes which differed considerably from the monumental architecture that springs to mind when archaeologists think 'Neolithic landscapes'. In comparison, rock art represents a small scale, sensitive and almost deferential means of expressing and constructing significant, and probably deeply felt, ideas. The carvings demonstrate an almost unparalleled intimacy with, and sensitivity to their medium – essentially the 'skin of the earth' (after Watson 2003). This raises the question as to whether the carving of living outcrops was simply a regional take on a widespread ceremonial practice linked to a commonly held set of beliefs, or whether this was a tradition that was entirely unique to these regions. It also raises questions as to who created and used the sites, and whether access was restricted or open to all. Were these modest 'monuments' created and used by particular social groups within local communities? The following five chapters begin to explore such ideas, drawing on the results of a series of landscape investigations from GIS analysis and field observation, to geophysical survey, excavation and motif analysis.

CHAPTER THREE

Nested landscapes

Rock art and nested landscapes

Recent landscape theory has explored people's tendency to imbue landscape features with special meaning and significance (Ashmore and Knapp 1999). According to both anthropological and archaeological research a whole range of practices from monument building to diverse activities, including the carving of rock art motifs, may reflect the expression of this significance by communities past and present (Ingold 1986; Tilley 1994; Bradley 2000; Scarre 2002; Jordan 2003; Chippindale and Nash 2004). With reference to Australian aboriginal rock art, Taçon (1999: 36-7) has suggested that the attachment of significance to places may derive from the fact that "certain landscape features invoke common responses in human beings – feelings of awe, power, majestic beauty, respect, enrichment", amongst others. For the indigenous peoples of northern Australia, as elsewhere, these locations are believed to be focal points that are intimately connected to powerful religious knowledge (ibid: 37-40). As such, these places can be used to reinforce or reveal certain ideas and understandings of the world by encouraging a certain perception or experience of the landscape. For instance, one might feel enclosed and safe, or powerful and 'on top of the world', in certain parts of the landscape. In this way it is suggested that communities were able to use these places to enhance the experience of particular events and activities by referencing these experiences as being part of the natural order (or disorder) of the world around them (Taçon 1994: 126). Thus, "by connecting to the land at unusual, specially marked sites a recognition of one's own place in the universe, in both time and space, results" (Taçon 1994: 127). It has been argued that these emotional responses occur cross-culturally (Taçon 1990), and they perhaps even lie behind contemporary western notions of landscape aesthetics (see Muir 1999: 244-70).

Taking this proposal a step further Taçon defined four types of 'natural place' where these responses are commonly invoked; where "great acts of natural transformation" are evident in the topography; at the intersection of geological, hydrological and / or vegetation boundaries; at distinctive and unexpected natural landmarks; and at viewpoints affording richly varied and extensive views of the surrounding landscape (1999: 37). This idea provides a compelling means of explaining why certain places were selected to be embellished with rock art, though ethnographic examples point out that carving and painting sites "more often overlook, indicate the approach to or mark the limits of the more sacred and restricted landscape zones" (Taçon 1999: 40). If correct, we might expect rock art to cluster at or near these types of significant points in the landscape, points that would have been readily identifiable, perhaps even predictable, to people moving through the landscape in the past.

However, such an approach is not without its critics. Of fundamental importance to this theory is the assumption that responses to landscape are cross-cultural; archaeologists' ability to identify the features that past communities were responding to is reliant on this hypothesis. Problematically though, the kinds of responses to landscapes described by Taçon undoubtedly vary on a cultural, historical and individual basis – we cannot assign predefined emotional responses to a predefined set of landscape features (Knapp and Ashmore 1999: 2). On the contrary, the very types of features that invoke a response are culturally mediated. Indeed, one's cultural background would inform the types of features one might even care to *notice* in a given landscape. Changing attitudes to modern landscape aesthetics suggest that responses can also vary wildly *within* a cultural milieu through time, with a given perception of landscape swinging from the hideous to the sublime within a few centuries, or even a few decades (e.g. Muir 1999 182-211). Brück (1998) has described related problems in terms of the use of phenomenological approaches to landscape (Tilley 2004). Here the experiences of frequently white, middle class, urban-dwelling, able-bodied male academics are projected onto prehistoric communities that were undoubtedly made up of a diverse range of individuals.

Our ability to propose potential responses to landscape relies on being able to draw on anthropological models and archaeological contexts in a thoughtful and critical manner, to identify layers of associations between past practices and distinctive places in the landscape. In a recent (and sorely needed) critique of the use of landscape approaches in rock art research, Smith and Blundell (2004: 245-53) have cautioned archaeologists against relying too greatly on the macro-features of the landscape whilst ignoring the (sometimes archaeologically invisible) minutiae. The focus of the contemporary western gaze on such features is arguably part of a deeply entrenched tradition of viewing and perceiving the landscape. As illustrated by several ethnographic studies (Marshall-Thomas 1959 and Myerhoff 1974 cited in Smith and Blundell 2004), the scale at which different communities may attach meaning to landscape features varies considerably between different societies. For instance, these may include features like clumps of herbaceous plants, individual trees, tree stumps, or heaps of pebbles (Smith and Blundell 2004: 248). Furthermore, notions that western viewers may generally conceive as fundamental to the human experience of 'Being in the World' – such as 'boundedness', or 'distinctiveness' – are highly subjective, and culturally constituted (ibid: 249). These issues may explain why, for instance, it is sometimes the stones that archaeologists consider to be the least conspicuous that were selected for embellishment, in spite of more 'spectacular' ones being readily available nearby (e.g. Beckensall 1995:9; Beckensall and Frodsham 1998: 51).

A key contribution of recent landscape-oriented rock art research is that it presents extensive and detailed evidence that the distribution of rock art, and rock art motifs, is highly structured rather than random, and sensitive to changes in the surrounding natural and socio-cultural landscape. However, as noted in Chapter 1, the specifics of these patterns often vary considerably and regularly contradict one another, sometimes between study areas within relatively close proximity. The rock art is on prominent outcrops in one area, and inconspicuous ones in another; complex designs are on the upland margins in one area, and around monument complexes in valley bottoms in another. Thus, there is not always a consistent pattern evident at the local level, let alone regional or wider ones (see Chapter 1). The positive sides of this are obvious; we have moved beyond the generalist explanations of processual archaeology whereby the regularities in human behaviour are sought. We are allowing the complexity and subtlety of the practice of rock art to shine through. However, can we be sure these patterns are representative of the motives of the Neolithic carvers? Might they simply be the result of a landscape archaeology based on inductive observations and phenomenological intuition? Is it possible that our interpretations of the landscape features we understand to be structuring the location of rock art would seem naïve, or even absurd or amusing to those who actually produced it? This is precisely the danger that Smith and Blundell (2004: 259) warn of when they discuss what they call the “gaze and guess” approach to rock art landscapes. Rock art is commonly seen as a means of signalling the significance of place. However, identifying this in practical terms without ‘over-reading’ the landscape risks a highly circular approach: the rock art is there because the landscape was significant, and the landscape was significant because the rock art is there. As Smith and Blundell (ibid) have shown, it is possible that reasons that are quite different from those we regularly rely on may have influenced the selection of carving locales.

The potential problems of the “overdetermination” of archaeological data and the reliance on circular reasoning are of concern for landscape archaeology in general (Knapp and Ashmore 1999: 5). Whilst this is a difficulty all landscape studies must strive to overcome, for a subdiscipline that is attempting to endear itself to the wider archaeological community (see Chapter 1), this kind of gaze and guess naivety clearly does rock art research no favours. As Smith and Blundell have demonstrated with devastating clarity, the treatment of landscape as “an unproblematic given” is in danger of leading the landscape archaeologist, and his or her readers, down a scenic but merry path (2004: 259). In their view this danger is heightened in cases where ethnographic support for the arguments that are presented is lacking: “At best, all we shall be able to see is a *possible* link between rock-art sites and the features of the [northern South African] landscape *that we perceive*. Without relevant ethnography our work is inherently constrained by our own limited cultural experiences of the landscape” (Smith and Blundell 2004: 254, original emphasis). Even less optimistic is the contention that perceived patterns of placement within the landscape are entirely “meaningless constructs” (ibid: 256 in reference to Lewis-Williams pers.comm.). This perhaps presents an overly pessimistic view of the opportunities afforded by landscape research, but it is the critical awareness of these problems that has been lacking in many recent landscape studies of Atlantic, and other, rock art traditions. Smith and Blundell's (2004: 254) exacting criteria for a more critical approach are worth repeating here:

"Landscape study can offer insights only if the practice of painting [or carving] (1) was affected by 'things' the painters perceived in the landscape *and* (2) we have been fortunate enough to perceive these same 'things' in the landscape *and* (3) the pattern of positioning in relation to these 'things' is striking enough that we can demonstrate a link".

It might be added that these 'things' would not have been the same for all rock art sites in a given region – we cannot expect one umbrella explanation to explain rock art distribution. In this way it is important for landscape studies to incorporate and weave together numerous different strands of landscape data when addressing questions relating to site distribution. The reliance on just a few selected variables might provide a seductive, but erroneous, explanation for distribution. For instance, as discussed in Chapter 1, recent rock art research has frequently focused on views, sidelining other aspects of landscape that might also have contributed to the positioning of carvings. Another important point here is that the variables that we perceive as influencing rock art distribution may in fact only co-occur with the variables or conditions to which the carvers were actually responding. This requires the archaeologist to think broadly, and cautiously, when interpreting the data, rather than 'laying down the rules' of rock art distribution. We must keep in mind an entire world of variables no longer readily accessible to us though either cartographic or phenomenological analysis.

The concept of 'nested landscapes' is one that has been interpreted in various ways by different archaeologists (e.g. Bender et al 1997). Here, it provides a useful means of addressing the spatial ambiguity in the term 'landscape', since communities, social groups and individuals respond simultaneously to aspects of landscape that may operate at a wide range of scales from the international, to the national, regional, and local. With recent research having established that rock art is located in a very specific manner, we now need to secure more of the 'basics' across wider study areas before we can *productively* move on to interpret these observations. For instance, we need to address the problems of selective preservation, taphonomic issues and survey biases that might be affecting the rock art distribution. This needs to be followed by the critical evaluation of the potential influence of a wide range of landscape variables that may operate at a series of different scales, across different regions. By selecting specific groups of panels to use to interrogate specific patterns there is a danger of missing what may be a much broader picture. In this way, the comparison of three different rock art landscapes across Ireland has provided useful insights that may not have arisen within a single study area.

So which types of landscape variables ought to be investigated? We can glean some useful places to start from broader archaeological studies of prehistoric Ireland and Britain. Though they cannot be discussed in full here, studies of other broadly contemporaneous prehistoric sites and material culture convincingly and repeatedly indicate that prehistoric communities across Ireland and Britain possessed a sophisticated awareness and appreciation of subtle changes in the topography (e.g. Cooney and Grogan 1994: 64-5; Cooney 2000 138-45), and the positions of landforms like outcropping rock (e.g. Tilley 1996; Bradley 1998) and bodies of water (e.g. Richards 1996; Bradley 2000: 47-63; see also Brophy 1999; Cooney 2000: 165). Both monument construction and artefact traditions, from stone axes through to pottery, indicate a considerable depth of knowledge of both the material and aesthetic qualities of stone and soil (e.g. O'Sullivan 1997; Lynch 1998; Cooney 2000: 174-211; Cummings 2002a; Meighan et al 2002). It has also been argued that the positioning of sites seems to respond to the views across the surrounding landscape (e.g. Cummings and Whittle 2003). Thus, there were potentially numerous interwoven aspects of landscape at work in the selection of carving locales. The challenge for the archaeologist is to distinguish significant patterns of association from those that might simply have been incurred by chance. Where multiple strands of landscape data converge to denote particular places in the landscape as distinctive, and where we see the archaeological response to these patterns repeated across space, it becomes more reliable that these locales were indeed viewed as significant in the past.

The combination of evidence discussed in Chapter 2 suggests that we should look to the Neolithic as an origin for the practice of Atlantic rock art. A cautious view places the current evidence for rock art production in Ireland and Britain at least as early as the Late Neolithic (3100-2500BC). However, with the increasing numbers of reused rock art panels in monuments that themselves date to the Later Neolithic to EBA, the possibility that the ultimate origins of the practice of rock art lie in the Middle Neolithic (3600-3100 BC), or perhaps even earlier, seems ever more likely. However, it also seems likely that EBA communities were still aware of the significance of rock art, as they continued to use and transform the panels, as well as create their own forms, including cup marked stones and carvings on cist capstones. Armed with this admittedly broad dating evidence, we can also begin to look at the ways rock art interacts in spatial terms with other archaeological monuments and features in conjunction with the features of the 'natural' landscape.

Since much of the current literature has proposed that rock art panels are frequently located on the margins of the lived landscape, we might expect them to spatially *dissociate* with settlement evidence. However, as discussed in Chapter 1, this theory is largely based on general readings of broad landscape zones (upland, lowland, valley, mountain etc). This chapter investigates whether we have sufficient archaeological evidence to explore these patterns in more detail. Rock art's relationship with different classes of archaeological sites has largely remained untested in Ireland (though see Long 2002 and the broad study by Johnston 1989: 274-315). In northern England and southern Scotland we see rock art and major monument complexes come together in some key areas (e.g. Kilmartin, and the Fowberry / Weetwood Moor area) in a way that suggests the long-term significance of certain locations for burial and ceremonial activity (RCAHMS 1999; Bradley 1997: 138-46). In other areas it has been suggested that rock art may demarcate routes into, or boundaries encompassing, these monument complexes (Bradley 1997: 113-20). With the close relationship between reused rock art panels and EBA funerary contexts in parts of Britain, we might expect a spatial association between *in situ* rock art and EBA burials in Ireland. This seems to be true in parts of northern England, such as Northumberland, where we see coincident distributions of EBA burial cairns and rock art (ibid138-46; Hewitt 1991). In this way, the positioning of later funerary monuments may have been influenced by the earlier periods of use of these parts of the landscape. Would this be the case in parts of Ireland?

The work presented in this chapter predominantly investigates rock art distribution using GIS technology. As archaeologists we are limited in terms of the types of social datasets we can glean from the archaeological record, and we must remain mindful of the fact that as yet unidentified or unmapped aspects of prehistoric life will undoubtedly have influenced the spatial distributions we seek to explain. Often, the level of detail we might wish to have access to in terms of the qualitative characteristics of archaeological datasets has not been established in a format that can be easily or quickly transformed into a spatial dataset. Thus, considerable preparatory data analysis and classification is often required before we can use a GIS to ask useful questions of this data. The work presented in this chapter deals largely with data that was either readily available or relatively easily collated by gaining access to and processing map data from a range of government sources (see Appendix B for more detailed descriptions). The potential influence of a range of landscape factors is addressed here, before moving on to look at relationships between rock art and other site types. In Chapter 6, a pilot study into the potential for the kind of social datasets that ask much more of the archaeologist in terms of data collation and preparation is presented. In this case, this more ambitious analysis attempts to wrestle the qualitative data pertaining to rock art motifs and compositions into a usable spatial format.

GIS design and methodology

The datasets incorporated into the GIS were collated from a wide range of sources, and include both archaeological and environmental information. Prehistoric site locations were collated from published surveys and inventories for the study areas, which were supplemented by sites from the online Irish excavations bulletin (www.excavations.ie). A range of landscape datasets was purchased from Ordnance Survey Ireland (OSi), including aerial photographs, elevation data, and a vector (point, line and polygon) version of the 1:50,000 scale Discovery Series maps, which provide details of rivers, streams, lakes and coastline, as well as roads, buildings and so forth. The locations of pollen core sites (see below) from within the study areas were also digitised in order to evaluate their relevance and research potential, as well as providing a broad context in terms of palaeoecology for the other analyses. Teagasc and the Geological Survey Ireland (GSI) generously provided soil and geology datasets respectively. The latter included bedrock geology, outcropping rock, and a selection of scanned, rectified and georeferenced images from the GSI's six-inch map archive, a valuable historical resource that was produced in the late 19^{th} century. Based on early field reconnaissance, the maps were individually hand-coloured and annotated in order to depict the major geological features of the area, including the extent of wetland areas and alluvium (see Figure 3.1 for an example). In the case of outcropping rock, the six-inch maps had already been digitised into a country-wide georeferenced dataset by the GSI, which kindly granted access to this secondary digital resource. The digital images of the six-inch maps were also used to 'heads-up' (on-screen) digitise an additional secondary dataset describing both current and former wetland zones.

Due to the detailed information required for such mapping to be produced, and the time-consuming nature of the production process, this is a rare dataset to have access to, and is obviously highly relevant to a project investigating rock art distribution. Such a map resource has not been used in British studies to date. It is particularly significant seeing that outcrops have been identified as the most common surface type on which Irish rock art occurs (Johnston 1989: 25). The locational accuracy of the outcrop mapping is rather generalised in that smaller outcrops may not have been identified and locations are broadly correct within individual fields rather than down to tens of metres. This provides a representation of the outcrop distribution rather than a specifically mapped set of individual outcrops. Those responsible for producing the maps were more concerned with providing an interpretation of the geological landscape than accurately surveyed locations. However, this is sufficient for the purpose of identifying major distributional trends. Equivalent data is not available for boulder distribution, and major (GPS) survey work would be required in order to establish such an extensive dataset. Unlike the outcrops, such a dataset would also be significantly compromised by the impact of recent land improvement. Though such a survey was deemed beyond the scope of the current project, it may prove useful in areas where recent landuse has not significantly altered the surface geology, as is the case in many parts of the Dingle Peninsula.

ArcGIS 8 software was used to collate and analyse this diverse range of datasets. A series of analyses was then used to address specific questions regarding the spatial relationships between the rock art panels, other archaeological sites, and physical or topographical features of the surrounding landscape. These questions relate specifically to current theories in the archaeological literature, which are discussed in more detail under the relevant sections below. The GIS analyses are primarily concerned with the landscape setting of rock art at regional and local landscape scales. By comparing the landscape setting of three discrete rock art regions, the question of regional variation was explored in more detail than has been possible in previous landscape studies, due to their tendency to focus on national or individual regional levels.

Throughout this research the inherent limitations of a GIS approach outlined in Chapter 1 were recognised, particularly in terms of the resolution or sensitivity of the datasets available. A brief discussion of landscape observations that operate at a more intimate scale than that readily accessible using GIS for the three study areas, was presented earlier. As this pointed out, such aspects are frequently ignored in GIS studies, and as a result, some of the more subtle observations that are seen as so crucial in phenomenological approaches can be elided. The GIS analysis employed here is presented as a means of investigating broad distributional questions, but as an approach that ideally must be complemented by ground proofing, and by landscape observations made in the field. For this reason it was important that as many as possible of the individual panels were visited and recorded on the ground. The locations of all of the surviving panels on the Dingle Peninsula, and in Louth and Monaghan were visited, along with the sites of some destroyed panels in Louth and Monaghan. On the Inishowen Peninsula the majority of the sites featuring more complex motifs than simple cups were visited (see Appendix A). The sheer number of cup-marked stones on the Peninsula meant that many of these panels could not be individually ground-checked within the time available, with only a reconnaissance survey of their general locations conducted. Further field survey here would be an important part of any future research.

Overall though, this groundwork allowed a sense of the landscape and topographic setting to be gained, provided familiarity with the immediate settings of the majority of the surviving panels, and provided a means of ground-checking aspects of the GIS work. It also allowed the settings to be examined. This process often raised questions or provided observations that would not have occurred through the GIS alone. Though time-consuming, it is proposed here that this combination of technology-aided analysis and on-site observation represents an important means of improving the sensitivity of GIS research that deals with complex landscape questions. At the same time, GIS analysis offers a means of identifying broad patterns that frequently cannot be discerned on the basis of field visits alone.

This chapter in many ways represents the core of the present study; a series of landscape explorations, which has in turn suggested further avenues of research. It is here that the significance of particular locales is identified. One of these areas was investigated in further detail, using geophysical survey and excavation, as presented in Chapters 4 and 5.

Taphonomy and distributional biases

When investigating distribution patterns we need to be aware of the potential taphonomic processes that may have influenced the preservation or destruction of sites in our study areas. For instance, in Counties Louth and Monaghan we already know that several panels have been destroyed, removed or buried due to land improvement and development. At Ballinloughan only two of the five original panels have been preserved, one in Dundalk Museum, one on site, whilst the rest were destroyed during the clearance of the field in which they were located (Van Hoek 1985). Stones from Carrickrobin, Miskish More, and Ballybarrack, were removed to museums, the latter having been discovered during the excavation of a souterrain prior to residential development (Tempest 1931; Raftery 1954; Clinton 2001: 66). One of the panels in Drumirril was removed during land improvements just to the northwest of the Deer Park, and placed alongside the boundary wall (Kieron Campbell pers.comm., Larry Durnin pers.comm.). At Tankardsrock, the farmer buried the panels in order to aid ploughing (Noel Ross pers.comm.). It is clearly possible that similar activities could have occurred beyond the known rock art distribution. However, the Louth / Monaghan group as a whole is located on a naturally rocky, wet and hilly area where the terrain undulates significantly. It seems likely that such areas have undergone less intensive improvement for agricultural purposes than the surrounding areas. Because the land is predominantly used for grazing rather than tillage, fewer outcrops and boulders have been disturbed, damaged or removed. However, the current extent of this zone might well have been slightly reduced by land improvement.

On the Dingle Peninsula, the locations of numerous panels previously recorded are no longer known, probably due to field clearance and possibly the use of erratic boulders for road metal (see Cuppage 1986). However, in some cases (e.g. Kinard East), stones reported to have been destroyed for such purposes were successfully relocated during the present research (cf. Cuppage 1986: 63). It is also encouraging, or perhaps revealing in terms of survey bias, that the majority of the known panels came from the most intensely farmed tracts of land on the Peninsula. In many cases then, land use seems to have led to discovery rather than destruction. If so, this may speak of the number of panels yet to be identified across less-frequented terrain. The same is true of the Inishowen Peninsula, where, with the exception of panel groups around inland lakes or small towns (e.g. the Lough Fad and Clehagh panels), the mountainous interior is largely devoid of known panels. At least one townland, Magheranaul, has undergone extensive outcrop clearance involving the dynamiting of numerous rock art panels (Van Hoek 1988). Such wholesale destruction points to both the need for outreach work and local education as to the significance of these carvings, and the need for caution in interpreting the distribution of panels.

As the wetland analysis below indicates, the extent of bog coverage may also be restricting the discovery of rock art panels, particularly in the mountainous interiors of areas like the Dingle and Inishowen Peninsulas, where peat coverage has increased considerably since prehistory. Johnston (1989:237) has pointed out that bog coverage could potentially have caused the apparent scarcity of rock art across entire counties, such as Mayo, where only two carving sites are currently known. Even at a local level, the consideration of long- and short-term landscape change must be taken into account. For example, on the Isle of Doagh to the north of the Inishowen Peninsula, local people recall a severe storm that is said to have covered large parts of the Isle of Doagh with a thick deposit of windblown sand, hence its present name – 'Isle of the Dunes' (Conall Byrne pers.comm.). The extent of the deposit across the northwest of the former island, which has been recorded by the GSI (see below), may well restrict the known distribution of rock art panels in this area. Although it is notable that, even in those parts not affected by the sand, the rock art displays a highly clustered distribution, it is possible that a third major cluster lies beneath the deposit, in the region of the single panel in the western half of the Isle of Doagh recorded by Van Hoek (1987).

As Johnston (1989:236) has pointed out, differential fieldwork also needs to be taken into consideration when dealing with distribution (see Figure 3.2). All three of the study areas have undergone intensive surveys during the production of the county survey volumes (Lacy 1983; Buckley and Sweetman 1991) and the Dingle Peninsula survey (Cuppage 1986). In addition, the work of amateur archaeologists has made a major contribution in Louth, Monaghan and Donegal, with the published surveys of Jack P. Clarke, Mabel Colhoun, and Maartin Van Hoek making substantial contributions to the inventories for these areas (Clarke 1982; Colhoun 1995; Van Hoek 1987, 1988). Indeed, some areas that now represent significant clusters in the rock art distribution of Ireland as a whole have only been recently discovered and published by these individuals (e.g. Clarke 1982, Van Hoek 1988; 1989). These intensive surveys have in some cases only been conducted over specific areas, such as Van Hoek's work on the Isle of Doagh (1987, 1988). On the Dingle Peninsula one of the most important recent surveys is that by Micheal ÓCoileáin (2003) in the Loch an Dúin Valley, conducted as part of his postgraduate research. There is a reciprocal effect in action here, since it is the significant number of panels and other monuments in these areas that attracted further attention, but equally this attention has reinforced these high numbers, whilst more sparse distributions might have gone unnoticed. Even within these areas of dense distribution, field visits made during the present research indicated that there were still new panels to be found. Within the context of the research presented here, new panels were identified in close proximity to previously known panels in all three of the study areas, despite the fact that the discovery of new panels was not an objective of the project.

This suggests that the known distribution slightly under-represents the original extent of sites, though exactly how significant this may be in numerical terms is difficult to estimate. In the Louth / Monaghan area Clarke checked uncarved outcrops across the region for further motifs (1982; Noel Ross and Kieron Campbell pers.comm.), though he himself noted that areas across the border in Armagh have yet to be subjected to this level of survey (1982: 116). Perhaps partly due to the sheer extent of exposed rock on the Inishowen and Dingle Peninsulas, similar control surveys have not yet been attempted in these areas. Thus, though the previous surveys in the three study areas ensure that the present distribution is a fair representation, there are undoubtedly further panels awaiting future discovery.

The occurrence of small numbers of panels in some areas – such as County Cavan, County Mayo and south Louth – also suggests that systematic surveys in these areas may well prove fruitful, and indeed should be a key objective of future research. Small, but growing numbers are known from the Wicklow / Carlow / Kilkenny region (Lucey 2004). As documented by Johnston (1989) small numbers are also known in the Northern Ireland Counties of Derry, Down, and Tyrone. This area has received rather less attention than the rest of Ireland to date, and would also be an important area for future surveys to investigate. Rock art surveys of this kind ideally need to be conducted by specialists, or those with experience identifying rock art motifs in the field, as the carvings are notoriously difficult to discern in poor lighting. It is also likely that in areas such as County Kerry, where the rock art is relatively well known, the likelihood that previously undiscovered panels would be identified during surveys would have been increased, whilst surveys conducted in counties with no known rock art might have been less concerned with the potential for new sites to be identified. The recent discovery (Jordan 1995) of a second rock art panel in County Mayo illustrates this point, with the panels identified by a geologist rather than an archaeologist (i.e. a specialist concerned with the natural outcrop of the area rather than the upstanding monuments). This reflects the age-old adage that archaeologists only find what they are looking for. However, even with these potential new areas in consideration, the overall distribution remains undeniably regional.

Places of regional focus

There are far fewer rock art panels in Ireland than in Britain. Shee Twohig (2004) recently estimated a figure of approximately 500 rock art *sites* for the island of Ireland. However, if using individual *panels* as a unit of analysis, this is probably a considerable underestimation. Even so, the numbers for the island are much smaller than those for northern England, where, for example, the single county of Northumberland now has over 1000 panels and counting (see the catalogue at www.rockart.ncl.ac.uk). The distribution of rock art sites across Ireland is interesting in that it appears to be non-random and highly regionalised (see Figure 3.2). Rock art sites are concentrated in peninsulas and coastal areas of Ireland, and are remarkably widely separated with major groups in Cork and Kerry, Louth and Monaghan, and Donegal. This regional pattern is more marked than in the United Kingdom, where the majority of quintessential rock art is located in Northern England and Southern Scotland. Whilst recent research has added to the small numbers of panels known from southern and southwest England and Wales (e.g. Greeves 1981; Waterhouse 2000) and the Isle of Man (Darvill and O'Connor 2005), the number of panels in these areas remains very small in comparison to the large, and growing, corpus further north. The former also consist of predominantly cup-marked panels and mobiliary stones, indicative of the distinctive regional practices across Britain and Ireland. However, the contrast between the British and Irish distributions may also indicate that different historical trajectories were involved in the development of rock art as a practice in these two major islands, a contrast also reflected in the relationship between rock art and megalithic art in the two areas, as discussed in Chapter 2.

Despite research aimed at identifying any coincident patterns in the distribution of rock art and other site types and artefacts (Johnston 1989), the sites appear to exhibit a spatial patterning that cannot simply be understood in terms of other prehistoric architectural or material culture practices. Given the complex and overlapping nature of the distribution of, for instance, the megalithic monuments of the Neolithic to Early Bronze Age, this situation is not unexpected. As has long been acknowledged in the wider archaeological literature, practices such as rock art cannot be understood as part of a ‘cultural package’ that equates to a specific group of people. Rather, as an aspect of Neolithic and Bronze Age material culture, rock art might be better understood as a regional tradition, a ‘way of doing’ that was closely intertwined with regional identity.

An unexpected result of the regional nature of the present study was the identification of a distributional phenomenon for Irish rock art that has not been acknowledged in previous work. Each of the three regions features one distinct location where rock art panels are highly concentrated (see Figures 3.3 - 3.5). The Isle of Doagh on the Inishowen Peninsula, the townland of Drumirril on the County Monaghan border, and the Loch an Dúin Valley on the Dingle Peninsula, represent significant concentrations of rock art panels within each of their wider regions. Drumirril features 55% (36 out of 65) of the region’s panels, and counting. The Isle of Doagh exhibits 53% (89 out of 167) of the Inishowen Peninsula’s panels, and counting. Lastly, though the numbers are slightly less convincing, the Loch an Dúin Valley features 27% (15 out of 56) of the panels on the Dingle Peninsula, and probably more. Though the latter has been extensively surveyed, the work was not specifically rock art driven, and subsequent work as part of this research and that by others (Long 2002) has identified additional panels. In the cases of Doagh and Drumirril the statistics are highly convincing; this is not simply the product of survey bias, unless we are willing to believe that these entire regions were once literally carpeted with motifs, or that clusters of up to 100 panels lie awaiting future discovery, or have already been destroyed or buried. Both possibilities seem remote. In each of the three clusters, the concentration of survey work within these areas has undoubtedly biased the data to a degree. However, prior to these surveys, the areas already featured a higher than normal panel count purely on the basis of the county surveys. The Loch an Dúin case is less secure and remains to be tested both via further reconnaissance surveys of the valley and by comparison with other parts of the peninsula.

The identification of these regional clusters raises numerous questions. With sufficient regional survey coverage, would we find similar patterns in each of the rock art regions in Ireland, or is this a limited pattern? How can we explain areas such as the Iveragh Peninsula, across which the densest concentration in the whole country has been well documented (O’Sullivan and Sheehan 1996)? Do they simply indicate variations in local practices, or is it possible that these locales represent regional gathering places? The latter interpretation has been put forward for some of the major complexes of Neolithic tombs (e.g. Loughcrew, Boyne Valley, Carrowmore), which are seen as places to which people from the surrounding area returned again and again across several generations, and possibly in both small and large groups (e.g. Eogan 1986: 179; Fraser 1998). The sheer numbers of panels in these clusters, especially in the case of the Isle of Doagh, raise the possibility that people from across the wider region, as well as the local area, visited and used these places. As regional gathering places these locales would suggest that a sense of regional identity existed, within which the carvings (in all their variability) were produced. Existing surveys indicate that a similar pattern occurs in the wider Donegal region, with a second significant cluster in the townland of Mevagh some 32kms to the west on the Rosguill Peninsula. If these regional clusters were regional centres for rock art as a practice, how should we interpret the dispersed panels that occur singly or in small numbers? The question of the role of the dispersed panels is discussed further below, in relation to settlement evidence from the three study areas.

The idea that such clusters represent meaningful concentrations, possibly regional gathering places, is not new. These have been noted in other rock art traditions around the world, such as those identified by Conkey (1980). In northern South African San art (Smith and Blundell 2004: 255-6), the larger sites feature numerous superimposed motifs, unlike the smaller sites in the surrounding area. This is suggestive of repetitive visits and the repeated marking and re-marking of the same stone surfaces. It is a significant feature of Atlantic rock art that superimposition, and the obscuring of previous designs with new motifs, or surface pecking (as seen in Irish megalithic art (Eogan 1997), are so rare, despite the numerous densely decorated surfaces. This would seem to indicate a deep respect for, and the continuing relevance of, the previous carvings over the *longue durée*. New additions build on existing compositions rather than obscuring or over-writing them (e.g. RCHAMS 1999: 50-1, 59). In the African examples the motifs also appear to differ at these clusters from the other sites (Smith and Blundell 2004: 256). Would the clusters in the three Irish study areas also be distinguishable in terms of their motifs? As we will see in Chapter 6, this type of local distinctiveness is readily identifiable on the Isle of Doagh.

If these places represent genuine clusters of panels, then we might also expect them to stand out in the ways Taçon (1999) has proposed; for them to be distinctive or unique in landscape terms so that particular memories, associations and significance would have been attached to them, as opposed to the surrounding areas. Thus we should expect to see the clusters situated at or around major topographic features or physical landmarks, at the intersection of different landscape zones, and / or at viewpoints over the surrounding landscape.

The field visits revealed each of the three clusters to be situated within topographically distinctive locations that do seem to recall each of Taçon's (1999: 37) categories of significant 'natural places'. But was this simply a function of searching for significance and distinctiveness in these landscapes? The Isle of Doagh (see Figure 3.6) represents a former tidal island that once lay just beyond the mainland, but whose marshy southern shore has silted up and now adjoins the mainland. The townland of Drumirril features an unusually undulating lowland mosaic of wetlands and outcrop-topped hillocks (Figure 3.7). The Loch an Dúin Valley (Figure 3.8) follows the Scorid River up to a natural amphitheatre of corrie slopes encompassing a lake and island, with a dramatic waterfall feeding the lake from the mountainous uplands above. Though these qualities bring an immediate distinctiveness to these locations, they remain highly subjective observations, and on their own do not provide the kind of 'striking' pattern required by Smith and Blundell's strict requirements.

However, further comparison demonstrates two additional aspects of these landscapes that seem to point to a repeated distributional pattern. Firstly, each cluster is located at the edge of its respective regional distribution of rock art panels; on the northern periphery in the case of the Isle of Doagh and Loch an Dúin, and at the southwestern edge in the case of Drumirril. This pattern is compelling, and may be a significant spatial characteristic of rock art regions. If, as has been proposed by several authors (Bradley 1997; Purcell 2001), rock art is intrinsically linked to the act of journeying across the regional landscape, then the intentional location of regional complexes at the margins would have imbued these journeys with additional significance due to either the sheer effort required to reach these locations, or the positioning of the clusters on the 'threshold' of the rock art distribution, depending on the direction of movement into or across the rock art region. Clearly, some caution is required in positing these locales as marginal – marginal to whom, and what of the social groups potentially living in adjacent areas (see below)?

Secondly, if we accept the idea that people visiting the clusters on the Isle of Doagh, in the townland of Drumirril and the Loch an Dúin Valley, might have come from the surrounding area where we see much smaller groups or individual panels occurring, an interesting commonality arises. Reaching each of these places from the surrounding dispersed rock art panels entails not just a significant journey, but also the passing of a considerable threshold in the physical landscape; the crossing of a tidal estuary separating a former island (the Isle of Doagh) from the mainland, the crossing of a distinctive bend in a major regional river (the Fane River, Co. Louth), and the crossing of a formidable mountain range (the Slieve Mish, Stradbally, Slievanea and Brandon ranges that comprise the central spine of the Dingle Peninsula). The relationships of the panels to these features is illustrated in Figures 3.27, 3.29 and 3. 31.

In the case of the latter, the threshold is one that is still traversed on the Dingle Peninsula as part of the 'Pilgrims' Route', which is marked out on the Discovery Series maps of the area. This routeway forms part of what was probably a pre-Christian pilgrimage, which later became associated with St Brendan the Navigator, a 6th Century sailor-saint (Cuppage 1986: 263-4; MacNeill 1962). Intriguingly, the route culminates at the shores of Cloghane Bay just northwest of the Loch an Dúin Valley. Corlett (1997) has described how prehistoric monuments, including a rock art site, demarcate a similar Early Christian pilgrimage route at Croagh Patrick, County Mayo, possibly reflecting the antiquity of the tradition. On the Inishowen Peninsula, Colhoun has recorded folklore references whereby 'fairies', who are believed to have remained on the island until relatively recent times, would be seen making low-tide crossings over to the Isle of Doagh; "many a row of lights could be seen crossing Trawbreaga Bay" (1995: 15). Stepping-stones across the narrowest stretches of the Bay were indicated on the 1900 edition OS maps of the Isle, and they may well still be in evidence, and use, today (see below). These landscape thresholds seem to echo the theories describing the ways landscape can be used to influence people's perception and experience of place. If reaching these places involved crossing major landscape features, this would have acted to inform and enhance the experience of visiting the carving site. This would have lent the journey added significance, and heightened its symbolic importance.

Are these patterns the sheer coincidence of distribution, the product of 'the search for meaningful landscapes', or are they relevant observations for understanding the past? The second Donegal cluster at Mevagh, Rosguill Peninsula, also lies at the northern edge of the region's rock art distribution. Mevagh too is situated on a long thin Peninsula joined to the mainland by a short stretch of flat, low-lying terrain between the towns of Carrickart and Downies. Whether this stretch of land represents what, during prehistory, was a tidal land bridge similar to the Isle of Doagh case, is less certain, but remains a possibility. The repeated nature of these patterns strengthens the possibility that they are meaningful.

Taking a closer look at the regional clusters, it is also interesting that each cluster itself has a localised nexus in terms of panel numbers (see Figures 3.3 – 3.5). In the Loch an Dúin Valley the panels consistently occur singly as dispersed panels, with a general clustering in the northwest of the valley and outliers in the southeast, around the lake. Mid-way between these extremes is a cluster of four panels making up three of the structural stones within the wedge tomb and an associated standing stone (Figure 3.9). Although the use of these stones appears to be intentional (see Chapter 1), it seems unlikely that these substantial panels were collected from across the entire valley – it seems more likely that they came from the immediate area. With the exception of a single outlier close to the lake, these panels lie on the opposite riverbank to the rest of the panels in the valley. The locale is also distinctive in topographical terms as a slight raised glacial deposit, referred to as Loch an Dúin Hill (ÓCoileáin 2003). This is emphasised by ÓCoileáin 's (2003: 176) survey, which also indicates that the locale was significant in terms of the nature of the field walls enclosing it (see below).

Likewise, at Drumirril, a key cluster of 11 panels, all with notably complex motifs, occur within just a few metres of one another (Figure 3.10). This group again lies at the centre of the distribution, and is located on the most visually distinctive natural outcrop in the area. A low snaking wall and trackway enclose the hilltop, from which each of the surrounding panel locations can be viewed (though the reverse is not the case). On the Isle of Doagh, the major cluster, and centre of motif and compositional complexity, is at Magheranaul Lower. In contrast, the possible attraction of the area in landscape terms is less clear, except for its proximity to the opposite shore of Trawbreaga Bay. This is a shore-side location, and the panels further inland to the west in Carrowreagh townland, as well as some of those in the more elevated terrain above Magheranaul Lower, are obscured from view by the local topography. The six-inch maps and aerial photographs show that the panels fall within a circular area defined by field boundaries to the north and a natural curve in the coastline to the south, a curve that represents the closest point to the opposite shore (Figure 3.11 – 3.12). The circular field boundary is presumably related to the burial ground (reputedly a cillin for unbaptised children) and cross slab at its centre (Lacy 1983: 282-3). Whether this circular enclosure could be referencing the much earlier significance of this particular area remains highly speculative. However, given the identification of an Early Christian horizon at Drumirril as part of the present research (see Chapter 5), and a 'ritual' (ÓCoileáin 2003: 34, 176) enclosure around the wedge tomb panels at Loch an Dúin, this aspect of the Isle of Doagh landscape would be worth exploring in further detail in future research.

The extent and quality of the rock art surveys in these three regional clusters reinforce the significance of the proposed existence of these further nexuses of panels in each; it is highly unlikely that equivalent groups of panels are yet to be found within these regional clusters. It is tempting to interpret the pattern as a micro-scale repetition of the wider rock art distribution. In other words, the wider pattern of rock art distribution across the three regions is repeated within the microcosm of the regional clusters. As Knapp and Ashmore have noted, "landscapes are also commonly thought to embody the cosmos in miniature, wherein one's own town, home and body occupy the symbolic centre of the universe" (1999: 13-4). This is an interesting idea to consider in relation to the three regional clusters and their respective focal panels. This is also reminiscent of the statement by Taçon that "by connecting to the land at unusual, specially marked sites a recognition of one's own place in the universe, in both time and space, results" (1994: 127). Again, the concept of nested landscapes seems particularly apt as a way of conceiving these 'patterns within patterns'. As we shall see, in each of the three nexuses the wider regional motif pattern is also repeated (see Chapter 6).

Such patterns are reminiscent of the kinds of subtle interrelationships that have been identified between focal and satellite tombs in megalithic complexes (e.g. Cooney 1990). Here the former are often large, elaborate, located in commanding positions, and referenced by the entrances to the latter (Cooney 2000: 147). The fact that this broadly contemporaneous tradition features this kind of spatial interplay between built monuments lends weight to the identification of focal panels within the regional rock art clusters. Surprisingly, research has found that focal passage tombs, as well as prominently placed tombs of other types, were built long after their associated satellite tombs (Bergh 1995; Cooney 2000: 150-1). This suggests that we cannot assume that focal rock art panels represent the earliest in their clusters. Instead, we might wonder whether the natural places, now intensely marked with motifs, formed the initial points of focus within these landscapes; the

Magheranaul shore, Loch an Dúin Hill, and the central Drumirril hilltop. In megalithic complexes such as that at Fenagh, County Leitrim, Cooney (2000: 150) has also identified what appear to be distributional patterns that reflect the wider regional traditions in the landscape position of different types of tombs. At Fenagh, the positioning of the different tomb types both in terms of their landscape context and their spatial relationships echo those operating at a broader scale across the wider region (ibid). The fact that we see these nested spatial relationships in Neolithic tombs strengthens the relevance of these observations for the practice of rock art.

As a tidal 'island', the Isle of Doagh might be conceived as a bounded, and liminal, space, from which one could look across to the wider landscape. Its impermanent, shifting relationship to the mainland distinguishes it from other islands in the region, such as Inch, on the southwest coastline of the Inishowen Peninsula. Drumirril townland features a series of undulating 'mini-drumlins', almost replicating the wider South Ulster drumlin belt landscape in miniature form. Loch an Dúin represents a glacially formed valley cut deep into the mountains. This forms an enclosed landscape where one's view to the lowlands and coast is overpowered by the visually dominant features within the valley, and the inward-looking character of the topography. Again, it seems possible that these three landscapes might have lent themselves to the reinforcement or revealing of certain ideas and understandings of the world, and the encouragement of certain perceptions of the landscape, as described by Taçon (1999). On their own, these experiential observations are highly subjective. Yet within their wider regions these clusters appear to be distinctive in their panel numbers, their peripheral location in comparison to other rock art panels, their separation from the other panels by major landscape features, and potentially in their distinctive motifs. The fact that these patterns are repeated across the three study areas reinforces the proposed significance of these observations.

Are these clusters also distinctive in terms of their other landscape characteristics? If people actively sought to express the significance of these places, or to harness the emotive resonance of these locales, we might also expect the rock art clusters to be situated at, or near, boundaries, landmarks, and / or viewpoints in the landscape, that are formed by a range of intersecting landscape variables.

Bedrock geology and outcrop exposures

In exploring the rock art distribution in relation to a range of landscape variables, bedrock geology and outcrop distribution provide an obvious starting point. The work presented here makes an important distinction between bedrock type and actual availability of surface rock. These need to be considered in tandem – that is, both categories had to have been 'right' for rock art to have been carved. At one level, the bedrock geology will have a degree of impact on the general distribution of rock art across Ireland. For instance, the nature of the bedrock geology would render particular regions more suitable in terms of the characteristics of the stone available. As Johnston (1989:237) has noted, some parts of the Irish midlands may have been predisposed to a lack of rock art owing to the soft nature of the limestone bedrock, which would have been highly vulnerable to erosion. This echoes the situation in Britain, where there is little rock art across the chalk downs of southern England (though see Lewis et al 2000). As noted in Chapter 1, the majority of Atlantic rock art motifs seem to indicate that durability was an important part of the carving tradition, with considerable care taken to produce deeply carved forms, rather than superficial renditions of the motif designs. As noted above, the idea that Neolithic carvers possessed a sophisticated awareness of the structural qualities of the stones they selected for carving is well in keeping with the wider evidence for the specific selection and deployment of materials based on a range of aesthetic and functional characteristics during the Neolithic and Bronze Age (e.g. O'Sullivan 1997: 28-30).

Within general spatial patterns of bedrock type, the effect of surface geology will also have a significant impact on rock art distribution. Recent archaeological and anthropological work has acknowledged that ridges, outcrops and other geological formations would have formed important features and landmarks in the prehistoric landscape (e.g. Ingold 1986; Tilley 1996; Roe and Taki 1999; Cummings 2002b; Calado 2002). The literature has tended to focus on social groups whose lifestyle incorporated (or is interpreted as incorporating) a significant degree of mobility. However, as argued in Chapter 1, the significance of these landforms may well have continued into periods when communities were partly or largely sedentary, yet continued to move around their local regions (see Cooney 2000, 2003). If we accept that rock art dates back into the Neolithic then such features may well have formed important locales for the practice of a range of activities, such as the carving of rock art motifs, and may have acted as landmarks that oriented people moving across their regional landscapes. Apart from cases where panels are portable, or are in secondary context (e.g. reused as standing stones), there obviously had to be surface stone available for carving. This factor is supported by the general tendency for rock art to be located in rocky areas, as opposed to isolated specimens within predominantly rock-free landscapes. One of the questions posed here was to what extent were distinct clusters of surface geology (identifiable to modern eyes) targeted by the carvers? In other words, might these rocky formations have held particular significance, or did any rock do?

Subtle distinctions in the texture, colour and form of the stones may also have been an important consideration. The effect of specific geological formations on rock art distribution has been noted in parts of the Iberian corpus (Diaz-Andreu 2001:164-6; García 1990). In the Villar del Humo area the panels cluster on *rodeno* sandstone, which is distinguished from the surrounding bedrock types by its red colouring. In this case, Diaz-Andreu (ibid) suggests that the colours of rock surfaces may have held special symbolic or ideological significance during prehistory, and therefore influenced the distribution of rock art sites. Similar observations have been made in relation to quartzite formations in Arnhem Land (Taçon 1991). The significance of colour and texture has been explored in terms of the selection of particular stone types for use in megalithic monuments and artefact production in Britain and Ireland (O'Sullivan 1997; Jones 1999; Lynch 1998; Cummings 2002a; Cooney 2005), but relatively little work has been conducted in relation to rock art (see Tilley 2003).

One exception is a recent study by Jones (2004, 2005a, 2005b). This indicated that consistent associations could be identified between fissure shapes and types of motifs in Kilmartin, Argyll. The identification of significant patterns in such forms is potentially highly subjective, and it is difficult to assess whether such subjective observations can really be important structuring forces, or whether they are simply a function of the local geology without a comprehensive control survey of uncarved stone. However, considering the importance of fissures in rock art compositions around the world, where anthropomorphic and zoomorphic figures repeatedly disappear into or appear out of cracks and fissures in the rock surface, or motifs respond compositionally to their presence, such features were clearly commonly taken into account across a wide range of rock art traditions (e.g. Shee 1968:145; Lewis-Williams and Dowson 1990; Lewis-Williams 1997: 328-34; Beckensall and Frodsham 1998: 51; Alves 2002:64-6; Bradley et al 2002; Keyser and Poetschat 2004; Coles 1999, 2005). Within the study areas investigated here, some panels feature motifs that incorporate fissures and natural solution holes into their form and composition. This is especially common in the Louth / Monaghan rock art (Van Hoek 1997). Bradley (2000: 68) has suggested that the natural features may have been perceived as ancient carvings during prehistory. As in other rock art traditions, the patterns of interaction with natural features at the landscape level are echoed at the panel level, where motifs define boundaries, entrances and distinctive features of the stones they inhabit (see Taçon 1999: 48). This area is therefore an avenue of research for future consideration for the Irish corpus. Chapter 6 incorporates the compositional use of natural depressions and fissures as part of a wider stylistic analysis.

Previous geological studies have tended to operate at either a very broad, or very focused, level. For example, they have concentrated on identifying whether different panel types (outcrop, boulder, portable stone) were selected intentionally. Johnston (1989: 30, Table 6) noted the dominance of carved outcrops in some counties (Donegal and Louth / Monaghan), whilst Long (2002) documented boulders as the favoured surface type on the Dingle Peninsula, despite the general availability of both types of rock surfaces. In parts of Britain, Stewart (1961) and Bradley (e.g. 1996) have addressed the variability of motifs across these two types of panels, finding that cups favour boulders, while more complex motifs favour outcrops. Bradley et al (1993a) have also taken surface rock availability into account in their analyses of patterns of distribution across local concentrations of rock in northern England. These studies have emphasised that carved surfaces did not extend across the full extent of available rock, and therefore seemed to be influenced by aspects such as views. The potential effect of spatial variations in geology on rock art distribution has not been investigated in great detail in Ireland, particularly in an inter-regional manner. Indeed, most rock art research has suggested that, apart from the obvious need for carvable and durable surfaces, geology has not significantly influenced rock art distribution (e.g. Bradley 1997: 90; Johnston 1989:

257, 1993: 260). Johnston (1989: 31) has stated that “petroglyphs were put on whatever type of rock was available rather than showing any particular preference in rock type”. However, this observation applies only at a very general regional level. When a more detailed analysis of geology and rock art distribution is attempted *within* these regions, as presented below, distinctive spatial patterning becomes apparent.

The bedrock geology formation names, codes and descriptions are listed in Table 2, and the data used to create the graphs discussed below is tabulated in Appendix B.

Inishowen Peninsula

The distribution of rock art panels across the Inishowen Peninsula appears to respond significantly to the characteristics of the bedrock geology, and to a lesser extent, outcrop availability. Taking a look at the wider rock art distribution for County Donegal as a whole, the majority of panels, with the obvious exception of the Mevagh cluster, fall within or near the Termon Formation (TE), which consists of banded semi-pelitic and psammitic schist (Figure 3.13). This formation runs diagonally through the County and across widely varying topographic zones from coastal lowland to mountainous inland areas, emphasising the apparent intentionality with which sites seem to be located along this geological zone. As Figure 3.14 demonstrates, this is not simply related to the relative size of the different geological formations. Even putting aside the massive concentration of panels on the Isle of Doagh, the panels still favour this bedrock zone. Field observations on the Inishowen Peninsula as part of this study demonstrated that there are a wide variety of colours and textures within the Termon Formation from dense steel-grey rock through to softer sandy textured pale grey rock. Future work comparing these aesthetic attributes with other neighbouring formations might prove useful. Interestingly, the outcrops at Mevagh, the second regional cluster in the Donegal region, are located within one of two very restricted areas of Clonmass Limestone Member Formation (dolomitic marble, calc and pelitic schists), possibly indicating that this location was also significant in geological terms.

On the Inishowen Peninsula the Termon Formation is flanked by quartzites, which are generally harder textured than sandstones and schists, perhaps making them less suitable for carving. This perhaps explains the scarcity of rock art across the terrain adjacent to the Termon Formation. It is less clear why the rock art panels do not extend into the formations further southeast, including the Upper Crana Quartzite, Fahan Slate, and Fahan Grit Formations, all of which feature psammitic schist. This is particularly curious, since other prehistoric monument types extend across the entire peninsula, though favouring the lowland slopes and flanks of the Inishowen mountains (see below). Part of the answer appears to lie in the relative scarcity of surface outcrop across the centre of the peninsula (see Figure 3.15). However, there are also large concentrations of outcrop on the eastern coast, corresponding with the Inishowen Head Grits and Phyllites Formation, an area entirely devoid of rock art other than a single cup-marked stone at its southern extent. This formation consists of psammitic and pelitic schist with grit, one that superficially sounds much like the Termon Formation. Future field analysis comparing the characteristics of these formations could aid in determining whether factors such as rock texture and durability may have influenced the distribution of panels. The distinct lack of surface outcrop in the south of the peninsula partly explains the large gaps in the rock art distribution here. It is possible, given the location of the city of Derry at the base of the Inishowen Peninsula, that much of the outcrop may have been cleared from the surrounding townlands as part of land improvement. Nevertheless, the distinct preference for Termon Formation geology is striking, and not easily explained via either taphonomic factors or more obvious concurrent landscape variables and characteristics. This may suggest that specific choices were made in terms of the carvers' preferred materials.

Moving to a more detailed scale, it is interesting that the Isle of Doagh, which features such a dense cluster of panels, does not exhibit greatly more surface outcrop than some of the surrounding areas of Termon Formation, though its outcrops are relatively large. Likewise, the panels near the centre of the formation are clustered around a series of lakes towards the edge of a concentration of surface outcrop. Within the preferred geological formation then, specific parts of the landscape, including water bodies and a tidal island, seem to have been selected for the practice of carving. Thus, whilst we should not underestimate the influence of specific geological types on rock art distribution, there are a range of interwoven factors that ultimately determined the locations deemed suitable for carving. It is also notable that the Isle of Doagh rock art extends across only part of the available outcrop (Figure 3.16). The possible influence of differential views from different outcrop groups on the island is investigated below.

The Mhuirthemne Plain, Counties Louth & Monaghan

The distribution of the Louth / Monaghan rock art is even more straightforward in geological terms. The panels are, without exception, consistently located on Inniskeen Formation (IN) turbidite (Figure 3.17). Turbidite is a type of sandstone more widely known as greywacke, and one characterised by graded bedding. The Louth / Monaghan outcrops form part of the wider Longford / Down Lower Palaeozoic Silurian zone. This formed an important source of quarry stone for use in the passage tombs of the Boyne Valley (Eogan 1986: 113-4; Cooney 2000: 136, Bradley 1997:119, Mitchell 1992). Greywacke was also utilised in other carved passage tombs, such as Knockroe (O'Sullivan 1997). Clearly, the suitability of this particular stone type for carving was well appreciated by the creators of both rock art and megalithic art. The rock art avoids the areas of Dinantian Limestone towards the northeast of the distribution, with only the megalithic panel at Killin (itself sandstone) located on this formation. As Figure 3.18 demonstrates, the preference for the Inniskeen formation is predominantly driven by its extensive coverage in this region. However, though the panels occupy a specific distribution within the envelope of this bedrock type, the use of this particular sandstone does appear intentional, based on a more detailed analysis of panel distribution. The western-most site, Miskish More, is located right on the edge of the IN turbidite, where it meets a section of Magoney Bridge Formation (MB), which consists of medium to thick turbidite and sandstone. Similarly, the site at Edenakill lies at the northern edge of the IN turbidite where it meets the Central Belt (CB) of undifferentiated turbidite and mudstone. Thus, whilst it is not surprising that widely varying stones that may not have been suitable for enduring carvings, such as the Mullaghfin Formation (MF) (Pale grey Limestone) to the west, and the Dinantian Limestones of the Cooley coast, have been avoided, it is interesting that the carvers seem to have actively differentiated between slightly different types of turbidite. Of course, an alternative explanation would be that carvings might have eroded away in areas of softer bedrock formations. However, the distribution thins out markedly well before the boundaries of the viable bedrock, which suggests that differential preservation alone does not explain the present distribution.

Within the extent of IN turbidite we can investigate further potential patterns by bringing in outcrop distribution (Figure 3.17). The Louth / Monaghan panels are predominantly distributed across a continuous linear spread of outcropping rock that runs from just west of Drumirril in the WSW, towards the Dundalk estuary in the ESE. Of the 64 panels there are four outliers. Only Ballybarrack, a stone reused in a souterrain, and one exhibiting somewhat unusual decorative effects that are more in line with megalithic art (see Chapter 1), lies on the outcrop cluster to the southeast. Miskish More lies at the edge of a northwestern outcrop cluster that predominantly lies within the Magoney Bridge Formation. Lastly, the panel at Edenakill, now a standing stone, lies in an area relatively devoid of substantial outcrops. The megalithic panels from the Kilcurry and Castletown River confluence contrast with the outcrop rock art, being located in landscapes that are also relatively clear of outcrops.

Within the outcrop distribution a further level of patterning can be discerned. The Drumirril area, where over 55% of the two Counties' rock art is concentrated, features the densest cluster of individual outcrops across the whole of the Inniskeen Formation (Figure 3.19). Large areas of generalised outcrop are indicated in the surrounding region, but these do not exhibit the distinctive topographic patterning seen at Drumirril where a closely packed series of small outcrop 'islands' converge. This is a qualitative observation, but one that seems significant, and renders the area immediately distinct from the surrounding landscape, in geological terms. Is it possible that these landforms lent Drumirril a distinctive character, and one to which the carvers responded?

One of the explanations offered for the Louth / Monaghan rock art distribution, which exhibits a rather linear SW-NE distribution, is that the carvings mark a ritual routeway leading towards the concentration of megalithic tombs in the mountains of the Cooley Peninsula (Bradley 1997: 119-20). It is tempting to propose that the linear distribution of outcrops and ridges across this lowland terrain may have formed an important means of navigating through the undulating lowland landscape towards the confluence of the Kilcurry and Castletown Rivers, the Dundalk estuary, and the surrounding monuments.

Dingle Peninsula

On the Dingle Peninsula, the majority of the bedrock geology consists of various types of sandstone. Because of this, the distribution was not expected to be as distinctive with regard to geology, in comparison with, for instance, the Inishowen Peninsula, which exhibits a greater range of bedrock types. It was expected that the rock art sites would be distributed across a range of different sandstone types. However, this was not entirely the case. With the exception of the important cluster in the Loch an Dúin Valley, the majority of sites cluster in and around the Ballymore Sandstone Formation (BM) (rhythmically bedded sandstone), with additional sites lying just a short distance from this formation (Figure 3.20). The second most preferred formation is the Annascaul Formation (AL) (mudstone, siltstone and breccia). By far the majority of panels on the peninsula consist of medium to large erratic boulders. At this stage it is not clear how closely the geology of the erratic boulders on the Dingle Peninsula relates to the bedrock formations below them, as this would require extensive specialist survey.

The distribution of panels is partly, but not entirely, driven by the area of different geological formations, as displayed in Figure 3.21. The Cappagh Sandstone (CA, purple cross-bedded sandstone), Dinantian Limestone (DIN, undifferentiated limestone) and Kilmurry Sandstone (KM, Aeolian sandstone) Formations are notably devoid of panels in spite of their moderate to predominant sizes. Though it is not surprising that rock art is absent from limestone zones, its absence from varying sandstones may again indicate a preference for certain textures or other structural or aesthetic characteristics of the stone on the part of the carvers.

The Loch an Dúin cluster is already distinctive in a distributional sense, as one of the few clusters located on the northern side of the peninsula, and therefore at the margin of the rock art distribution. When compared in terms of geology, this cluster again stands out as the only group of panels, with one exception, on the Coumeenoole Sandstone Formation (cross-bedded sandstone). The single exception is that of Ballintlea, a massive upstanding outcrop featuring a line of six cups, and a (modern) cross. This site is also distinctive in terms of its motifs and composition, as the only *line* of cups in the region in addition to that on one of the capstones of the Ballyhoneen wedge tomb in the Loch an Dúin valley (see Chapter 1).

Given the preference for boulders over outcrops in the Dingle corpus, it is perhaps not surprising that the rock art distribution bears little relation to the outcrop distribution. Only Ballintlea is a probable outcrop (though this is based on its substantial size - 5.5m in length - rather than definite proof that it is not an earthfast boulder). The preference for boulders is in direct contrast to the Inishowen and Louth / Monaghan traditions, patterns reflecting the regional idiosyncrasies of the tradition. The Dingle landscape is literally strewn with boulders, much more so that even the most unimproved parts of Louth / Monaghan and the Inishowen Peninsula. Outcrops are available, but, as demonstrated in Figure 3.20, not to the extent of that in the other two study areas. These are also frequently in the mountainous central areas of the peninsula that are less readily accessible, or along the shoreline – an area where rock art carvers seldom focused their activities.

Considered in isolation, the geology maps for Dingle are provocative in terms of the apparent support they lend to the idea that subtle changes in the geology played a key role in rock art distribution. In general though, a range of prehistoric site types all cluster along this stretch of the peninsula (see below), possibly due to the more sheltered nature of the southern valley system that runs along the mountainous peninsula. The sites also favour the south-facing slopes, areas that would have been favoured for a wide range of settlement-based activities. This pattern of distribution would also fit in with some of the current theories on the location of rock art being along well-traversed routeways through the landscape. As a long valley connecting the Dingle peninsula with the mainland, this terrain would have provided easy access to various parts of the peninsula. Indeed, it still does today, with the main roadway between Dingle and Tralee running along this valley system. In geological terms the distinctiveness of the Loch an Dúin Valley panels reinforces the proposal that this group of panels played a different role from those dispersed across the rest of the Peninsula. However, the general preference for the Ballymore Sandstone Formation may reflect broader topographical characteristics, rather than the active choice of this material for carving.

Discussion

When interpreting these results we need to keep in mind that apparent patterns might be in fact due to concurrent landscape characteristics – that is, there may have been associated reasons for selecting particular geological formations, as seen in the general preference for the southern valleys of the Dingle Peninsula. For instance, these formations could have been associated with particular topographic, soil, hydrological, or botanical trends (to name but a few environmental possibilities). We should not, therefore, leap to the most obvious conclusions in explaining spatial co-occurrence. However, across the three areas, the detailed patterns of distribution do seem to point towards the active selection of particular geological formations for carving practices. This is reflected by the number of panels located on certain formations, by the location of outlier panels on the boundaries of preferred formations, and the fact that these patterns cannot be explained by the relative size of these geological zones.

Topographic situation

As noted above, particular parts of the landscape within zones of geological preference seem to have been favoured by those who produced the rock art of these three study areas. As numerous authors have demonstrated (e.g. Johnston 1989; Bradley et al 1993a:129), rock art across Britain and Ireland generally tends to be located at intermediate zones between lowland and upland. Johnston's study of rock art sites in Ireland, excluding Cork and Kerry, demonstrated that rock art generally clusters at mid-level altitudes, with a marked preference for terrain under 133m OD

(Johnston 1989: 241-4, 1991: 90). This broad study, based on Ordnance Survey Ireland (OSi) ½ inch mapping, provides a useful baseline with which to compare the more detailed regional analysis presented below. The study areas addressed here generally follow this widespread pattern, with some regional idiosyncrasies. Here, rock art locations are compared with the area of elevation zones at 50m contour levels within the study areas overall in order to assess the significance of the apparent patterns in rock art distribution. The data was collated using 50m spot height (for Louth / Monaghan) and 10m contour (for Dingle and Inishowen) data purchased from the OSi. This data was transformed into digital elevation models (DEMs) using ArcGIS software. The analysis was limited to 50m resolution datasets in order to maintain a reasonable processing speed with the computing facilities available. In future work, finer-scaled analysis of particular areas would be useful, particularly in the subtle undulating lowlands of the Louth / Monaghan area. Nevertheless, the level of detail achievable with this data has allowed an apparent preference for subtle topographical zones to be identified.

In the Dingle study area, the majority of sites are located on the foothills of the major mountain ranges of the Peninsula (see Figure 3.22). However, in Louth / Monaghan, and in the Inishowen Peninsula the situation is slightly different, with a marked preference for lowland areas, despite the availability of physiographic zones at higher elevations nearby. These areas demonstrate that we should be careful not to generalise distributional patterns on the basis of well-known concentrations of sites, since this elides potentially significant regional variations.

Note: The data used to create the graphs discussed below is tabulated in Appendix B.

Inishowen Peninsula

Along with the Dingle study area, the Inishowen corpus exhibits a greater range of elevations (from 0-50m to 200-250m) than the Louth / Monaghan group (Figure 3.23). The general trend in the Inishowen data is decreasing numbers of panels with increasing elevation (Figure 3.24). A similar trend is evident in the Louth data (see below). The Inishowen data displays a particularly rapid decrease in panel numbers, compared to the gentler decrease in the area of the elevation zones. Thus, whilst the figures partly reflect the topography of the peninsula, there is a marked preference for lowland terrain under 100m elevation, with c.65% of panels positioned within a zone making up just 38% of the peninsula. In part, this reflects the large number of panels located on the low-lying Isle of Doagh. However, even when this unusual concentration is excluded the pattern remains identifiable. Only a small number of sites extend onto terrain above the 100m contour line, in the northwest of the Peninsula. These sites cluster around the entrance to one of the major mountain passes across the interior between Slieve Snaght and Bulbin Mountain, a pass featuring a series of small lakes. As noted below, bog coverage may also play a role in the known distribution.

The Mhuirthemne Plain, Counties Louth & Monaghan

The Louth / Monaghan rock art generally favours the lowlands that stretch from the more dramatic drumlin (or so-called ‘basket-of-eggs’) landscape of Monaghan out towards the Louth coast. The sites therefore contrast somewhat with the types of topographical locations typical of, for instance, the Iveragh Peninsula or Northumberland rock art. The general location bears some resemblance to some of the southern Scottish material, which favours the coastal lowlands (Morris 1977, 1979). Even here though, these are frequently paired with upland panels in mountainous inlands, even if at moderate elevations. Such panels are, as far as we know, lacking in the Cooley and Slieve Gullion mountains to the north and east of the Louth / Monaghan corpus. Furthermore, the Louth / Monaghan sites appear to focus specifically along the 50m contour line within the 0-50m elevation zone, with 68% of the panels located within a zone making up just 37% of the study area (Figure 3.25 – 3.26). This observation demonstrates the manner in which the carvers appear to have actively honed into a specific landscape zone. It is possible that this pattern reflects the active choice of a different landscape feature that happens to coincide for physiographic reasons with this contour (e.g. water table levels, geology etc.). The main linear spread of panels is located along a zone where, using 50m contour lines, the local landscape exhibits a great deal of contrast in terms of elevation (Figure 3.25, top). This echoes the field observations made in Chapter 1 regarding the apparent preference for small hills and ridges within this study area. Even the outlier Miskish More lies just west of a localised prominence within the 50-100m elevation zone. This awareness of relatively small changes in the local topography echoes similar observations in relation to the siting of Neolithic monuments on small hills in Brittany (Roughley 2005).

What seems more significant is the location of Drumirril at the extreme southeastern extent of Monaghan’s Drumlin Belt (see Figure 3.25, bottom). This resonates with the description given by Taçon (1999) of the significance of junctures in the geology, hydrology or vegetation – but in this case it is in the topography. It seems possible that this reflects the active intention of the carvers and their response to this point of landscape transformation. In this way, subtle topographic features appear to have played a key role in the positioning of the Louth / Monaghan panels.

Dingle Peninsula

The Dingle panels exhibit a slightly different trend again in terms of elevation. As noted above, the Dingle and Inishowen Peninsula panels exhibit a greater range of elevations (from 0-50m to 200-250m) than the Louth / Monaghan group (Figure 3.27). A slight increase in numbers is evident in the Dingle data into the 50-100m zone, compared with the much lower figure for the 0-50m elevation zone (Figure 3.28). Again, this is not simply a reflection of the Loch an Dúin cluster. This contrasts with the trends in both the Inishowen and Louth / Monaghan panels, where their numbers consistently decrease with increased elevation. This may in part reflect the nature of the topography in the area. Although mountainous zones are present within Louth / Monaghan and the Inishowen Peninsula, these are more restricted in their distribution, whereas the Dingle terrain is dominated by a long mountain ridge along the spine of the peninsula. Nevertheless, this indicates that intermediate to upland zones seem to have been actively avoided by the carvers in Louth / Monaghan and Inishowen in spite of their availability within the local area. In Inishowen, as already noted, this may partly reflect survey bias and / or bog coverage. The Dingle data also displays the greatest divergence between the panel numbers and the changing areas of the elevation zones (Figure 3.28). Here, as the areas of the zones decrease, the panel numbers increase markedly, demonstrating that the pattern of location is intentional rather than simply random.

Discussion

With reference to topography, broad trends are evident across the three study areas, including the preference for generally lowland elevations and coastal regions. This trend contrasts with some of the more elevated rock art sites elsewhere in Ireland and Britain. However, within this, regional differences are also apparent. There are variations in the preference of the 0-50m and 50-100m zones between regions, with the Dingle panels more frequently located on terrain within the latter elevation band. While the Dingle and Inishowen groups display a preference for coastal areas in the foothills of these mountainous peninsulas (keeping in mind the potential distribution biases involved), the Louth / Monaghan group occupies a specific topographical band that runs inland from the Dundalk estuary and exhibits exaggerated contrasts in elevation. Thus, within wider patterns there are clear regional variations in terms of rock art's relationship to topography. In contrast to the landscape theories presented above, it is not always what archaeologists might consider the most *dramatic* topographical features that seem to have attracted carving activities. In the case of Drumirril and the Isle of Doagh in particular, the concentrations of carvings may be referencing much more subtle, yet potentially highly symbolically charged, topographical characteristics.

Purcell (2001: 88-91) identified a dichotomy on the Iveragh Peninsula between accessible and inaccessible panels. However, on the whole the Dingle, Louth / Monaghan and Inishowen sites were readily accessible in terms of the topography. The physical danger described by Purcell in accessing the Iveragh sites may well be a unique regional feature of this Peninsula. It is also possible that there is an element of survey bias creeping in here, in that dangerous locations certainly exist in Donegal and Dingle, yet these locations have probably received less attention in terms of archaeological survey. However, the steep and elevated landscapes of these Peninsulas are not available in the Louth-Monaghan rock art distribution. As explored above though, other (in some cases less obvious) landscape barriers may have acted to separate the regional clusters from the surrounding dispersed panels; the tidal flats of Trawbreaga Bay, the Fane River, and the mountainous spine of the Dingle Peninsula.

Wetlands and water bodies

Several studies around the world have noted the spatial association between water bodies, or flowing water, and rock art locations (e.g. Bradley et al 1993b; Bradley 1995a: 94, 2000: 66;

Bengtsson 2004b: 135). In Waddington's (1996) work, he found that watercourses also defined his proposed grazing areas featuring rock art, effectively encompassing the inscribed locales. Johnston's (1989: 244-5, 1991:90) work has already established that rock art sites across Ireland broadly favour positions in relatively close proximity to key water sources, with the majority of panels situated within 50m of them. This was the first study to assess the statistical significance of more casual observations that rock art possibly exhibits ideological links with water. O'Sullivan and Sheehan (1993: 83) went as far as suggesting that rock art may have played a role in a 'water cult'. As Johnston's (1989: 244; 1991: 90) work points out though, the nature of the Irish landscape is such that one is never very far from a water source of some kind. However, considering that the practice of hoard and other votive depositions in wetland areas and river crossings has been well documented for both the Neolithic and Bronze Age (e.g. Bradley 1990; Cooney and Grogan 1994: 139; Cooney 2000: 208-10), such a proposal deserves investigating more closely. These types of locations resonate with Taçon's (1999) proposal that hydrological boundaries play an important role in rock art locations. Water bodies would have formed important landmarks in the local and regional landscape, and would have represented open spaces within a largely wooded landscape. For these reasons they are also highly likely to have held symbolic significance. The unique way in which carved motifs themselves serve to retain and direct the flow of rainwater lends further weight to this potentially significant association (e.g. Waddington et al in press)

Water features are frequently only broadly mapped in modern cartographic sources. Accurately reconstructing the full extent of these landscape features during prehistory requires considerable additional research. In order to investigate the reputed association between water sources and rock art sites as part of the present study, a detailed dataset was collated. This incorporated a range of water bodies, including rivers, streams, and springs, as well as marshland, bog, and former wetlands. To achieve this, two separate data sets were employed in the GIS analysis. The first was derived from Ordnance Survey Ireland vector (ie., line, point, and polygon) data. This indicates the locations of rivers, streams and lakes, and is therefore representative of the contemporary landscape.

Each of the study areas, particularly across the stretches of lowland terrain, would have undergone drainage during recent centuries in order to improve the arable status of the land. By identifying former wetlands that predate some of the more recent drainage and land improvement a zone of *potential* prehistoric wetlands can be identified. In order to reconstruct the wetland zones of these areas a second dataset was created for each of the study areas specifically as a part of this research project. This dataset indicates the locations of wetland zones of all types, and areas of alluvium that represent former wetlands. This wetland layer was digitised from the GSI's 19th Century hand-coloured six-inch maps, which were described above. By way of example, in the Louth / Monaghan study area the wetland areas indicated on the geological maps included areas labelled as a variety of wetland types; boggy areas, bog, ponds, gravel and sand areas around rivers, dried up lakes, gravel sand and silt, swamp, flat, estuarine alluvium, sand and fine gravel under bog, boggy flat, old bog, flooded in winter, and liable to floods. By including water bodies, waterways, and areas of other wetland types, it is possible to explore whether prehistoric communities may have made a distinction between these different landscape features when selecting locations for carving. That is, were different types of water bodies treated differently?

Though drainage works would have occurred prior to the GSI survey, this material currently represents the best cartographic means of reconstructing past wetlands for these particular study areas, without extensive field survey. The Discovery Programme employed a similar approach to the identification of potential prehistoric lakes in the southwest of Ireland (Grogan pers.comm.). Though not possible here, an ideal reconstruction would also include extensive geomorphological analysis in order to investigate the changes in the wetland and dry-land landscape zones through time. When the wetland zones are compared across the different editions of the OSi six-inch maps, there are minor inconsistencies between them with regard to some of the small areas of marshland and bog (typically those under 200m in diameter). As a result, these small wetland areas will not be reliably represented in the GSI data. Thus, whilst improving on previous studies in terms of both detail and the reconstruction of former wetlands, the present study does not take into account absolutely all of the smallest wetland areas. In other words, in its current form the collated data slightly underestimates the full extent of former wetland as observed in the different 19th Century map editions. These additional areas could be added in future work.

As demonstrated below, the three study areas, like much of the island of Ireland, feature abundant water sources. The production of the Dingle Peninsula dataset revealed that vast tracts of the peninsula were dominated by expanses of blanket bog. Blanket bogs accumulate under conditions of high rainfall and humidity (Coulter et al 1998: 23), and therefore do not necessarily represent former wetland areas. Many of these remain undated but as detailed below, some areas date back to later prehistory (c.3500BP; see Dodson 1990). Initial observations indicated a similar situation for the Inishowen Peninsula. As a result the GSI data was initially thought to be less useful in terms of investigating rock art distribution in relation to wetland zones in the Dingle and Inishowen study areas. As a consequence, and with the time-consuming collation process in mind, the Dingle data was collated to test whether the GSI data could be usefully employed in the assessment of wetlands, and only two small study areas (one coastal, the other inland) were investigated for the Inishowen Peninsula (see below). By comparing rock art distribution with the extent of bog coverage, an unexpected pattern arose, as described below, which seems to indicate that bog coverage has had a significant taphonomic impact on the known rock art distribution.

The Mhuirthemne Plain, Counties Louth & Monaghan

In the Louth / Monaghan area the rock art is located in an area of rolling lowlands where small wetlands and localised areas of bog are relatively common (Figure 3.29). As noted above, though these areas themselves have not entirely escaped the land improvement schemes of the area, the general extent of this rocky and marshy zone may be a reduced version of the original due to recent land improvement. Within this area lies a series of small lakes and associated wetlands; Drumcah Lough, Topras Lough, Cortial Lough and Glebe Bog, which may represent a former lake. The majority of the panels cluster either side of a bend in the Fane River, with the remainder fanning out in an easterly spread towards the estuary at Dundalk. With a few exceptions, the *in situ* panels cluster tightly around the line of small lakes across the centre of the distribution.

Miskish More, though not *in situ*, represents an obvious exception as a westerly outlier. This panel is located along the eastern bank of the Fane River, just a few metres from the waters edge. The Cortial, Drumsinnot and Carrickallen panels also lie beyond the main distribution, and at a greater distance from the wetland zones depicted here. However, additional 19th Century map editions indicate that small wetland zones were present in these areas, though they were not recorded on those that formed the basis of the GSI survey. Tankardsrock and Carn More are also isolated from the central zone of wetlands, but each exhibits a major area of marshland associated with small streams, and additional six-inch additions indicate that these may have been more extensive than those recorded on the editions used by the GSI. Thus, each of the Louth / Monaghan panels is situated in close proximity to water features or wetlands of some sort, but the type is not consistent across all of the region’s panels.

As noted above, it is significant that the most dense cluster of rock art – the Drumirril-Comraghs group – represents the only rock art to the west of a pronounced curve of the meandering Fane River. Along this section of the river its course twists and turns, and probably provided beneficial effects such as slower moving water and a shallower riverbed. Such an area would have been more attractive for a whole range of riverside activities as well as providing an easier fording point across the river. It is perhaps noteworthy that the Early Neolithic settlement at Monanny (see below) to the west of the rock art distribution also lies on a notably ‘wriggly’ section of the Glyde River. Of course, when talking of river bends and Neolithic landscapes, the best-known example is the Brú na Bóinne, County Meath, where the waterway curves around and defines a conceptual ‘island’ of dry land (Cooney 2000:153). In a predictive modelling sense these bends make obvious places to look for prehistoric and later activity across what are currently ‘blank’ areas of the archaeological map. As noted above, if the proposal that communities from across the local region used the Drumirril area is correct, this might also be significant in social and ideological terms with respect to the pathways of movement to the Drumirril cluster.

At first glance, the distribution of sites could be compared to the ‘inscribed grazing areas’ proposed by Waddington (1996), whereby rock art is located in positions bounded by streams and rivers (see Chapter 1). However, this is also a reflection of the topography of the area, and it is difficult to establish whether this represents a significant spatial pattern. In the Louth / Monaghan area the panels seem to distinguish between standing bodies of water and moving water. That is the majority cluster around small lakes rather than in proximity to streams and minor rivers. This suggests that mere *access* to water as a resource was not necessarily the underlying factor.

Dingle

On the Dingle Peninsula the extent of wetland zones is considerable, with dryland zones by far the minority (Figure 3.30). The peat coverage across the peninsula predominantly represents blanket bog (Cuppage 1986); thus only a small and as yet unidentified proportion of this relates directly to former wetland zones of some type. It is interesting to note then that rock art panels are predominantly located on the margins of the dryland, with few exceptions. Though it is tempting to interpret this as an intentional cultural pattern forming a means of negotiating environmental changes (e.g. see Tilley 2004: 84-5), given what we know about the nature and chronology of blanket bog development it is probably more likely to reflect a taphonomic bias in our ability to identify panels in and under the bog. It is notoriously difficult to date the spread of peat and bog accurately, but it is usually assumed that it largely post-dates the Neolithic and Bronze Age, partly because of the tendency for prehistoric field systems to be located on these now agriculturally marginal zones, beneath substantial peat deposits. Pollen analysis in the Loch an Dúin valley suggests that bog habitats were present there by 4400BP, with the blanket bog expansion occurring from 3500BP onwards (Dodson 1990, see below). The Loch an Dúin sites are unusual in being located deep within the extensive wetlands along the northern side of the peninsula. This may reflect survey bias in this archaeologically well-traversed valley. Considering that any undiscovered panels within wetland zones may in fact be covered by peat, this is a difficult problem to test using control surveys in the wetland zone.

Bog coverage aside, the rock art distribution appears to be closely linked to major stream and river systems that run across the peninsula. This will in part be linked to a topographical preference for mid-level elevations, as opposed to uplands, but even so, the pattern is distinctive. As in the Louth / Monaghan area, it is waterways and water bodies, rather than wetland zones, that seem to attract the rock art locations. The functional attributes of these features, both as actual water sources and as routeways and landmarks, may indicate that this association is due to a combination of ideological and functional purposes.

Inishowen Peninsula

On the Inishowen study area the rock art distribution clusters markedly to the western side of the peninsula. Here the rock art demonstrates a tendency to cluster on lowland coastal or inland areas, and around inland lakes. The Inishowen panels exhibit a wider variety of locations in relation to major streams and rivers than the other two study areas (Figure 3.31). By far the majority of panels lie within close proximity to major streams and rivers. However several sites are located on terrain lying *between* the nearest stream systems. The inland panels cluster markedly around the terrain leading to a mountain pass and a series of lakes; Lough Fad, Lough Naminn, and Mintiaghs Lough. This is similar to the pattern seen in the Louth / Monaghan area. However, this may be a reflection of survey bias and bog coverage (see below).

As demonstrated for the Dingle Peninsula, the Inishowen panels in the inland study area are located consistently along the edges of the blanket bog, suggesting that this pattern is partly taphonomic. The GSI maps were also useful in defining the extent of the former Isle of Doagh and its relationship to the mainland (Figure 3.32). Here the rock art clearly clusters at the points of the island which are closest to the mainland, and which may have marked a kind of 'threshold' that could only be reached by foot on a tidal basis. The Magheranaul cluster lies directly opposite a small headland defined by marshland on either side, reinforcing the importance of this particular locale in terms of accessing the Isle. Interestingly the Isle of Doagh sites seem largely to ignore the inland lake, which is located in a sheltered area at the centre of the island. It is also of interest that the Magheranaul and Carrowreagh clusters, already defined in distributional terms, are also separated by a stream system. It is possible that such landscape features formed important social or ideological boundaries in terms of the ways people moved across and interacted with different parts of the Isle of Doagh landscape.

These two areas demonstrate that, though essentially indicating widespread bog coverage, it would be worth digitising the full Inishowen Peninsula wetlands using the GSI maps in future work, particularly in order to assess its impact on panel discovery and identification.

Discussion

As has already been established by Johnston (1989), rock art exhibits a distinct preference for locations close to rivers, streams and lakes. Although this is a dominant pattern, this does not apply to every panel. While each of the study areas reveals noteworthy relationships between rock art and wetland zones, these vary in both a regional and local sense. That is, it is not possible to establish a 'standard' or 'expected' relationship which will be revealed in every rock art distribution, in a 'predictive modelling' sense. As a result it is difficult to posit rock art as a practice that was specifically related to a prehistoric 'water-cult'. In all three areas major clusters are located in close proximity to lakes. However, this is not a consistent pattern, as several of the inland lakes on the Dingle and Inishowen Peninsulas are not associated with any known rock art panels. Although some of this may be due to survey bias, this also suggests that though water features played a role in rock art location, additional factors also influenced the ultimate selection of carving locales. It is also possible that a variety of benefits afforded by water (proximity to settlement, availability of water, use of waterways to traverse the landscape) is reflected in the spatial patterns described above. The patterns are generalised rather than specific; many panels lie in situations that fit with Taçon's description of hydrological boundaries, but the association does not form a striking pattern for all panels.

An important contribution of the analysis of wetlands has been the identification of the consistent location of inland panels along the bog edge on both the Inishowen and Dingle Peninsulas. This demonstrates that bog coverage has had a significant impact on rock art identification, and that the known distribution of panels is very much a partial picture in these areas. This has profound implications for the potential for undiscovered and / or buried panels to be present in other counties that feature extensive peat and bog coverage.

Soil types

Johnston's (1989) broad study incorporated rock art's relationship to soil types. This work concluded that Irish rock art panels tended to be located on arable soils, or soils that may have been arable during prehistory. In doing so, Johnston argued that this represented a probable spatial association between rock art and prehistoric settlement (1991a). This followed similar interpretations for the distribution of megalithic tombs on the basis of their relationship to arable soils (Cooney 1979; Ó'Nualláin 1983). This inferred association contrasts with interpretations by Waddington (1996) and Bradley (1991: 80; 1997: 90-104), where rock art is posited at the margins of the settled landscape, in areas visited on a seasonal basis for grazing, hunting, and ritual purposes. As discussed in Chapter 1, these interpretive frameworks are built on two diverging narratives relating to the nature of Neolithic settlement (sedentary versus mobile) for Ireland and Britain. More recent work has focused on the increasing evidence for regional diversity in the life ways of Neolithic communities, and increasing evidence for fluidity within these life ways. Groups maintaining largely or partially sedentary lifestyles still moved around their regional landscapes (e.g. Cooney 2003: 48; see also Rosenberg 1998), and those who seem to have left little evidence for structures designed for long-term occupation may have practiced other means of establishing long-term attachment to particular places (e.g. Garrow et al 2005). Accepting this more open approach to settlement, we might expect both mobile and sedentary groups to have made use of more arable soils, and for much of their settlement-related activities to have been focused in these areas.

Until very recently, we have been unable to compare the distribution of rock art and soils with the distribution of secure and detailed evidence for settlement activity in these study areas, since such sites had seldom been uncovered. However, as demonstrated below, recent discoveries of Neolithic structures and other settlement activity, particularly in the Louth and Monaghan area, have enabled this issue to be tentatively explored (see below). As for the bedrock geology, the analysis here aimed to investigate finer distributional patterns to test the types of ideas proposed by Taçon (1999). Following these theories, we might expect that, as well as specific types of soils, the boundaries between different landscape zones that reflect changing soil types, or areas exhibiting unusual and distinctive qualities, might have formed the focus for the practice of rock art.

Research by the Johnstown Castle Research Centre indicates that the three study areas investigated here all lie on lands that, up until 1980, exhibited moderate to high tillage land percentage (Coulter et al 1998: 17-20). This demonstrates the broad utility of these areas for both cultivation and pasture, as demonstrated by Johnston's work (1989). In order to investigate finer patterning, digital soil data was obtained from Teagasc (the Irish Agriculture and Food Development Authority) in the form of physiographic divisions that define the landscape on the basis of both topography and dominant soils. Each of the major physiographic divisions and associated soils are listed in Table 3, and those featuring rock art are fully described in Table 4. The data used to create the graphs discussed here is tabulated in Appendix B.

Taking a look firstly at their broad physiographic divisions the panels are predominantly distributed over two types (see Figures 3.33 – 3.35). The first is Mountain and Hill, where the panels avoid the lower level Blanket Peat and Gleys, and favour Podzols and Lithozols. The second is Rolling Lowlands, where a variety of principal soil associations feature rock art, including Acid Brown Earths, Brown Podzolics, Gleys, and low level Blanket Peat. In addition, a number of panels are found on Drumlin Acid Brown Earths, and a small quantity on Flat to Undulating Lowland whose principal soil association is Gleys. The panels avoid Hill divisons entirely, despite its presence in the Louth / Monaghan study area. All but a single panel, Ardbeg on the Dingle Peninsula, avoid the Flat to Undulating Lowland division. This panel, a large slab with a single cup, was identified in Stradbally Graveyard, and is quite probably in a secondary context (Cuppage 1986: 58). Its position indicates that the panel could be some distance from its original location, possibly having been brought to the churchyard for building purposes.

Looking at the dominant soil types themselves (Figure 3.36), across the three study areas the panels consistently favoured zones dominated by peat coverage or soils dominated by Acid Brown Earths, with c.57% of panels located in these areas. Peaty Podzols feature c.19% of the panels, Brown Podzolics c.16%, and Blanket Peat c.6% of panels. The widespread occurrence of blanket bog in the Inishowen and Dingle Peninsulas demonstrates the difficulties in interpreting distributions on the basis of modern data sets. Much of the modern peat coverage would not be contemporaneous with the rock art, and so may be masking the influence of different soil and habitat zones on rock art distribution. It is worth noting though, as observed by Johnston (1991: 92, 1989: 262), that modern Peaty Podzols result from the extensive leaching of what were formerly Brown Earths. Furthermore, the same process can ultimately result in the production of Blanket Peat (ibid). This strengthens the case for rock art's specific distributional preference for Brown Earth soils. If this is taken into account a combined figure of c.82% of panels fall within these three soil types.

The more detailed data used here also allows distinctive patterns to be identified within the individual study areas. The Inishowen panels fall within a conspicuously small soil zone, with physiographic division 16 (90% Acid Brown Earths) making up just c.0.7% of the peninsula and featuring c.58% of the panels. As shown in Figure 3.37 the Isle of Doagh, and a small area of the adjacent coastline to the north, are in fact the only areas of Acid Brown Earths on the entire peninsula. It seems possible then that the reasons for the Isle of Doagh's popularity as a carving locale extend further than its unique topographical and geological characteristics as a rocky tidal island. With the exception of division 5 (high level Blanket Peat), the remaining data partly reflects the extensive areas of divisions 1 (75% Peaty Podzols), 20 (60% Brown Podzolics) and 24 (low level Blanket Peat) (see Figure 3.33). Though we should not necessarily jump to the conclusion that the Isle of Doagh represented a kind of 'agricultural haven', the spatial patterns here in relation to soil type are undeniably striking, and may well have played a part in the repeated visits to the Isle. However, the noted absence of known panels on the shore to the northeast, a tiny portion of which also features Acid Brown Earths, cautions us against relying on soil type alone to explain rock art distribution.

The picture in the Louth / Monaghan area indicates that the rock art distribution, with the exception of division 12, is partly linked to soil area (Figure 3.34). Still though, there is a major distinction between the number of panels on Rolling Lowlands (c.92%) versus Drumlins (c.8%), even though both divisions are composed of 75% Acid Brown Earths. It is perhaps notable that division 12, which the rock art distinctly avoids, is comprised predominantly of *coarse textured* Acid Brown Earths (Figure 3.38). Is it possible that this slight distinction rendered this zone less attractive for a whole range of activities, including, perhaps indirectly, the practice of rock art? As demonstrated above, the preference for lowland locations, and suitable geology, would also have played a role in the avoidance of this zone. Thus, in this area, soil type may have formed part of an interrelated series of landscape characteristics that informed the ultimate choice of carving locations.

On the Dingle Peninsula, c.39% of panels lie on Acid Brown Earths, c.30 % on Peaty Podzols and c.23% on low / high level Blanket Peat, the latter two with their potential origin in Acid Brown Earths, as noted above (Figure 3.39). Meanwhile, the areas dominated by Lithosols and Outcropping Rock, and Gleys feature lower numbers of panels (c.2% and c.5% respectively). With the exception of the low level Blanket Peats, which exhibit more panels (c.20%) than might be expected, and Minimal Grey Brown Podzolics, which, probably due its location on Flat to Undulating Lowland, exhibits no panels, the Dingle data largely reflects the available areas of these physiographic divisions (see Figure 3.35).

The preference for light dry soils across each of the three study areas suggests that this is a significant pattern. These are soils that are broadly suited to agricultural activity, and which can be maintained and improved via manuring (Coulter et al 1998: 22). Alone, this broad observation agrees with that presented by Johnston (1989), who interpreted the trend as reflecting rock art's probable proximity to settlement-related activities. The investigation of finer scaled patterns here has allowed the impact of the size of the different soil zone to be assessed. As shown above, the size of the zone has played a role in the Dingle Peninsula and Louth / Monaghan areas to a certain extent. However, the Inishowen data indicates that soil type played a more crucial role in this area. In addition, particular areas exhibiting subtle differences in soil types seem to be studiously avoided, as seen in the Monaghan area. However, the actual *boundaries* between soil types do not seem to have played a role in rock art distribution. Rather, it seems likely that soil type has a broad influence, perhaps indirectly, on the manner in which different parts of the landscape were used, and reused through time. In the case of the Isle of Doagh, its unique characteristics (including soil type) seem to have lent it special significance.

Palaeoecology

There have been a small number of palaeoenvironmental studies in Donegal and north-eastern Ireland (Flanagan 1977; Goddard 1971), but only one within the Inishowen Peninsula (Weir 1986). This study, from Kindroghed townland in the east of the peninsula, is an unpublished BA dissertation and unfortunately could not be consulted within the context of the present work; this would be an important resource for any future work. Figures 3.40 – 3.41 display the locations of pollen cores within the study areas of Louth / Monaghan and Dingle Peninsula. Though these are capable of providing only very broad approximations of the vegetation history of these areas, they do allow for the relevance of visibility and soil productivity studies to be broadly assessed. With regard to soil analysis, pollen data can provide evidence for human impact in the form of clearance activities and cereal cultivation. In terms of viewshed analyses and visibility studies, which have become so fashionable of late, several recent critiques (e.g. Chapman and Gearey 2000; Wheatley and Gillings 2000: 5-6; Tschan et al 2000) have pointed out that these tend to fail to account fully for, or present highly generalised interpretations of palaeoenvironmental evidence (e.g. Gaffney et al 1995; Chapman 2000, 2005; Roughley 2004; but see Cummings and Whittle 2003). This is especially unfortunate given that these studies are most commonly applied to prehistoric landscapes, when woodland cover would in fact have been significantly more extensive than today, in spite of the presence of agricultural communities. As anyone who has conducted visibility studies in the field will appreciate, even small stands of trees have a dramatic impact on the views of the surrounding terrain. Extensive woodlands were still growing in parts of Donegal, predominantly the coastal areas, river valleys and around loughs, and the Dingle Peninsula, notably along the north coast from Tralee to Brandon Mountain, as recently as the 17th Century (McCracken 1971: 45, 62-4).

Louth / Monaghan

A series of palynological studies has been conducted across County Louth, with a particular interest in the development of agriculture across the relatively arable soils of the area (Weir 1992, 1993). The studies employed pollen cores from a series of bogs; Redbog, Essexford Lough, Whiterath Bog and Liscarragh Lake, though the latter was not analysed due to a low pollen count (see Figure

3.40). These wetlands vary in size, and all represent former lakes (Weir 1992: 106). The Redbog material provided radiocarbon dates for the pollen sequence. This work demonstrated that widespread clearance did not occur in the region until the Early Bronze Age onwards. The following discussion is based on Weir (1993).

In the Redbog sample levels that predated the Neolithic (c.4700-3800 cal. BC) depicted a landscape of mixed woodland comprised of hazel, elm, oak, pine, birch, alder, and areas of heather. Natural burning of the bog surface, which was possibly quite dry, was also implied. By c.3800-2650 cal. BC more obvious human impact started to occur in the area. Though this indicated the opening up of the woodland structure, this was not intensive. A decrease in oak and elm accompanied an increase in plantain and grass species, as well as hazel and ash, which probably grew along the margins of woodland clearings. Later, however, a more closed woodland landscape was re-established, marked by increased elm and oak values and the disappearance of plantains and grasses. This was followed by a second elm decrease and an associated increase in disturbance-related taxa. A single cereal pollen grain was also identified from this phase indicating low-level cultivation. This, along with decreased oak, and a substantial increase in hazel, indicated that a more open woodland structure was present at this time. Broad changes in taxa also indicated that increasing wetness of the bog surface drove out pine, and allowed alder and sedge species to increase, though this too was short-lived.

From c.2650-2300 cal. BC there was increased human-induced change in the region, with increased blackthorn, hawthorn and alder all indicative of habitats along woodland margins and regenerating woodland, with yew and ash present alongside oak, hazel and elm. Overall an increasingly more open woodland structure was indicated. A broader range of disturbance-related taxa was apparent (sorrel, buttercup, plantain, nettle, and rosaceous species), but these were again at a low level, suggesting that clearance was not intensive at this time. Weir (1993: 89) suggested the clearance was small-scale and predominantly for grazing purposes. By the Early Bronze Age (c. 2300-1600 cal. BC) more intensive clearance and agricultural activity became apparent, including a significant decrease in hazel values, and changes in tree taxa that may have represented increased ground water run-off that was probably related to clearance. Ash values also increased, which indicated a more open woodland structure, and a wider range of herbaceous taxa probably implied that the clearance was grazing-related.

At Essexford Lough the results also indicated an open woodland structure, here with high oak values, and low-level cultivation activity from c.3400-2300 cal. BC. More intensive agricultural activity was evident from c.2300-1800 cal. BC, with increased herbaceous taxa, the presence of flax, a range of arable weeds (poppy, chamomile, fat hen and chickweed), and pastoral taxa (buttercup, dandelion, scabious). Thus, the picture of a predominantly wooded landscape with pastoral activity present, as derived from Redbog, was supported by the results from Essexford Lough.

At Whiterath Bog, the relatively dense woodland was dominated by oak and elm from c.2750-2300 cal. BC, a secondary post-elm decline woodland, with small-scale clearance indicated by the presence of ash, rowan / whitebeam, blackthorn and holly. Light disturbance was indicated by herbaceous taxa and charcoal. By c.2300-1950 cal. BC there was increased clearance here in comparison to Essexford Lough and Redbog, with high ash and grass values, and a range of decreased woodland tree values accompanied by increased charcoal. There was little to indicate that cultivation was the prime-mover for this trend. Further clearance was occurring by c.1950-1650 cal. BC with increased and broader herbaceous taxa present. These represented both arable weeds and pasture species, including bracken (indicating rough pasture), and cereal pollen was present in almost all levels. This trend is accompanied by increased mineral content of the sediment due to erosion and run-off, and decreased woodland tree taxa.

Dingle Peninsula

There have been relatively few palynological studies conducted in southwest of Ireland. Work conducted by Lynch (1981) identified wheat pollen in levels dating to 5845+-100BP, and similar cereal grain pollen in levels dating to 5370BP. This suggests that agricultural activity, albeit small-scale, may have been underway by this time. Clearance by these prehistoric communities, alongside deteriorating climatic conditions, eventually lead to widespread podsolisation and bog growth. Three studies provide pertinent information as to the extent of woodland and agricultural activity on the Dingle Peninsula; that at Ballinloghig (Baile an Lochaigh) by Barnosky (1988), by Dodson (1990) in the Loch an Dúin Valley, and most recently by Wolters (1994), also in the Loch an Dúin Valley (Figure 3.41). The first two studies obtained similar results, and the findings of the more recent analysis are related below.

Dodson (ibid) analysed three cores from the Loch an Dúin area; one from the corrie lake of Lough Camclaun, which lies to the west of Loch an Dúin, a second from the low rise referred to as Loch an Dúin Hill (where the wedge tomb is located), and the third from Loch an Dúin Bog, 60m south of the wedge tomb. During the Mesolithic period (7500BP) a woodland landscape of oak, elm, birch and hazel was present. This began to decline from 4400BP, while heathland, bog and pasture species (including plantain) appeared and / or increased, probably in association with agricultural activity. At Lough Camclaun levels dating to 4520-2820BP also saw a decrease in tree taxa, including pine, and an increase in herbaceous taxa (plantain, grasses, heather, heath, silverweed, sedges). The lack of evidence for burning may imply that the clearance was small scale. The sample from Loch an Dúin Hill indicated high levels of birch, but significantly low levels of oak, alder and pine by 3710-3170BP. Alongside this, high counts for grasses, sedges, heather and sphagnum indicate the presence of peat and bog habitats by this time. Cereal pollen was also identified, implying that the clearance was not only for grazing purposes. In levels dating to 3350-3000BP, the Loch an Dúin Bog sample was dominated by birch and alder, with some oak, elm, grasses, and sedges, but little evidence for clearance. By the Late Bronze Age (3000-2500BP) grasses, sedges, and herbaceous taxa (including bracken that indicated the presence of rough pasture) had increased, while alder and birch decreased. Oak values were still high, possibly indicating that the clearance was selective. From 2500BP increased heather values demonstrated further deterioration. Thus, the major clearances in the area occur from the Early Bronze Age period onwards. During later prehistory (from 3500BP) the presence of sedge, heather, sphagnum and grasses infers increasingly damp and the acidic soil conditions, marking the beginning of blanket bog expansion.

Wolters' (1994) study provides the additional benefit of having been linked to archaeological contexts, namely a pre-bog wall that forms part of the fieldsystem in the Loch an Dúin Valley (Wall 8 in ÓCoileáin 2003). However, though the 3.50m deep peat covered 4000 years (ÓCoileáin 2003: 246-9), the earliest levels date to the Middle Bronze Age. These indicate a wooded landscape of alder and birch through to 3250BP, after which herbaceous taxa increase, and the presence of grasses and cereal pollen are indicative of clearance for pasture and cultivation, probably via felling rather than burning. This activity increased in intensity from 3200BP, mainly for pasture, up until which some woodland remained. Thus from 4000BP farming was introduced but this was relatively low-intensity. Carr peat (wooded fens in a wooded terrain, with less acidic soil and a relatively rich mineral content, usually with alder, willow, sallow (Whittow 1984: 83)) was forming in hollows by 3600BP, with blanket bog peat developing from 3200BP.

The pollen evidence overall suggests that during periods broadly contemporaneous with rock art, woodland was still present, albeit with a more open structure than before. In this way the landscape can be envisioned as a mosaic of wooded areas, open grassy clearings, rough pasture, areas of open wetland, and small-scale cultivation. As the above descriptions demonstrate, these habitats shifted and changed within different prehistoric periods. Waddington (1998: 35) has already suggested that petroglyphs in the Milfield Basin area may have been situated in woodland glades, and we should keep this possibility in mind for the Irish sites. These results are significant for any discussions of views and visibility across the landscape (see below). They suggest that visibility would have been restricted in many areas.

It is notoriously difficult to extrapolate vegetation mapping from individual pollen cores, though advances are being made in terms of specialist software (for example see www.geog.ucl.ac.uk/ecrc/pollandcal/index). It is probable that GIS technology, with the advice of a palaeobotanist, could be used to better define the irregular 'radius' within which individual pollen cores are most relevant. For example an 'interaction zone' for pollen based on topography, elevation, soil and so on could allow areas (e.g. valley systems) that represented the immediate catchments for pollen sample locations, and then wider zones within which long-range dispersal would have been possible, to be identified. This could all be depicted in cartographic form, albeit in broad brush-strokes, using GIS technology. In the context of the present study, one way of extrapolating the Louth / Monaghan and Dingle data out into the landscape, albeit highly generalised, is to look at the distribution of areas that may have been *predisposed* to natural clearances, which in turn may have been enlarged by communities clearing areas for pasture, small-scale cultivation and other activities. Such natural clearings would have formed important foci for Neolithic communities in both functional and ideological terms (e.g. Last 2005: 344; Brown 1997: 140-142).

Figure 3.42 indicates the locations of large areas of outcropping rock and water features, including wetland in the case of the Louth / Monaghan area. The rocky nature of these areas apparently did not deter settlement activity and monument building (e.g. Cooney 2000: 150). These areas would have encouraged a generally more open woodland structure due to the shallow depth of soil deposit and the presence of standing water and localized marshy wetlands. In addition, we know that around the Dundalk Bay area to the east of the rock art distribution, sea levels would have been higher through to the Bronze Age, with much of the now improved coastal flats of Dundalk town lying under marshland. In the Louth / Monaghan area the rock art panels cluster around the small areas of wetland, small lakes and expanses of outcropping rock running across the hummocky lowland terrain of the Mhuirthemne Plain. Without geomorphological analysis in the area it is difficult to establish how much erosion might have occurred since the Neolithic and exposed outcropping rock. However, it can be suggested that the panels may have been located in areas prone to small-scale natural clearings. In spite of this, the views across the landscape were still likely to be restricted by wooded areas, though in the larger clearings, the distant Slieve Gullion and Cooley Mountains might have been visible.

In contrast, on the Dingle Peninsula the rock art panels cluster in areas that, though strewn with erratic boulders, are largely devoid to expanses of outcropping rock (see Figure 3.43). Though the extent of blanket bog masks the more localised patterns of prehistoric wetlands, the bog would have initially developed in hollows from which it later spread. In this way it is possible to speculate that the blanket bog coverage masks a series of formerly localised wetlands. However, as noted below, the majority of the panels lie outside the blanket bog coverage. At first, this might suggest that the panels favoured zones that were more likely to be more densely wooded. However, as illustrated previously, the panels also cluster along the edges of rivers and streams. These areas would have been naturally predisposed to narrow linear clearings and so again it is possible that the majority of the panels were located in areas with enhanced visibility in terms of palaeovegetation. However, according to pollen evidence the views were not likely to have been extensive. With the exception of obvious topographical viewpoints then, many of the panels probably enjoyed only localised views across the surrounding landscape. In light of the palynological evidence the visibility studies presented below must be viewed as highly generalized models only.

Views and visibility

As discussed in Chapter 1, previous work claims to have identified significant patterns in the views available from rock art panels. However, the results of these studies depict a wide range of possibilities in terms of the types of views we might expect from these sites. These range from wide views (e.g. Bradley et al 1993a: 135), to focused views (e.g. Bradley et al 1993b: 275), to a relative lack of views due to the viewing angle encouraged by the local topography (O'Sullivan and Sheehan 1993: 76). Because such a broad range of outcomes is possible, it is difficult to judge the significance of the siting of rock art based on views alone. Whilst numerous sites in the three study areas afforded the kinds of extensive views described by Taçon (1999), many were positioned on local prominences, avoiding the nearby higher ground, which would have afforded much wider and more varied views. This is particularly notable in the Drumirril area, where, though panels are consistently located on hilltops and ridges, they avoid the higher ground nearby.

Thus, while their locations afford good views over the immediate terrain, extensive and varied views do not seem to be the *key* factor underlying their location. Many of the panels in each of the three study areas are located on lowland coastal terrain. Likewise, in areas lacking the distinctive mountainous terrain of the Iveragh Peninsula (Purcell 2001), Kilmartin (RCAHMS 1999), and Northumberland (Waddington 1996), such as the Mhuirthemne Plain of Counties Louth and Monaghan, it has been difficult to establish sound ways of distinguishing categories of panels such as those identified by Purcell (2001) in the form of viewpoint panels and routeway panels. This points towards the importance of considering a wide range of rock art areas before deciding on the key distributional factors, which may themselves be operating at a regional level. The designation of routeways and viewpoints as being of primary importance is probably as much about the landscapes of the well-known rock art areas upon which previous studies were based, as the rock art itself. This is not to question the importance of this work, but it should be kept in mind that such factors may a) simply occur in association with alternative aspects of landscape that influences rock art distribution, and b) may not apply to all parts of the rock art distribution.

Furthermore, as described above, the palaeoenvironmental evidence for both the Dingle and the Louth / Monaghan area suggests that a mosaic of woodland and clearings was present in these areas during the Neolithic, with more intensive human impact from the Early Bronze Age onwards. This means that visibility studies are only useful in the broadest of terms, for testing general models rather than specific questions. Therefore, though numerous interacting patterns and variables could potentially be investigated using this method, it makes up only a small part of the GIS analyses presented here.

According to the landscape theories outlined above, the regional clusters of panels, if any, might be expected to have the widest and richest views. We might also expect the clusters, as significant places in the natural landscape, to be highly visible from the surrounding terrain and the surrounding dispersed panels. The different roles of the dispersed and clustered panels should also be reflected in differences between their views. As significant places, the visual connections between the clusters and surrounding landscape should reflect the way these locales were conceptualised by those living in or moving around the surrounding region. In order to test these ideas, a visibility exercise was conducted by comparing the views from the clustered panels with the dispersed panels. The digital terrain models created for the three study areas allowed a series of viewshed analyses to be conducted. Here, ArcGIS software was used to establish those areas visible from the different groups of panels. Cumulative viewsheds are presented for the dispersed panels and regional clusters for each study area. These provide an additional layer of visibility information by coding the visible land and seascape (the 'viewshed') according to the number of sites that view different zones. In the Figures discussed below the visible land and seascapes are highlighted in blue, with darker shades representing the zones visible to higher numbers of locations.

Inishowen Peninsula

The Inishowen corpus was investigated by comparing the views from dispersed panels, and those from the Isle of Doagh cluster. As illustrated in Figure 3.44 though large stretches of sea and coast are visible from the dispersed panel sites, they are afforded somewhat fragmented views of the surrounding landscape due to the undulating terrain of the Peninsula. Areas of prehistoric woodland would have broken up the landscape even further in visual terms. The results also indicate relatively low levels of intervisibility between these panels. This is not surprising given their highly dispersed distribution. The visibility of the Isle of Doagh is also notably low from the dispersed panels, with a maximum of eight dispersed sites viewing the Isle's rock art locations. As shown in a previous study by Gaffney et al (1995) these locations were not always selected for their visual prominence in the landscape.

As noted previously, the Isle of Doagh features two distinct panel clusters, one at Carrowreagh in the centre of the Isle, and the other to the east at Magheranaul. Taking into account the potentially obscuring effect of the sand deposits in the northwest of the island, it is interesting to note that the panels still demonstrate a marked preference for the southern lowlands and coastline. This is in spite of the northern areas providing roughly equal quantities of outcropping stone of the same type. Field observations indicated that, within the Isle, which itself seems to have been selected as a special focus for carving via a series of interwoven landscape variables, the visibility of the more accessible mainland to the south may have been an important factor in the location of the panels. Alternative explanations such as distance to the mainland, or shelter from onshore and northerly winds, may have contributed to this pattern, but did not seem to fully explain the distribution. It is tempting to interpret the nexus of panels at Magheranaul as the deliberate marking of the nearest point to the 'mainland' as a kind of threshold onto the Isle. However, some of the panels extend away from the shoreline, and the relatively sheltered valleys in the interior of the island are devoid of rock art. Might the views available from the southern areas have influenced the preference for the southern coast? Certainly during the field visits, the mountains along this part of the northern Inishowen coast formed a dramatic and compelling view. To explore this idea, viewshed analysis was conducted for the Carrowreagh and Magheranaul panels in order to determine whether the views available from rock art panels differed from the areas of undecorated outcrop.

As Figures 3.45 and 3.46 demonstrate, both clusters of panels enjoy views across the mountains to the south of the Isle, including the terrain that features the series of dispersed panels in this area, with Magheranaul enjoying wider views of this mountain ridge from more panels. In contrast, the uncarved outcrops, despite their sheer numbers and wide extent across the Isle, offer a very different series of views (see Figure 3.47). The focus is much less defined, with the views from the majority of outcrops directed on the mountains to the north. It is possible then that a view across to the opposite shore of Trawbreaga Bay, the point of origin for a journey across the tidal flats to the Isle, was an important consideration in the position of the carved panels. Overall, rather than a preference for wide or rich views, the views from carved panels are more focused and restricted, than those from the uncarved panels. While this characteristic may well have been employed to inform and enhance the visits to the Isle of Doagh panels, it is difficult to argue that this is a significant pattern for *all* panels.

The Mhuirthemne Plain, Counties Louth & Monaghan

The viewshed analysis of the Drumirril cluster and the dispersed panels of Counties Louth and Monaghan illustrate the prominence of the Slieve Gullion and Cooley Mountains in today's open grassland landscape (Figure 3.48). Again, however, the Drumirril sites do not appear to enjoy significantly wider views than the dispersed panels (Figure 3.49 – 3.50). What is more interesting is the fact that the Drumirril cluster, and only part of it, is visible from only one of the surrounding dispersed panels. In fact, the Drumirril panels cluster to the south of the available outcrop in the area (see Figure 3.51), apparently favouring a distinct envelope of *low visibility*. Likewise, only one of the dispersed panel locations to the east (at Tullagee) is visible from the Drumirril group. This indicates that in spite of Drumirril's position on a topographically distinctive series of hills and ridges, the views available from these hilltops, and their visual prominence within the surrounding area, were not a primary concern. On the contrary, the cluster seems to favour a deliberately hidden location.

As noted previously, the linear arrangement of panels in this area has prompted the proposal that the Louth / Monaghan rock art may demarcate routeways towards the monument complexes in the northeast of the county (Bradley 1997: 119-20). If so, we might expect these pathways of movement to have favoured areas where intervisibility and wider views were afforded. It is notable then that the dispersed panel locations are frequently not intervisible, in spite of their positions on local topographical prominences. However it is also notable that the terrain across which the panels are dispersed represents a zone of relatively continuous visibility, whilst that to the north and south is less visible. That is, this is a visually self-contained area, but much of the terrain immediately beyond the rock art distribution remains obscured from the panels, even in an entirely tree-less digital landscape. The viewsheds often take linear forms along the ridges and lines of hilltops. The routes of the river valleys do not explain the lack of visibility across the terrain either side of the visible zone. In light of the probability that natural clearings were present in the rock art zone, the additional visual 'boundedness' of this terrain points to visibility as a factor for the distribution of the dispersed panels in the Louth / Monaghan area, contrasting with the hidden nature of the Drumirril cluster.

Dingle Peninsula

On the Dingle Peninsula, the contrast between the views from the Loch an Dúin cluster and the dispersed panel locations is striking. The Loch an Dúin panels enjoy views of the immediate valley, lowland to the north and northeast (including the Pilgrimage Route), and the seascape to the north (Figure 3.52). This viewshed from the cluster is more focused and defined than the views from the dispersed panels, owing to the deep glacially cut valley in which the panels are situated. None of the dispersed panels, even those on the northern coast of the peninsula, are visible from the cluster. The views of the dispersed panels exhibit moderate intervisibility and a focus on coastal and sea views (Figure 3.53). As in the Louth / Monaghan area, the dispersed panels are situated in positions that might have aided those navigating their way along the southern valley systems of the peninsula. In contrast, none of the views from the dispersed sites encompass the Loch an Dúin Valley. This striking absence of visual connection is purely a function of topography, but the continued distinctiveness of the Loch an Dúin cluster in terms of a range of landscape attributes, including visibility, lends further weight to the significance of this location within the rock art distribution. As we saw at Drumirril, and to a lesser extent the Isle of Doagh, these clusters appear to repeatedly favour low-visibility landscape positions.

Discussion

The results directly contradict those that were expected based on the recent landscape theory outlined at the beginning of this chapter. The clusters do not enjoy wider views than the dispersed panels, particularly in the Loch an Dúin and Drumirril areas, locations that are almost entirely *invisible* from the dispersed panels. The Isle of Doagh differs slightly in that a small number of surrounding dispersed sites enjoy views over the Isle. By virtue of elevation though, this area has a notably low visual impact on the surrounding Trawbreaga Bay area. The results of the analyses indicate that wide varied views and high visibility did not exert an over-riding influence over rock art location. However, the Isle of Doagh results demonstrate that views may have influenced the choice of locations at a more local level within areas that were selected in the first place for a broader range of landscape factors. Although the investigation of views and visibility have provided a highly productive and thought provoking means of investigating the distribution of rock art in recent work, it seems most useful to bring visibility studies into rock art research as just one of a diverse range of landscape variables that influence panel location.

The marked lack of visual connections between the regional clusters in the Loch an Dúin Valley and Drumirril, and to a lesser extent, the Isle of Doagh, and the dispersed panels may have influenced their effectiveness as foci for particular activities and experiences. As in other respects, such as their modest form, the preference rock art panels exhibit for low visibility landscapes seems to directly contrast with those selected for monument complexes featuring megalithic art. Though upland locations are not necessarily the norm, such complexes frequently take advantage of some of the highest ground, or local prominences within, the surrounding landscape (Herity 1974: 27; Cooney 1983). The tombs also frequently sit at the very apex of hilltops, creating a strikingly dominant visual effect over the surrounding terrain (e.g. Bergh 2002: 146). With the dating evidence discussed in Chapter 2 pointing to contemporaneity between these two related practices, this direct contrast in terms of visibility seems significant rather than coincidental. It seems likely that this contrast reflects the very different roles that these locations played in Neolithic communities. The lack of visual connections between the clusters and the surrounding landscape may speak of the way these locales were conceptualised. With rock art clusters positioned in such modest, almost hidden, landscapes it begs the question whether the social groups making and using the two site types might also have differed considerably. This theme is explored further below, and in the following chapters.

Rock art and the archaeological landscape

Datasets for monuments and other archaeological site types were collated from a range of sources (see Appendix B for full lists for each area). The primary sources consulted were the Survey Volumes for Counties Louth (Buckley and Sweetman 1991) and Donegal (Lacy 1983), the Dingle Peninsula (Cuppage 1986), and the County Monaghan Inventory (Brindley 1986). These provide details of upstanding monuments as well as the locations of sites that are now destroyed, all drawn from a range of sources including OSi six-inch mapping, local traditions, and more recent field surveys. Unfortunately, though Irish studies are well served in terms of accessible digital data, the online GIS datasets for Recorded Monuments maintained by the Department of the Environment, Heritage and Local Government (formerly Dúchas) currently feature too many locational errors to make these a viable resource. A project is currently underway to rectify this situation (see www.heritagedata.ie). In order to enrich the data available in the Survey Volumes with some of the more recent discoveries, the online Excavations Database (www.excavations.ie) was searched by county in order to identify relevant sites that are broadly contemporaneous with rock art. This database covers the period from 1970 - 2000, and the most recent published Volumes by Bennett for 2001 and 2002 were consulted in hardcopy form. In addition, a number of very recent excavations within the Louth / Monaghan study area, associated with the Dundalk Bypass excavations overseen by the National Roads Authority, were included. Such large-scale developments are lacking within the Dingle and Inishowen areas, and this should be kept in mind when comparing the results for the three regions, particularly in terms of low-visibility settlement sites. Because of the special interest within this study in the relationship between Neolithic settlement and rock art locales additional literature occasionally provided information on occupation activities dating to this period (see below).

Whilst this range of resources establishes a solid general distribution of the known Neolithic to Bronze Age activity in the study areas in terms of sites and monuments, the dataset has its weaknesses in terms of absolute completeness. Location data available for stray archaeological finds in Ireland includes the Topographical Files held by the National Museum and a range of published catalogues including the Stone Axe Project (Cooney and Mandal 1998) and inventories of Bronze Age metalwork (Harbison 1968). The former contain details of find spots on a townland basis, dating back to the early 19th century. Due to time restrictions, it was not possible to incorporate the finds data into the GIS as initially planned. This decision was influenced by a number of factors. As a pilot study into the extent to which this data source would be useful for landscape analysis, the County Louth and Monaghan files for each of the townlands featuring rock art were inspected. This area was selected for initial investigation since tillage is more frequent in this area than the two other study areas. Surprisingly, no Neolithic or Bronze Age finds (or indeed finds of any period) had been recorded for these townlands that were not already recorded as sites or monuments. In addition, many of the finds in the Topographical Files are provenanced only at the townland level, with more accurate coordinates of the find locations entirely unknown. As a result, the finer distributional patterning of interest here would not have been achieved using the Topographical File data.

The lack of finds from these townlands is probably due to the relative dearth of both tillage cultivation and field walking projects in the area, as well as the relative scarcity of prehistoric flint artefacts in the wider region as demonstrated by excavated prehistoric sites such as Monanny (Walsh 2004a) and Knowth (Eogan and Roche 1997). Although peat extraction may have resulted in find discoveries on the Dingle and Inishowen Peninsulas, in general these areas would be expected to have an even lower frequency of finds from field walking or antiquarian sources based on the predominant landuse and large areas of rough grazing, rocky uplands and moorland. Though a wider search within the Louth and Monaghan townlands may have proved more fruitful, the scarcity of finds during the pilot study led to the decision to exclude material culture distribution from the present study. Thus the present study is based on sites and monument data only, and therefore potentially underestimates the extent and richness of archaeological remains within the study areas. In future work it is hoped (and recommended) that the potential of this type of data might be further explored in combination with a field-walking program. In addition, there are undoubtedly recent excavations that slipped through the net of the general online database queries (including several for which coordinate data was not published), and further sites might at present only be published in 'grey literature' reports. However, for the purposes of this study, where the focus is on investigating the general spatial relationships between rock art and other types of activity, the dataset is suitable.

With regard to the sites and monument distributions, monuments were included where the published surveys and excavation summaries indicated a Neolithic (Early, Middle, Late or general Neolithic), Early Bronze Age, or general Bronze Age date. Middle to Late Bronze Age sites were not included as these bear less relevance in terms of the broad chronology established for rock art production and use. Only in a few cases, mainly the excavation summaries, was a sub-period (e.g. Early Neolithic or Early Bronze Age) established, as by far the majority of sites either lacked dating evidence or awaited confirmation of their date via specialist pottery analysis or radiocarbon dating. For this reason, only a broad indication of chronology has been possible in the maps presented here. Clearly, more detailed research using the full excavation reports, where available, as well as wider literature (i.e. journal articles) would be an important aspect of future work in order to pin down a tighter chronology for these sites. When looking at distributions of monuments it is important to keep in mind that spatial association can result from a number of potential scenarios; continuation of use across consecutive periods, chronological association, and the continuation of particular functions of certain parts of the landscape, to name a few. Thus, it is important that spatial association is not confused with chronological association, as has occurred in the past (see Chapter 2).

Rock art and megalithic monuments

One of the questions addressed here was whether rock art exhibits any repeated spatial associations with particular types of built monuments within and across the three study areas. This question is related to a series of ideas in the current literature. As noted previously, rock art and megalithic art have commonly been viewed as very separate traditions, partly based on their apparent lack of spatial association across Ireland. This has been used to reinforce their proposed chronological separation (a proposal refuted here). However, in the Louth / Monaghan area, both traditions are present across the Mhuirthemne Plain, allowing finer patterns of spatial association to be assessed. If we accept the evidence that both traditions date to the Neolithic, this raises the question as to whether the two site types were used in similar or divergent ways by the same communities, as reflected by their landscape locations. Other types of built monuments of the Neolithic have been shown to cluster in groups that may reflect the continued use of particular places through time (Cooney 2000: 145-8). If rock art represented another means of expressing this continued attachment to place during the Neolithic, then we might expect the panels to cluster alongside these megalithic monuments. However, this would assume that the two operated in a similar manner, and were frequented by the same audiences and practitioners, a theory already challenged by some of the findings of the present study.

Looking to later monument types, the continued significance of rock art into the Bronze Age suggests that we might also expect repeated patterns of spatial association between rock art and EBA monuments, with the later monuments making use of, and signalling already established places of ideological significance. Ironically then, spatial association may in fact reflect chronological *differences* between these two site types in some cases. This idea has already been discussed in terms of the divergent evidence for the re-use of rock art panels in Ireland in Chapter 2. That is, we tend see re-use occurring in Later Neolithic to EBA monument types (wedge tombs, standing stones, stone alignments, stone circles), rather than the secure Neolithic monuments that were contemporaneous with the rock art. These chronologies too, however, have been extrapolated from broad evidence.

Inishowen Peninsula

On the Inishowen Peninsula the rock art and megalithic monuments tend not to associate closely in spatial terms, with the exception of the Isle of Doagh and the area immediately to the south (Figure 3.54). Here we see a prominently placed wedge tomb (featuring cup marks) located inland on the Isle, and a series of unclassified or possible megaliths of a type frequently referred to as 'Cloghtogle' (Lacy 1983: 44-9). These often consist simply of a single large monolith resting on outcrop, or on smaller boulders or cobbles. Many of these are now destroyed, and the survey volume considers some of them to be natural boulders. However closer reading of observations by Boyle-Somerville (1929) and Colhoun (1995) raises the possibility that they represent a monument type similar to the boulder monuments of Cork and Kerry (see Ó'Nualláin 1978; O'Sullivan and Downey 2003). That described by Boyle-Somerville (1929: 156-60) reputedly rested on three small cobbles and was associated with a line of cup marks on the outcrop running parallel to the capping boulder. Further field inspection of any 'Cloghtogle' sites still surviving would be needed to explore this idea further. Their spatial association with rock art on the Inishowen Peninsula raises the question of the precise date of these unclassified megaliths, and whether the two might be broadly contemporaneous, or representative of the continued use of these areas across the Neolithic-Early Bronze Age. In the Aghaweel Hill area on the western coast of the peninsula, we see a second concentration of court tombs, a wedge tomb, an unclassified tomb and a portal tomb. Although these monuments are fairly loosely clustered (see Figure 3.54), Cooney (2000: 145-8) has called for the investigation of such complexes as potentially meaningful groupings, and places of long-term significance to the communities that created them. Unlike the Isle of Doagh panels, the panels in this area mainly feature cup marks (see Appendix A). Elsewhere though, the rock art and megaliths display little spatial association. This strengthens the proposal that the majority of dispersed panels were used in very different ways from the megalithic sites.

The standing stones on the Peninsula exhibit a close spatial relationship with the rock art panels (Figure 3.55). This is especially notable on the Isle of Doagh, where an oval arrangement of standing stones encloses the main cluster of panels at Magheranaul, and defines the edges of the raised terrain in this part of the Isle (Figure 3.56). Recent work by Van Hoek (1987) has identified a second series of standing stones in the townland of Carrowreagh, though their positions have yet to be accurately surveyed (see Van Hoek 1988: 46). It is unclear how deliberate the apparent oval arrangement at Magheranaul might be. Further field investigation would be worthwhile in order to explore the extent to which they appear to be related in formal and landscape terms, and therefore potentially in chronological terms. These stones would have been visible from coastal parts of the mainland and from the sea, and it is tempting to read this pattern as the intentional marking of the margins of this ‘inscribed Isle’. There is also a close relationship between the rock art and standing stones across the flanks of the mountains to the south of the Isle, where a number of the standing stones themselves feature rock art motifs (e.g. Altashane and Carndoagh). This close association is well in keeping with Cooney’s (2000: 131-5) proposal that many standing stones may date to the Neolithic.

The Mhuirthemne Plain, Counties Louth & Monaghan

Bradley (1997: 91, 119-20) has argued that the rock art distribution in the Louth / Monaghan area can be explained in relation to the presence of a large number of megalithic monuments to the northeast, where a series of tombs and cairns lies along the upland flanks of the Cooley Peninsula. It is suggested that the rock art may lie along the routeway towards the monument complex (Bradley 1997: 119-20). As discussed in Chapter 1, this idea is clearly closely linked to the notion of rock art as a site type visited whilst on the move. It also reflects the dominance of built monuments in our narratives of the Neolithic – rock art *refers to* the monuments rather than operating autonomously. Taking a broader view, the Louth / Monaghan rock art group lies between two distributions of megalithic monuments, one in the mid-elevation to upland terrain of the Slieve Gullion and Cooley Peninsula mountains in the east, and the other on the drumlin hills of Monaghan to the west (Figure 3.57). Again, this almost mutually exclusive spatial relationship reinforces the idea that these modest sites played quite a different role from that fulfilled by megalithic monuments. However, taking into account recent excavation evidence from the confluence of the Kilcurry and Castletown Rivers, and the destroyed monuments at nearby Killin Hill, the rock art distribution in fact meets and overlaps with the distribution of megalithic art and other monuments. This pattern echoes, albeit on a broader scale, the relationship between rock art panels and passage tombs in the Loughcrew area, one of the few other regions where the two traditions occur in close spatial proximity (see Shee Twohig 2001). In contrast to the two other study areas (see below), the wedge tombs are notably peripheral to the rock art in the Louth / Monaghan region. The panels interpreted here as belonging to the megalithic art tradition (though all discovered in secondary contexts) are positioned closer to the ‘monumental landscape’ as defined by the megaliths, a pattern in keeping with their usual primary context in passage tombs. The standing stones in the area cluster along the southern and eastern margins of the rock art distribution (Figure 3.58). Again, in comparison with the other two areas these site types are less closely related in the Louth / Monaghan area. Again, each region displays its own distinctive monument associations.

Dingle Peninsula

On the Dingle Peninsula it is difficult to discern a consistent relationship between megalithic monuments and rock art, particularly as there are comparatively few megalithic monuments (with the exception of standing stones) on the Peninsula (Figure 3.59). The distribution investigated here is likely to be a partial picture yet to be filled out by more extensive survey. For instance, new megalithic tombs have recently been reported from the western slopes of Mount Brandon (ÓCoileáin 2003: 14). Standing stones again appear to have a close spatial relationship with rock art (Figure 3.60). As noted above, in the Loch an Dúin Valley a wedge tomb and two standing stones occur within a key series of enclosures (ÓCoileáin 2003). One of the standing stones features cup marks, and three of the structural stones of the wedge tomb feature cup or cup and ring motifs, probably representing re-used rock art panels. This echoes the case of the Magheranaul wedge tomb near the key cluster on the Isle of Doagh, which features cup marked structural stones (Colhoun 1995: 13-4). It is possible to view these two wedge tombs as monuments that drew on the continued significance of these locales from an earlier period into the Late Neolithic-EBA, and as part of this, intentionally reused some of the rock art panels from these places. In the case of one of the capstones of the Loch an Dúin wedge tomb, it seems likely that a line of cups dates to the construction of the tomb (see Chapter 2) indicating the continuation of the cup marking tradition. At Ardmore, as discussed in Chapter 2, a stone alignment also makes use of a former rock art boulder as an outlier. A stone pair (Ballyrishteen) and unclassified megalith (Glanmore) also feature single stones with possible cup marks (Cuppage 1986: 20, 40). Again this points to the continued significance, but shifting meanings and treatment, of the carvings into the Later Neolithic to EBA.

Rock art and funerary monuments

The close relationship between rock art and Bronze Age burials in parts of Britain indicates a relationship that may be based on the continued ideological significance of particular places, and a possible link between rock art and a range of mortuary practices. Broad ideological links of this sort have also been proposed by Waddington (1998: 37-42). Unlike Britain, Ireland does not exhibit the large numbers of panels used in the actual construction of these funerary monuments (see Chapter 2). However, this need not rule out a spatial association between the two site types. Any investigation of this sort necessarily relies on a limited dataset in terms of Early Bronze Age burial distribution. Because many Early Bronze Age burial types cannot be discerned on the ground surface, we are limited in these cases to those uncovered during excavations or agricultural activity. The sites investigated here include pit or cist burials, which are often only discovered fortuitously, as well as more visually prominent funerary monuments including cairns, barrows, mounds and ring ditches of various classifications. Where excavation evidence or discovery included the identification of diagnostic pottery vessels, these features are indicated as Neolithic or Bronze Age as appropriate. In the majority of cases, though, these sites remain undated. Broadly speaking, cairns, barrows and mounds are considered to be Bronze Age in date, while ring ditches are known to date to a range of periods from Neolithic to Iron Age as well as more recent periods (see Waddell 2000 for an overview). Although cists are generally understood as a Bronze Age phenomenon, a small number of examples in Britain (see Chapter 1) has been found to contain Later Neolithic finds, indicating the possibility that some of the undated cists themselves might date to the Late Neolithic. Because recent research has indicated that the role of megalithic ‘tombs’ such as court tombs, portal tombs, passage tombs and wedge tombs is much more than simply a place of burial, and in fact that burial forms within these monuments are frequently of a token or votive nature, these monuments are not included here (e.g. Cooney and Grogan 1994: 81; Cooney 2000: 96, 121, 147-8) (see above).

In the Louth / Monaghan area the known distribution of burials seems to avoid the rock art distribution (Figure 3.61). Many of those in north Louth are as yet undated, while the known Neolithic examples occur to the south of the main rock art distribution. Major clusters of burials occur to the south of the outcrop rock art and in the southwest of the county. On the Inishowen Peninsula too the rock art largely appears to avoid the evidence for burial activity (Figure 3.62). In this region the burial evidence is widely dispersed with no obvious clusters. If these date predominantly to the Late Neolithic to Early Bronze Age then they suggest that communities were widely dispersed across the Peninsula at this time (see below). On the Dingle Peninsula the two distributions have a closer spatial relationship than in the other two study areas (Figure 3.63 – 3.64). However, this also reflects the general focus of almost all monument types (though field systems are an exception) on the southern valley systems of the Peninsula, whilst they avoid the northern terrain with the notable exception of the Loch an Dúin Valley. None of these burials can be securely dated to the Neolithic, though the pottery and lithics from Mounthawk (see Figure 3.64) further east suggest that the features uncovered here can be interpreted as Neolithic-BA cremation pits (Dennehy 2000). In five cases there is a notably close spatial relationship between undated burials and rock art sites. However there are also panels associated with mounds, cairns and ring barrows. Thus, there does not appear to be a consistent pattern of association or clustering between rock art and other burial monuments either between or within the three study areas.

The general lack of spatial association with burial contrasts directly with the evidence from areas in Northern England. On the basis of the current evidence, the rock art locations certainly do not seem to represent parts of the landscape employed for a range of burial practices through time. Thus the possible association between rock art and funerary practices raised above does not seem to be reflected by the current distributions, unless less visible practices were conducted at rock art sites that archaeologists have as yet failed to identify. This reinforces the absence of association implied by the relative dearth of reused panels in these monuments in Ireland, compared to Britain, as described in Chapter 2. It is possible that this reflects chronological differences in the development of rock art traditions in particular regions of Britain and Ireland. In Ireland the reuse of rock art is exemplified by a small number of panels in Late Neolithic to EBA monuments such as standing stones and wedge tombs, rather than the secure EBA sites seen in Britain. However, it is also possible that this contrast reflects differences in the historical development of regional traditions, so that particular places in the landscape were reused in some regions, but fell out of use in others.

Rock art and settlement

As discussed in Chapter 1, recent theories have posited rock art on the margins of the settled landscape. This reflects the impact of the divergent interpretations developed for British versus Irish Neolithic settlement, and broad readings of landscape zones (e.g. upland versus lowland), as much as direct archaeological evidence (which is often lacking). Recent road and commercial developments in Ireland have dramatically increased the evidence for prehistoric settlement in selected areas. In the Louth / Monaghan area in particular, this work has uncovered several new Neolithic–EBA settlements (Figure 3.65). These have provided evidence of activities that may relate to temporary occupation, such as pits, hearths, stake hole structures and artefact scatters, as well as the types of rectangular and circular timber structures that have been interpreted as houses and barns in the Irish literature for some time (e.g. Ó Ríordáin 1954). Around 6km east of Drumirril at Monanny, Carrickmacross, pre-development excavation revealed the floors of three timber-built rectangular structures. These were clustered in a sheltered position alongside a bend in a small river that forms part of the Glyde River system, well known for its significant fish stocks (see Figure 3.66). This waterway is ultimately connected to a tributary of the Fane River, which eventually traverses the landscape immediately east of Drumirril. Based on the characteristics of the rectangular structures, pottery and lithic finds (Walsh 2004a), the settlement at Monanny is considered to date to the earlier Neolithic (c.4000-3000 BC).

Around the same time as the discoveries were made at Monanny, numerous sites of Neolithic and EBA date were identified during the pre-development excavations along the Dundalk Bypass towards the eastern extent of the rock art distribution (O'Donnachadha 2004a, 2004b, 2004c, 2004d; Bayley 2004a; Walsh 2004b). It should be remembered that the distribution of these features has been highly reliant on the locations of major developments, since this type of material is notoriously difficult to identify without the aid of large-scale open area excavation (although see Chapter 4 for the use of high resolution geophysical survey). Even, in the Louth / Monaghan area the key clusters and sites lie close to major towns – the Dundalk group, the site of Monanny near the town of Carrickmacross, and Richardstown, near the town of Ardee. However, these sites open up the possibility that a whole series of small settlements and temporary occupation sites might have been located along riverbanks and in other amenable locations across the Mhuirthemne Plain. The further investigation of this question is of key importance for future work, and the closer investigation of the banks of the Fane River would certainly seem an appropriate place to start. In light of the interpretation of rock art chronology presented here, it is the people living in such settlements that may well have been creating and visiting the rock art. As shown in Figure 3.65

settlement and occupation sites are closing in on the rock art distribution. That the Dundalk Bypass has revealed Neolithic settlement evidence within just c.700m of the rock art panels at Tankardsrock to the east of the rock art distribution, indicates that this type of evidence can occur in very close proximity to the rock art. What is yet to be established is whether the regional rock art cluster at Drumirril represents an area that was separate (both physically and ideologically) from these settlements, or whether people were living directly amidst and around Drumirril's hilltops. Evidence of Neolithic activity uncovered during the excavations at Drumirril as part of the present research hints at the latter (see Chapter 5).

In addition to these sites, a broad range of 'settlement' activity from flint scatters to temporary occupation to timber structures to *fulachta fiadh* is taken into account in the distributions presented here for each of the study areas (see Figures 3.65, and 3.67 – 3.69). On the Inishowen and Dingle Peninsulas relatively few developments of this scale have taken place, and not surprisingly the evidence for Neolithic settlement is much more limited. In both cases, recent excavations at the nearest major town or city (Tralee to the west of the Dingle Peninsula, and Derry, to the south of the Inishowen Peninsula), have identified significant clusters of Neolithic to EBA occupation and settlement evidence. In the case of the Derry sites, this undoubtedly also reflects their key location in the landscape; where the River Foyle meets Lough Foyle (Figure 3.67). However, scattered evidence in both areas suggests that we currently have only a very partial picture of prehistoric settlement in these areas. For instance, timber structures are known at Drumenny Lower, near Donegal Town (Dunne 2003), and Cloghers, near Tralee (Kiely 2000, 2003), the latter shown in Figure 3.69. As a whole, the settlement evidence is somewhat at odds with current literature that sees rock art as peripheral to the everyday lived landscape.

In several areas within the rock art distribution across Ireland we also see carved panels occurring in or around ancient field systems. Across Ireland, these field systems are widely conceived as dating to the Bronze Age or later periods. However, some may be earlier, and several seem to have been multi-phase (e.g. ÓCoileáin 2003). In addition to the securely dated Neolithic example at Ceide, County Mayo (Caulfield 1978, 1983; and Caullfield et al 1998), others, such as Rathlackan, County Mayo, and Roughan Hill, County Clare, are also thought to date to the Neolithic (Byrne 1986; Jones and Gilmer 1999; Cooney 2000: 46-7). Similarly, Mitchell (1989) has demonstrated that a pre-bog wall at Emlagh, on Valencia Island in southwest Kerry dates prior to 2650BC. On the Dingle Peninsula there are several prehistoric field systems recorded by the archaeological survey (Cuppage 1986: 17-29). The example in the Loch an Dúin Valley has been the subject of a recent intensive survey by ÓCoileáin (2003). As noted in Chapter 1, part of what the aerial photographs suggest was once an extensive system of low walls and enclosures is evident across the townlands of Drumirril and Comraghs, County Monaghan. Until now, the extent of analysis of this field system has been a letter by archaeologist Kieran Campbell in a Record of Monuments and Places file noting its presence (Campbell 1984). As discussed in Chapters 4 and 5, the fieldwork conducted as part of the present research has allowed a more detailed picture of the extent and form of the boundaries and enclosures to be developed (see below). On the Inishowen Peninsula, a single rock art panel is associated with the field system at Knockergrana, of which a preliminary survey was published by Lacy (1983: 52-3). Though the field visits to the Inishowen rock art panels as part of the present study were not able to incorporate a more detailed survey of the Knockergrana field boundaries, this would be a useful step for further research. Reconnaissance across the Carrowreagh area on the Isle of Doagh during the recording of the rock art panels for this project also revealed extensive field boundaries, many of which are just visible in the OSi aerial photographs (Figure 3.70). Most of these are only just visible above the moorland vegetation, suggesting that they may be obscured by peat cover. Although it is possible that some of these features are relatively recent, with some of the boundaries recorded on the Ordnance Survey six-inch maps (Figure 3.71), further investigation would be worthwhile.

These examples are yet to be conclusively or comprehensively dated, but their coincident distribution with rock art again raises questions over the reputed marginality of the carved panels. Here we see panels in areas that at some time in prehistory (possibly later in the case of Drumirril) formed *part of* the everyday settled landscape. Evidence for similar field systems is currently lacking from the main concentrations of rock art in Britain. There are several British examples of rock art occurring within, or in association with, enclosures, though their chronological relationship to the panels is not always clear (see Chapter 5 for further discussion). The lack of attention paid to this type of evidence from Ireland can perhaps be understood as part of the wider tendency to marginalize non-British evidence that does not fit comfortably with models for the Neolithic that have been developed largely on the basis of the archaeology of southern England (see Cooney 1997). Further biases have also been outlined by Cooney (2001), who has warned that the dominance of archaeological research on ritual monuments over that on domestic sites may reflect contemporary gender politics. It seems likely that rock art research too has been influenced by these sets of colonial and gender-related issues.

Here, we can take a closer look at two areas where we have the most information as to the morphology and layout of the fields and enclosures, and the precise locations of rock art panels; Loch an Dúin Valley and Drumirril. In the Loch an Dúin Valley 11.6kms of field boundaries have been systematically identified via probe survey, as used at Céide fields (ÓCoileáin 2003: 32-3). The system consists of an organic cluster of irregular fields of different sizes interspersed with very small enclosures (see Figure 3.72). ÓCoileáin (2003) suggests that at least two distinct prehistoric phases can be identified on the basis of field morphology. The panels are scattered along the length of the Scorid River, with most lying at the northern end of the valley, though this may partly reflect peat cutting in this area. A key cluster lies to the east of the river, and two outliers are positioned further south, on either side of the lake. The most complex panel in the valley lies well outside the field system on the western lakeshore. In the cluster of panels to the north, the rock art tends to lie close to the field boundary walls, and in some cases the enclosures. As ÓCoileáin (2003: 265) notes, the rock art may have "had some function in the laying out of the field system and possibly the location of the habitation sites."

It is notable that the focal cluster of panels lies within the series of curving enclosures that ÓCoileáin (2003) has singled out as a possible ritual enclosure because of its distinctive form in comparison with the other boundaries. The 'Wedge Tomb Complex' walls enclose the area, but this is achieved via a series of three interlinked areas, rather than closed fields. As noted above, this series of enclosed spaces is located on a rise in the local topography on the opposite side of the river from the majority of the archaeological evidence, is associated with a wedge tomb and two standing stones, and is positioned in a key central location with views of the entire valley. ÓCoileáin (2003: 266-9) argues that the construction method of this part of the field system, the position of the tomb at the terminus of one of the dividing walls, and the distinctive layout of the enclosures, may point to a chronological association between the walls and at least some of the ritual monuments. Excavation and pollen evidence has provided a *terminus ante quem* for part of ÓCoileáin 's 'Central Complex' at 3200-2500BP, though other parts of the field system may be substantially earlier (2003: 255, 262, 269). If so, and keeping in mind the proposed Neolithic date for the origin of rock art, it is possible to imagine that those building the field system were aware of the presence of the rock art, and may have taken this into account in terms of the ways different parts of the landscape were perceived and used.

Only a preliminary survey of the Drumirril field system has been possible within the context of this study. The series of boundaries and enclosures has been identified on the basis of aerial photography, field reconnaissance, and geophysical survey (see Chapter 4), and is therefore a partial picture only. Even so, the relationship between the boundaries and the rock art is even more striking (Figure 3.73 and 3.74). Each of the major clusters of rock art panels is enclosed by an oval or circular enclosure, or a partially enclosing feature such as a 'C' or 'S'-shaped boundary. In all cases these are on local prominences, and so, for example in Transect C, the locale is defined by an 'S'-shaped boundary running along the western and southern sides, and the steep slopes forming the northern and eastern edges of the rocky hilltop. Again, several, though not all, of the more dispersed panels seem to be located close to the visible boundaries (see Figure 3.73). Both examples suggest that particular parts of, or places in, these two landscapes were used in particular ways, both by the rock art practitioners and the enclosure builders. It also suggests that the link between these two very different types of archaeological features may not be as tenuous as we would normally presume.

If both these sites indeed represent prehistoric field systems, it opens up the possibility that the panels were located within areas that, at least by the Bronze Age, were being used extensively for agricultural, and possibly settlement-related, purposes. A wide range of sites indicates that the areas used for Early Neolithic settlement often continued to be used into the Later Neolithic, and into the Bronze Age (e.g. Jones and Gilmer 1999). Thus, it seems possible, particularly for the Loch an Dúin Valley where the field system is best understood, that these areas may also have been parts of the settled landscape during the Neolithic.

As a whole, the settlement and field system evidence calls into question the supposedly peripheral location of rock art within the prehistoric landscape. Instead, can we start to imagine these dispersed panels as nodes of ritual activity within the everyday lived landscape? Such a proposal is far from revolutionary, given that we have very similar evidence for the locations of dispersed megalithic tombs within Neolithic-Bronze Age settlements, such as those at Ceide Fields and at Roughan Hill, and evidence for domestic activity at Newgrange and Knowth (Mitchell 1984; Mitchell and Ryan 1997; Eogan and Roche 1997). Such 'everyday ritual' also echoes the evidence for 'ritual' activities directly within settlements, in the form of structured pit deposits and ritual burning. This proposal might also explain the distribution of the dispersed rock art panels – as places used by people living in the type of dispersed hamlets of varying sizes and moving between locales of temporary occupation that seem to be represented in the archaeological evidence for Neolithic settlements in the three study areas.

Again, this a period during which ideological and spatial distinctions between 'ritual' and 'profane' were not made in the ways we do today (Brück 1999). This has implications for the types of audience that had access to the panels. The proximity of settlement activity and the open nature of rock art sites suggests that they were accessible to a wide audience (including men, women and children) rather than just 'specialists' as has been proposed for the megalithic art inside passage tombs. This is in keeping with many ethnographic studies, where rock art sites were visited by groups of men, groups of women, or for puberty rituals for young boys or young girls, or by groups of mixed ages and / or gender (see Chapter 1). Although specialist carvers may have been responsible for many of the more complex and finely finished panels, it is possible to imagine that rock art played an important spiritual role in the lives of the communities in an inclusive sense.

Discussion

As this chapter demonstrates, the answer to the question "why is there rock art here and not there?" is a long one! The idea of 'nested landscapes' is particularly apt when it comes to explaining the complexities of rock art distribution. There are potentially significant patterns in the placement and positioning of the motifs to be detected at the level of the individual outcrop, the individual topographic feature, the local landscape, the region, the national level, and across international spheres. As the results above demonstrate, within areas where the practice of rock art may have been geologically *possible*, Neolithic communities were responding to complex and subtle combinations of what archaeologists can, in some cases at least, tentatively identify as landscape features and characteristics.

At the regional level wetland zones, major rivers, topographical zones, and broad soil types played a role in structuring general distribution patterns. Within these areas though, more subtle landscape qualities including local topographic features, specific geological formations and outcrops, distinctive zones of arable soil, and specific viewpoints or hidden parts of the landscape, were selected as carving sites. Thus, within the areas of potential, there appear to have been islands within which a whole series of landscape characteristics, some identifiable, others undoubtedly elusive, overlapped. This ‘Venn-diagram’ effect goes some way towards elucidating the types of landscapes that people responded to, through the practice of rock art. In the past, research has sometimes failed to consider the potential subtleties and nuances involved, frequently focusing on a limited range of landscape characteristics. What the results presented here suggest is something significantly more complex, but well in line with the practices of ascribing meaning to certain places in the landscape, as documented in ethnographic studies.

Within each of the study areas investigated here, the rock art distributions respond slightly differently to their local and regional landscapes. These variations lend each of the areas a distinctive identity in terms of the ways people interacted with and responded to their regional landscapes. In this way, rock art can be seen as part of the means through which people expressed and constructed significant relationships with their local landscapes, and as a means of expressing the symbolic and historical significance of particular places in those landscapes.

Though particular zones of soil and elevation can be interpreted as having been ‘preferred’, we must also remember that the patterns we may be able to identify were not necessarily the *actual* reasons for the selection of rock art locales. For instance, particular soil or bedrock types may also have had covariant (ie. associated) characteristics, from ecological diversity, to degree of openness, types of topographic features, colour or texture, which might not be as readily apparent and identifiable to archaeologists today. The patterns also reflect a complex range of taphonomic issues and survey biases, all of which need to be accounted for. The development of a critical approach to Atlantic rock art landscapes is a crucial step if this area of research is to mature and make genuine contributions to wider prehistoric landscape studies.

The results also emphasise a point raised previously. This is that within a regional distribution of rock art, it seems that different types of panels may have played different roles, and have been used in different ways. This calls for a more sensitive treatment of the variations exhibited across the Atlantic rock art corpus as a whole. We can envisage the regional clusters as focal points to which people from the surrounding area may have journeyed, and at which they may have gathered at particular times of the year, or for particular events. It seems possible that a degree of restricted access may have been an important part of the choice of location for the regional clusters and that landscape features such as tidal flats, major rivers and mountain ranges might have acted to separate these areas from the surrounding dispersed panels. This also seems to be echoed in the relative absence of visual connections between the regional clusters and the dispersed panels. The dispersed rock art panels may have acted on a more local scale, as readily accessible points of ‘everyday ritual’, closer to home. In this way, it seems likely that the distinctive landscape qualities of the regional clusters were intentionally harnessed in order to inform people’s perception of these places, and their relationship to the world around them.

Taking the Mhuirthemne Plain as an example, the way the rock art is placed in the physical landscape, and the way that panels interact in spatial terms within the clusters resonate with Cooney’s (2000: 150) description of a monument complex in the townland of Fenagh, in nearby County Leitrim, which itself is representative of those across the south of the county; “the tombs themselves are all on areas of ‘rockland’, characterised by shallow soil cover and frequent limestone rock outcrop. By contrast, many of the other inter-drumlin areas are wetland, with lakes or bogs…in this kind of topography these rockland areas would have provided important focal points of both settlement and ceremony, as well as the structural stones of all the tombs…the area has a special character, emphasised visually by being enclosed by the higher ground of drumlins to the east and west and by small lakes to the north and south” (see also Cooney 1979; 1983). Thus, the sensitive treatment of and interaction with specific parts of the physical landscape can be demonstrated across a range of Neolithic monuments, from megaliths to rock art clusters.

The results of the distribution studies of other archaeological site types suggest a number of things. Rock art largely avoids major clusters of Neolithic monuments. This raises the question of audience and the role of these sites, which clearly differed from that of the megaliths. In contrast, rock art seems to have had a special spatial relationship with standing stones, reinforcing the apparent association on the basis of standing stones that themselves bear carvings. It is noteworthy that in the Loch an Dúin Valley and on the Isle of Doagh wedge tombs are located at key points in major rock art clusters, and also reuse rock art panels or feature cup marking that seems to date to the construction of the tomb. This suggests that the significance of particular places (here two nexuses that are themselves within regional clusters) continued to be expressed from the Neolithic into the EBA. Across the three study areas, the panels are interspersed with burial monuments, but there is no clear spatial relationship with them. This contrasts with the situation in Northern England, and emphasises the highly regional ways in which rock art apparently operated. In the Louth / Monaghan area we have the best evidence for settlement activity, and this indicates close (up to 700m) proximity between the dispersed *in situ* rock art panels and settlement activities. Here and elsewhere, rock art panels seem to have informed the layout of prehistoric field systems and enclosures. This evidence calls into question the supposedly peripheral location of rock in relation to the settled landscape.

There are two clear paths towards testing further some of the ideas presented in this chapter. Firstly, we can examine variation in the motifs across the three study areas in order to explore whether they vary in response to different landscape features. In this regard, a pilot study into motif analysis is presented in Chapter 6. Secondly, we can investigate the sites of dispersed and clustered panels as places in the archaeological landscape using traditional techniques such as geophysical survey and excavation. As a first step in this direction, the Drumirril cluster was selected as a location for further field investigation using high-resolution geophysical techniques and targeted test excavation. The results of this work were revealing, as discussed below, in Chapters 4 and 5.

CHAPTER FOUR

Intimate landscapes: the significance of place

Rock art as 'place'

Archaeologists have commonly treated rock art in quite a different way from other archaeological site types. As outlined in Chapters 1 and 3, there has been a healthy growing interest in the topographical and landscape setting of Irish rock art in recent work. However, the investigation of the use of the actual locations by people in the past – the treatment of rock art as an archaeological site or a place in itself – has been somewhat lacking. Archaeologists have investigated the views available from panels and the ways people might have moved through the landscape and encountered rock art (e.g. Bradley et al 1993a; Purcell 2001), but until recently they have rarely taken advantage of the full gamut of traditional tools used to investigate other site types. Because rock art panels have commonly been presented as isolated locales on the margins of the settled landscape (see Chapters 1 and 3), people were thought to have visited these locales repeatedly, but only temporarily, on the way to somewhere else - complexes of 'proper' monuments, water sources, grazing lands and so on (Bradley 1991, 1996, 1997; Bradley et al 1994, 1995;). Though not explicitly expressed as such, many current discussions seem to operate on the assumption that the sites were used exclusively for 'ritual' purposes, but that these probably left little in the way of physical evidence, other than the motifs themselves. In Chapter 1 this was dubbed (all in good humour) the 'singing and dancing model'.

Recent research has also emphasised the idea that the actual rock, or the location itself, may have originally formed the significant 'monument' (Bradley 2000). The notion of outcrop rock art as 'natural monument' has probably nurtured the idea that human impact on the area surrounding the panels was virtually non-existent. This idea probably originates in the binary distinctions made between nature and culture in western thought (Descola and Palsson 1996). This is further compounded by the fact that many panels are not accompanied by obvious signs of built features, or other surface traces of human activity. The carved surface itself is therefore seen as the only evidence of human action. While this theory may well be correct, it has yet to be adequately investigated. Waddington (1996) is one of the few authors to describe rock art locales effectively as 'destinations' within seasonal patterns of movement, thus implying that more than simply brief encounters took place at the panels, and that some of the activities performed may have been part of the annual subsistence cycle. However, the activities that might have occurred at rock art sites, and whether traditional archaeological techniques are even valid means of investigating how people used rock art sites in Ireland and Britain, have remained untested. The landscape studies presented in Chapter 3 suggest that this may be short sighted, and that archaeologists have been overlooking a potential wealth of information.

The idea that rock art motifs exist in a vacuum is also linked to the tendency to emphasise a visual understanding of them. That is, as archaeologists, we have traditionally focussed on the visual observation of the motifs – to understand them we simply need to identify and record the designs themselves. In this way, the motifs are viewed as passive signs to be read, and as such they need only be transcribed and decoded. Until recently, the dominant recording practices have reflected this idea, displaying clearly defined designs suspended in clean empty space. There are some important exceptions such as the high quality recording by the RCAHMS (1999), but these are few and far between. As Bradley (1997: 8) has pointed out, even some of the most detailed research has failed to adequately document the physical location of the art. However, some recent studies have begun to emphasise the importance of recording the material or physical nature of the panels, including the form and texture of the decorated stone surface itself (Bradley et al 2002; Jones 2004a; Coles 2000: 21; Tilley 2003). Accordingly, it is suggested here that the details of the panel surface itself must be included in any illustrations.

As noted in Chapter 3, even the recent landscape based approaches that have so revolutionised our approaches to rock art have also focussed on the visual, perception and intervisibility in particular (e.g. Bradley 1993; Purcell 2001). Recent work has exposed this emphasis on the visual as rather narrow, and certainly one that provides only a partial understanding of these sites (Ouzman 2001). In several cases, the activities practised at these sites, and people's multi-sensory experiences of them seem to have played an important role (Goldhahn 2002; Boivin 2004; Lymer 2004). Thus, if we are to identify physical traces of these activities and experiences, the investigation of rock art panels as 'locations' via traditional techniques (geophysical survey, excavation) seems ever more valid.

It may be partly due to these issues that few geophysical surveys or excavations have taken place around rock art outcrops. A more fruitful approach is one whereby rock art panels are interpreted as sites or places that formed a focus for human activity, albeit of a relatively unknown nature. As suggested in much of the literature, rock art is thought to have signalled or marked special or significant places in the landscape - locales embedded with meanings, and possibly retaining cultural significance over a considerable period of time. I wanted to take the understanding of rock art as 'place' a step further. If the current literature is correct, did the significance of these locales also carry over into the potentially multiple practices, events and activities that occurred there? The questions that the work at Drumirril embarked upon investigating are whether excavation is a valid means of investigating how people used rock art sites in Ireland and Britain; whether human activity can be identified at the sites; and whether it is consistent with our concept of 'ritual'. Geophysical survey represented an important first step in order to increase the likelihood of identifying evidence for activity around the panels. This would also enable precise areas of potential to be identified so that small tightly targeted excavation trenches could be investigated.

This approach allows us to begin to discuss issues such as the time span over which prehistoric (and potentially later) social groups visited the sites, as locales in the landscape. The nature of these visits, their regularity and frequency, the probable numbers of people involved, and the types and range of activities that were deemed 'appropriate' to conduct in the vicinity of rock art, can also be investigated. Furthermore, there are many questions arising from the assumption that the sites were loci for ritual activity specifically. Might the traces of activity differ from those at nearby locations featuring all the usual requirements for rock art, but with no carvings present? Would the view of rock art panels as isolated ritual locales hold up in the face of any activities that might be identified? Would these be in keeping with ideas on ritual activities, or would their nature be more ambiguous? How were rock art panels related to other areas of activity in spatial terms? Were they closely related to daily life or, as suggested in much of the literature, were they both physically and ideologically distant from the 'mundane' world of the 'settled landscape'? What would this imply about the nature of their audiences?

As we have seen, added to the dominant views that discourage the use of traditional archaeological techniques at rock art sites are the inherent difficulties in dating the actual practice, and our inability to relate the motifs on known *in situ* panels to other archaeological material in stratigraphic terms. Thus the enigmatic status of rock art seems to be partly derived from a methodological tendency to treat the panels as unstratified spot finds. This renders the panels somewhat disconnected from the landscapes, not to mention the potential archaeological deposits, surrounding them (Bradley 1997: 8).

It is argued here that the reasons for excavating around rock art panels can be seen as equivalent to the reasons for excavating the area enclosed by a stone circle, or the area around a standing stone. The key difference is that carving onto, rather than erecting, a stone surface signposts the location as a focus for cultural activity. Admittedly, there is a further critical difference in that *in situ* rock art panels will not feature a construction event – the digging of sockets to hold standing stones. However, even with stone circles there is no guarantee that the remains of any associated activities will be clearly related to the socket cuts in stratigraphic terms (Waddell 2000: 169; Bradley and Sheridan 2005). Rather than allowing the chronological difficulties to prevent research questions from moving forward, this project was seen as an opportunity to ask during what periods these locations were specifically in use? In addition, the possibility that stratigraphic relationships may exist between carvings and overlying deposits has not been adequately addressed for the British and Irish material. The test excavation at Drumirril suggests that in certain cases this may be more viable than previously imagined (see Chapter 5).

Clearly, extreme caution needs to be exercised during such a project. It is important to acknowledge exactly what this type of approach might allow us to discuss, and what remains beyond its reach. We should not assume that any activities identified were *directly related* to the carving events or even the presence of carvings, even if they could be shown to be broadly contemporaneous with the practice of rock art. However, they could still be considered to have played a role in the broader social context of art production in the ways discussed in Chapter 1. The investigation of outcrop panels attempts to provide a context for the possible activities that may have occurred in the immediate vicinity, and to test for possible differences in the use of the areas surrounding different panel types. Any positive excavation evidence for activity surrounding the panels might allow us to comment on issues such as the apparent length and frequency of 'visits' to the location. However, as pointed out by Loendorf (1994) and Whitley (1998), it would be naïve to assume that evidence for activity in the vicinity of rock art panels speaks of the function of the art *per se*. Ethnographic and archaeological studies from around the world suggest that rock art panels can form a focus for a wide range of activities, which may or may not have been directly connected to the production of, or interaction with, the art. In particular, we cannot assume that the vicinity of rock art panels was necessarily the preserve of what archaeologists and anthropologists call ‘ritual activity’ (ibid; see Brück 1999). However, it is argued here that evidence for activity does tell of the practices that were *deemed appropriate* to conduct at rock art locales. It also tells us how these places were thought of and valued, which in turn can indicate why it was considered appropriate to create rock art at such locales.

Given the argument put forward in Chapter 2, any activities that date to the later Neolithic to EBA would be of particular interest. It is during these periods that the people visiting or conducting activities in the area would be most likely to be aware of the presence, and significance, of the rock art. This potentially provides a springboard for further interpretation – for instance, what associations can be identified between these places and the activities? For example, fire lighting, specific artefact production or deposition, burial rites, and food preparation would each carry different associations and implications.

Geophysics and landscape archaeology

Geophysical survey, particularly earth resistance and magnetometry techniques, have long been viewed as a means of investigating ‘places’. More recently, geophysical survey has been recognised as key method of investigating ‘landscapes’. Recent multi-disciplinary landscape studies have recognised the benefits of employing geophysical techniques over vast areas alongside the more traditional tools such as aerial photography, cartographic resources, surface surveys, and excavation (Kvamme 2003; Neubauer 2004). This shift is partly due to developments in geophysical survey techniques and technology that allow large areas to be covered quickly, and massive numbers of readings to be stored, downloaded and visualised in a highly accessible format. Considering the types of features and detail now accessible to modern geophysical techniques, a rich picture of archaeological activity can now be built up at the landscape level. At Tara, County Meath, geophysical survey has played a key role in identifying previously unknown low visibility features associated with the upstanding monuments (Newman 1997; Fenwick and Newman 2002; Fenwick 2003). The extensive surveys in and around Stonehenge also complement the known archaeology, though this work was predominantly development-driven rather than for pure research purposes (David and Payne 1997: 74). Such projects are not usually concerned with identifying small features (ibid: 100), but rather they allow broader patterns of use and activity to be addressed across a continuous landscape.

The technical aspects of earth resistance and magnetometry survey have been described at length elsewhere (Scollar 1990; Clark 1996; Gaffney and Gater 2003), and only a brief summary is necessary here. Earth resistance survey (see Figure 4.1) works by sending an electrical current into the ground at regular intervals along a survey grid. The resistance of the soil to this current is then measured in units known as ‘ohms’, allowing an interpretive picture of the subsurface deposits (optimally to 1-1.5m depth) to be built up, reading by reading. As water is a good conductor of electricity, the degree of resistance encountered by the current is directly related to localised variations in the moisture content of the soil. The activities of people in the past - digging features, building masonry structures and so on - can directly affect the local moisture content of the soil. Thus, it is frequently possible to identify these features against contrasting background readings. For example, a cut feature, such as a pit or ditch, will commonly retain moisture more successfully that the surrounding subsoil, especially if it is filled with organic-rich archaeological deposits. These features usually present low resistance to the electrical current. Meanwhile, a masonry feature is likely to be free draining in comparison to surrounding soils, and will accordingly present high resistance. Thus, *contrast* is of prime importance in the successful identification of features against the natural background. However, there are always exceptions to the rule. For instance, a masonry-filled pit surrounded by comparatively moisture-rich subsoil may give a different reading to that normally expected of pit-like features. Thus, prior knowledge of the likely nature of the archaeology and the characteristics of the local soil and bedrock is paramount. Earth resistance survey is particularly useful in identifying masonry features (including paving), or buried features such as larger ditches and tracks (David 1995: 9). In some cases excessively shallow bedrock and dry weather conditions may inhibit the success of the technique.

Magnetometry (or fluxgate gradiometry) survey relies on the detection of changes in the magnetic properties of the soil, and takes readings in ‘nanoTeslers’ (see Figure 4.2). It provides a good companion to earth resistance survey since the two techniques are likely to pick up complementary, as well as overlapping, features. The activities of people in the past also impact on the magnetic properties of the soil in a number of ways. Ferrous material and areas of burning, the latter leaving a thermoremanent signature, will be highly responsive in a magnetometry survey. The particularly intense responses from ferrous and burnt materials often incur bi-polar readings (very high readings surrounded by a ‘halo’ of very low readings). More subtle features can also be detected owing to variations in the mineral iron content across different soil deposits. For instance, the relatively organic-rich nature of the topsoil in a given area will usually contrast with the more highly leached subsoil. This can aid the geophysicist in identifying cut features, since topsoil and other material with a higher iron content than that the surrounding subsoil often builds up in negative features such as pits and ditches through natural in-washing and cultural deposition. In contrast, the use of masonry or subsoil to construct banks, mounds and other features can also be detected against the neutral background owing to the typically low mineral iron content of these materials. Again, there are important factors to be aware of, including the impact of the local soil and geology. For instance igneous geologies have strong thermoremanent magnetic effects and thus will produce dramatic readings in a magnetometry survey. Likewise, modern ferrous material including metal surface trash and fences will exhibit strong responses. Magnetometry can be especially useful in indicating the presence of pits, areas of burning, tracks, ditches and sometimes artefact scatters (David 1995: 9). In both magnetometry and earth resistance survey, modern features and natural anomalies in the subsoil and geology can easily be mistaken for archaeological features. Thus, the results need to be scrutinised for 'potential' archaeology that in some cases can only be verified via excavation.

Only a handful of geophysical surveys have been conducted in Britain to investigate the context of *in situ* outcrop panels (eg., Edwards 1986; Cheetham and O'Connor 2000), with no published examples to date in Ireland. As a result, there is currently very little evidence based on geophysical survey for the possible activities that may have occurred around *in situ* rock art panels during prehistory. As with excavation, the primary aim of the few examples to date was usually to investigate a major built monument, and thus the presence of rock art panels was relatively, though not entirely, incidental. Some of these investigations were limited by the range of techniques found to be applicable to the given soil conditions (eg., Edwards 1986: 7). At Backstone Beck, earth resistence survey revealed anomalies that were later found to correlate to natural geological vartiations within a large, reputedly Bronze Age enclosure (ibid). More recently, Jones employed earth resistance survey at Kilmartin, following on from the successful results from Drumirril (2004a; pers.comm.). However the survey revealed little in the way of features or areas of activity. Given the subsequent identification of features adjacent to the Kilmartin panels using excavation techniques, the lack of success with the geophysics may have been due to the choice of technique for the particular geological conditions in the area. Thus, magnetometry survey in this area may well produce more successful results in the future.

A much wider landscape scale survey was conducted at Burroo Ned and Calf Sound on the Isle of Man (Darvill and O'Connor 2005; Cheetham and O'Connor 2000). A range of archaeological sites is known from this area including two promontory forts, one of which encloses a series of cup and basin marked panels, and, according to local reports, a possible *keeill* or chapel near a single cup marked outcrop. A combination of magnetometry, earth resistance and topsoil magnetic susceptibility survey were conducted. This revealed the possible foundations of two structures and an ovoid enclosure with associated pit or grave-like anomalies, a possible ring-ditch, and areas of burning in the vicinity of the reported *keeill*. Within the Burroo Ned promontory fort heightened areas of activity (a round structure, and possible hearths and pits) were identified in the vicinity of the rock art. Adjacent to this a possible ditch feature and rectangular structure were located in a much 'quieter' zone within the fort. The chronological relationships here remain untested, but it is possible that some of these activities were broadly contemporaneous with the art, and that those who conducted the later activities were aware of the carved outcrops as significant in some way. Very recently, geophysical survey also revealed possible pit features around the cup-and-ring-marked mass rock at Ballinvally, near Loughcrew (Shell 2005: 3). Again, this formed part of a wider investigation of the prehistoric landscape of this area.

Drumirril: place and palimpsest

The results of the analyses presented in Chapter 3 suggest that the Drumirril area (RMP 32:19) formed an important focus for the practice of rock art within the wider Louth / Monaghan region. The area is topographically, geologically, and hydrologically distinctive, and features an unusually high number of rock art panels within close proximity to one another. It seems to be a distinctive type of rock art site, possibly visited over a considerable time period by people from the wider region. It is also located in relatively close proximity to evidence for a sedentary Neolithic settlement. Thus, Drumirril represents an obvious location for further investigation via traditional techniques. It must be acknowledged that further investigation here is quite likely to uncover results that would differ from those that might be obtained at the smaller panel clusters further east. However, considering the pervasive nature of the 'singing and dancing model' (i.e. one that indicates that subsurface remains should not be expected around rock art panels), it seemed useful to investigate an area where the likelihood of identifying evidence for activity would be heightened. A crucial future step will be to widen the types of sites investigated to encompass the smaller panel clusters.

Currently, 33 of the 37 known panels in the townland of Drumirril, and its neighbour Comraghs, lie within the area delimited by the walls of a former Deer Park. This lies just to the southeast of the town of Inishkeen and around 10km inland from Dundalk (central Irish National Grid reference: 293,800 / 304,700) (see Figures 4.3 – 4.4). The walled Park is thought to date to the late 18th to early 19th centuries (Tadhg O'Keeffe pers.comm.) and covers an area of approximately 31.6km with its eastern edge actually forming part of the County boundary between Monaghan and Louth. The area was formerly part of the lands of the See of Armagh, and later became a hunting ground for the Filgate estate of Lisrenny, Co. Louth (Shirley 1845; Day and McWilliams 1998). Former owner and local resident Cecelia Cunningham (pers.comm.) recalls stories whereby the hunters apparently positioned themselves in the walled laneway along the eastern side of the Deer Park, and pursued a particular individual deer, which was studiously avoided by its companions. In comparison to surrounding fields, the Park is relatively untouched as far as recent land improvement is concerned (see Figures 4.4 and 4.5). This is undoubtedly due to its highly rocky nature and (probably as a result) its former use as a Deer Park, rather than for grazing or cultivation. Even with the aid of modern machinery the current farmer considers the improvement of the area to be unviable (Larry Durnin pers.comm.). This factor has undoubtedly aided in the preservation of rock art panels within the Park's walls. The area is characterized by a series of small low hillocks and ridges, many with outcropping rock. It also features some limited swampy areas that were probably originally more extensive, to judge from the drainage works in evidence, which probably post-date the creation of the Deer Park (see Figure 4.6). Further east from the Deer Park are a number of small lakes and associated marshy areas. The Park is currently under rough pasture with small clusters of hawthorn trees and areas of gorse, and is used for sheep and cattle grazing.

Though local residents have known of the existence of the rock art panels for some time (Cecelia Cunningham pers.comm.), the site was only formally recognized following the pioneering survey by Jack Clarke (1982). Clarke cleared and photographed many of the Drumirril panels and published an article detailing the range of sites he had identified between Dundalk and the Inishkeen area. He described those at Drumirril as "possibly in excess of seventy specimens of rock art" (Clarke 1982: 110), having used individual motifs as his unit of analysis. On the basis of Clarke's work, Kieran Campbell and Gerry Millar surveyed the locations of the key rock art clusters in Drumirril (pers.comm. 06/02/2002). Later, Van Hoek (1997) recorded the locations of 25 panels in Drumirril and also produced drawn plans of the motifs. The area was also included in postgraduate research by Johnston (1989) and Nolan (1999). During her fieldwork, Nolan (1999) identified a new panel near the rock art cluster in the north of the Deer Park. During the fieldwork presented here two further panels were identified in the southeast of the Deer Park. On the basis of previous work that records or describes the locations of individual panels, these are thought to be previously unrecorded.

Some flatter terrain between the Deer Park hillocks feature areas of ridge and furrow or lazy beds. These are probably of relatively recent date, as local residents have described the use of the area for potato cultivation during World War II (Cecelia Cunningham pers.comm.). Some localized signs of quarrying around the rocky outcrops have also been identified. These take the form of sheer rock faces where stone has been removed, and large localised ground depressions. It is possible that some of these date to relatively recent activity, perhaps even to the period of construction of the Deer Park wall, which reportedly once measured six feet in height (ibid). Evidently the stone from the wall was later reused for other building purposes, as the wall now ranges in height from c.1-2m. However, this activity may also be significant in terms of earlier, potentially prehistoric, quarrying practices. As McCabe and Nevin (in Eogan 1986: 113-4) have demonstrated, the large structural stones of turbidite or greywacke used in the building of the Brugh na Bóinne passage tombs are likely to have come from the Longford / Down Lower Palaeozoic Silurian zone, which extends within a few kilometres north and east of the site. It is possible that the sought after structural properties of the stone from this area, Drumirril included, led to the small scale quarrying of the material for use in a range of construction endeavours during prehistoric, as well as later periods.

As discussed in Chapter 3, a number of low walls measuring between 150-600mm in height which appear to make up a coaxial field system (date unknown), and several small curvilinear enclosure features, measuring from 20-46m in maximum diameter, are evident across the Deer Park. Some of these features are just discernible in the Ordnance Survey aerial photographs (flown 1995) for the area (Figure 4.5). These consist of a mix of turf-covered stone walls and earthen banks, sometimes with associated ditches. The ridge and furrows appear to post-date these features, based on their apparent superimposition. Though these features are not recorded as RMP sites, they were mentioned in a letter in the RMP file relating to the rock art, along with a brief description of a possible sub-rectangular hut site (Kieran Campbell 18/10/84). The letter suggested that the features were pre-18th century in date. A second possible sub-rectangular hut was identified in the southeast of the park during the present study. On the basis of the aerial photographs, the walls and enclosures appear to continue beyond the Deer Park into the fields to the north and northeast, which are similar in terms of their rocky and undulating nature. However, although Clark checked these outcrops for motifs (K. Campbell pers.comm.), there are few panels known from the fields beyond the Deer Park walls.

The townland of Drumirril is mentioned in numerous historical sources including maps, manuscripts and other documents. The field system is not recorded on the early edition Ordnance Survey maps. A detailed map predating the earliest edition (1835) that might aid in further interpretation of the former fieldsystem has not yet come to light, despite research into possible earlier estate or See Lands maps that might cover the Deer Park area. Unlike other neighbouring areas, Drumirril was not mapped during the 18th century by Raven or other land surveyors from the Bath Estate. This was probably due to controversy over the ownership of the land between the Earl of Essex and the See of Armagh (Patrick Duffy pers.comm. 22/02/02, 1983, 1987). The Townland is variously listed at different times as being held by the See of Armagh, and by the Filgate Estate of Lisreeny, Co Louth (Ashe 1703; Anon. C1703; McCrea 1790-93; Shirley 1845; Day and McWilliams 1998).

'Drumirrill' is listed in Ashe's 1703 survey, one of the most detailed of the rentals or surveys of the See of Armagh lands, confirming that the townland was held by the Archbishop:

> 'Drumirrill…contains by estimation 160 acres or thereabouts. Thomas Baker and Thomas Carolan are tenants and share under them several small tenants on this town and is [sic] a small village which has in it 11 or 12 small houses or tenements which have small gardens or little parks belonging to them'

Another source, dating to c1703, lists the townland of 'Dromirrill' as being leased to Roger Whitehead and Rowland Duffe by the 'Bishop of Ardmagh' (Anon c1703). By the time of Shirley's Account of Farney in 1845, Drumirril was listed as one of 23 townlands belonging to the See of Armagh. The translation of the townland name was given as Irial's Hill (Shirley 1845: 206), an alternative spelling of Uriell or Oriell after the ancient Oirghiall (ibid: 1-2). The Barony of Farney or Ferney, within which Drumirril lay, was described as 'the plains of alder trees', and, in reference to a 1653 description of the area, as consisting of lowland and bogs covered with trees, with wooded areas named Alder Shrubb Wood and Alder Bogge (ibid:1). Shirley also notes a 1655 account of the barony as 'entirely unenclosed', with 'a large proportion…in an uncultivated state' best described as 'Shrubby Wood' or 'Rocky Pasture' (ibid: 138-9).

In an apparently conflicting account, the deer park at "Dromeril' is described as the property of William Filgate Esquire in the Ordnance Survey Memoirs of 1834-8 (Day and McWilliams 1998).

McCrea's map from 1790-93 also shows the seat of Filgate Esquire marked at 'Dromirril' and delineated by trees. Whether the deer park underwent ownership changes that differed from those of the rest of the townland, or whether there was ambiguity over the lease of the land as opposed to actual ownership in the historical documentation, is difficult to say. The Filgate estate eventually went to the incumbent estates court (Noel Ross pers.comm.).

Overall, these early accounts of the townland lend the impression that much of the area was unsuitable for farming or improvement – a situation still reflected in the current condition of the Deer Park. They also suggest that the field system and enclosures predate the earliest (17th century) accounts. Thus, in addition to the rock art, there is clearly a complex palimpsest of features at Drumirril. For this reason the Deer Park represents an interesting study area within the Louth / Monaghan rock art group, and one with considerable archaeological potential.

Soil and geology

As noted above, soil and geology play an important role in determining the success of geophysical techniques (Clarke 1996, Gaffney and Gater 2003; David 1995). The Deer Park is situated on the interface between two topographic types: primarily No. 14 Rolling Lowlands, and a small 'peninsula' of No. 29 Drumlin (Gardiner and Radford 1980; see Table 5). These types are dominated by sedimentary and glacial geologies, and acid brown earths with minor amounts of gleys, brown podzolics, peaty gleys and interdrumlin peat. The Drumirril topography almost appears as a scaled down version of the so-called 'basket of eggs' drumlin landscape, dotted with small rocky hillocks and ridges. According to the Teagasc and GSI data presented in Chapter 3, all of the Deer Park panels lie on acid brown earths and fall within the Inniskeen Formation, which consists of turbidite sandstone (or greywacke – sedimentary stone deposited via a dense current of water and sediment leaving tell-tale graded beds), with a smaller proportion of red mica and red shale. The topsoil in the area is very shallow, particularly over the rocky hillocks, where it sometimes reaches to a depth of just 100mm. The subsoil features frequent small to medium flat angular fragments of the local sandstone.

It was realised prior to the survey that the lack of deep soil deposits within the Deer Park might compromise the success of the earth resistance survey (see below). Magnetometry is known to produce successful surveys over sedimentary geology, though peaty soils would not usually be considered prime targets for the technique (David 1995: 3). Drumlins are also usually associated with boulder clays, a soil type not normally considered to be optimal for geophysical survey due to the weak responses they often produce. However the results can vary according to the type and intensity of archaeological activity, and surveys on the clayey soils of southern England are beginning to produce some positive results (Nicholls pers.comm.). To date no published examples of geophysical surveys that have been conducted within areas classified as No. 29 Drumlin topography in Ireland have been identified. There are however four examples of geophysical surveys on No. 14 Rolling Lowlands, all of which produced positive results, and the soils found within the two categories are generally similar. These surveys were conducted by Stratascan, GSB and Margaret Gowen & Co. (Nicholls 2002). The present study area is located on the edge of the main drumlin belt, where soils are moderately well drained and loamy, which may have improved the survey conditions to some degree. The transects were also located on high points in the local topography further ensuring that areas of well-drained soils were surveyed. The use of a fine-grained resolution (see below) may also have aided in the identification of features exhibiting relatively subtle responses due to the nature of the soils.

The fluxgate gradiometer results indicated that the soil and geology of the area are indeed suitable for magnetometry survey. This quelled initial concerns that the potentially clayey nature of the soil and the varied, but frequently shallow depth of deposit overlying the bedrock geology might hamper the survey. The benefit of having surveyed a number of large areas became apparent in terms of identifying and interpreting features of archaeological potential against the geological background. In some areas, banks or low walls that are still visible on the surface have produced distinctive responses in the magnetometry survey results. These are frequently exhibited as a low magnetic linear response abutted on either side by a high magnetic linear response. Similar, but subtler anomalies have been identified in areas devoid of any discernible surface features. The similarity of these responses to the more obvious features described has allowed for more confident interpretations to be presented. The survey revealed that the area features two igneous dykes running across the width of the Deer Park. These are oriented northwest-southeast, roughly perpendicular to the predominant ridges of outcropping rock. They exhibit very wide bands of high readings in the survey results for Transects C, E and H and Control Transects 2 and 3. Such features are known throughout the surrounding area, as indicated in the Geological Survey of Ireland 1:100,000 Bedrock Geology map. Fragments of dolerite were recovered during the subsequent excavation, and the dykes may also contain this material (Stephen Mendal pers.comm.).

Survey design

The geophysical survey (Licence 02R123) was conducted between August 2002 and June 2003. Permission to conduct the survey was kindly granted by the landowner, Mrs Olive Durnin, and farmer, Mr Larry Durnin. Because of the dearth of previous work, there were few expectations in terms of what the application of these traditional archaeological techniques might reveal. Accordingly, initial objectives were fairly cautious – simply to test whether any human activity could be identified in $60m^2$ geophysical survey transects around rock art panels, and to compare the results with ‘control’ transects located on adjacent hilltops. Four detailed objectives were defined:

- I To compare results from earth resistance and fluxgate gradiometer surveys in order to identify the most successful technique for the study area in question
- II To determine whether evidence for human activity can be identified in the area immediately surrounding the panels (within $60m^2$ transects), and the nature of any positive evidence
- III To determine whether evidence for human activity can be identified within selected ‘control’ transects featuring ‘uncarved’ outcrops or boulders, and the nature of any positive evidence

IV To determine whether high resolution geophysical survey can be used to identify any low visibility archaeology present more successfully than the standard resolution normally applied.

The survey covered a series of targetted transects (Figure 4.7). These were positioned both directly around known panels and, as a form of 'control' sample, on surrounding hilltops with exposed stone surfaces not featuring any known rock art. This would determine whether a distinction could be made between the two transect types in terms of the features (and therefore activities) exhibited. The control transects were identified on the basis of a number of required characteristics. Firstly these needed to be similar to rock art locations within the Deer Park – that is, they needed to feature prominent or well defined hilltops, ridges or raised outcrops. Secondly they needed to feature undecorated rock surfaces. The outcrops were systematically checked for previously unidentified rock art. The thought process involved here is one whereby all signs suggest that the locations should be 'ideal' for rock art, but no known panels are present. Thirdly, for practical reasons they needed to be relatively free of gorse cover to enable the survey to proceed smoothly. The large electrical tower near the centre of the park was also avoided since such towers are known to influence readings within a c.40m radius (Elliot *pers.comm.*). In the case of Control Transect 1, further considerations included the presence of obvious surface archaeology, suggesting that the geophysical survey would successfully identify features of archaeological relevance (see below).

This process proved to be an interesting and useful one in itself. It is often remarked by rock art researchers that as one becomes familiar with a particular rock art group or landscape it is possible to 'predict' their likely location on a qualitative basis (see Bradley 1996: 93). In two instances (Transect H and a hilltop to the south which was subsequently not surveyed), new rock art panels were identified within areas that were initially selected for control survey. These panels may have been identified previously by Jack Clarke, though his knowledge provided an important baseline survey for that later produced by Kieran Campbell and Gerry Millar, and these stones were not included in their study. Nor were they identified in Van Hoek's survey (1997, pers.comm.). These two 'new' panels complete the distributional picture for the Deer Park, extending it into the SE corner, which was previously devoid of rock art. The fact that so many panels are known within the Deer Park, but few have been found during surveys beyond its walls, again suggests that panels may have been destroyed during the improvement of the surrounding fields.

While providing a useful comparison, it should be pointed out that the control areas do not necessarily provide a 'scientific' test as such. Because of time constraints, and the lack of viable hilltops within the Deer Park suited for the purpose, only four transects were surveyed as controls as opposed to the eight rock art transects. This disparity should be kept in mind when interpreting the significance of any contrasts between the control and rock art transects. As noted above, beyond the Deer Park land improvement has proceeded more aggressively. Any archaeological material present would have been impacted more seriously in these areas, rendering them less suitable for this initial survey phase.

If traces of activity *could* be found, there were no guidelines based on previous work as to their expected distance from the panels. On average, the transects covered a 60x60m area centred on the panels. This provided sufficient coverage to be able to interpret any anomalies within their wider setting. It also acknowledged the fact that, as ‘significant places’, we should not assume that potential activities only took place right up close against the carved outcrops. The extent of the survey transects was also defined in response to the local topography and areas of wet and dry land, so they varied slightly in shape and size. In order to increase the likelihood that archaeological material would be identified, both earth resistance survey, using Geoscan’s RM15 twin probe earth resistance meter, and magnetometry survey, using Geoscan’s FM36 fluxgate gradiometer with sample trigger, were employed. These were initially tested over two transects (A and B) before proceeding further.

A variety of different panel types is evident within the study area and the geophysical survey investigated a range of these in order to facilitate comparison. These panel types range from densely decorated ground-level panels (Transects B, E and H), to sloping or vertical outcrop panels (Transects F and C), sometimes with a small number of simple motifs (Transects D and G), to prominent outcrops, which may have been regarded as a type of ‘natural monument’ or landmark within the local area during prehistory (Transects A, B and C). A range of different landscape settings was surveyed, from hilltop knolls (Transects C, D, E and G) and ridgelines (Transects B, F and H) to low-lying outcrops (Transect A). In this way the survey was designed so as to allow the idea that different rock art sites may have been used in different ways during prehistory to be investigated. Because a number of the Deer Park’s enclosures are located in direct association with prominent knolls featuring outcrop rock art, the investigation of these features was also deemed to be of value.

One of the issues facing any geophysical survey is the resolution at which the features particular to the given site type will be identifiable in the survey results. It is widely recognised that the resolution regularly employed in both research and commercial survey is usually incapable of identifying smaller features such as postholes. It is equally likely to miss low visibility features such as small artefact scatters or ephemeral deposits of archaeological material. Higher-than-standard resolution is rarely employed. This is probably due to the time consuming nature of this type of survey, and the fact that the software and equipment settings are not always designed to deal with particularly high resolutions (see below). One exception is the survey conducted at the site of Rathcroghan mound (Fenwick et al 1999: 10-11). Here a 0.25x0.25m resolution magnetometry survey allowed a sequence of circular structures comprised of what are thought to be large timber uprights set into massive post-pits, to be identified with great clarity. Though the post-pits were fairly substantial, the increased resolution was crucial in the interpretation of different phases at the site. This example indicates that certain sites may warrant the use of higher-than-standard resolution.

A high-resolution survey methodology was employed at Drumirril, with readings taken every 0.5x0.125m for the magnetometry survey and 0.5x0.5m for the earth resistance survey. There were a number of reasons for this. Firstly, the archaeological literature generally considers rock art sites to be isolated in terms of obvious signs of other human activity, and so large-scale features were not necessarily to be expected. Secondly, the types of activity that may have taken place at rock art sites are effectively unknown, and therefore any physical traces could be relatively ephemeral. Thirdly, the few excavations around rock art panels in the UK to date have identified only low visibility evidence for human activity, including lithic working areas, stake holes and patches of heat altered subsoil suggestive of short episodes of burning (see Chapter 5). For these reasons, adopting a high-resolution approach seemed to be the best means of identifying any evidence for activity that might be present.

A site grid (aligned to magnetic north) and the locations of the geophysical grids were established and surveyed using a total station. The grid was later georeferenced to Irish National Grid using a survey grade global positioning system. Resistivity readings were taken along 0.5m traverses at 0.5m intervals in a zig-zag (east and west) formation using 10m grids (see Figure 4.1). During the earth resistance survey of Transects A and B problems were encountered with the nature of the soil and geology in the study area. The ground was so dry and rocky that in several areas only a handful of readings could be obtained from particular grids. These grids tended to be located on top of, or adjacent to, free draining, raised rock outcrops. The relatively dry weather conditions in the month leading up to the survey would have compounded this problem. The technique was also considerably slower than the use of the fluxgate gradiometer. Combined with the comparatively less successful identification of features on the part of the earth resistance survey, these factors lead to the decision to rely solely on magnetometry survey for the remainder of the transects. However, some useful results were obtained for Transects A and B, as discussed below. More discrete areas of interest identified via magnetometry could potentially be investigated using earth resistance survey in the future.

The survey results were downloaded and processed on a laptop computer using Geoplot 300 software (see Table 6). Due to the resolution adopted it was necessary to download the survey results in the field as the memory capacity of the FM36 gradiometer catered only for two 20x20m grids at a time. Because the fine resolution used is relatively uncommon, the mechanical and software specifications of the FM36 gradiometer did not allow for the desired combination of transect and sample interval settings. A compromise was attained by ‘fooling’ the gradiometer into taking readings at 0.125m intervals along 0.5m transects within 20x5m grids, by setting the instrument to take two transects worth of readings for every single transect walked. This allowed a series of four 5m wide grids to be combined into a full 20x20m grid. Initial concerns that the roughness of the terrain – with outcropping rock and raised ridges and hillocks a common feature of the area – and the very fine resolution readings might induce errors in the quality of the magnetometry survey data were relieved once the ideal settings had been established. The methodology employed, using parallel transects, produced clean results with small areas only occasionally displaying the effects of mis-positioned readings. In particularly undulating areas of the landscape, additional flags and tapes were sometimes used so as to ensure the consistent placement of readings along each transect. The benefits of the high-resolution method employed at Drumirril are evaluated later in this chapter.

Results

A total of 12 transects were surveyed around rock art panels (Transects A-H) and across control transects (Transects 1-4). The survey results are displayed using AutoCAD and ArcGIS software. Ian Elliott of IGAS Ltd advised on processing and interpretation. The AHDS Guide to Good Practice (Schmidt 2001), English Heritage guidelines (David 1995), and IFA Technical Paper (Gaffney et al 1991) for geophysical survey were used as guides in terms of field practice, data processing, archiving, and report production. In each of the Transects a range of features of archaeological potential has been identified, many within close proximity to the rock art panels. The features identified in the survey results discussed below are labelled with alphabetical letters in the corresponding interpretive plots. Table 6 provides the processing details for each of the survey transects.

Rock art transects

Transects A and B

These two transects were surveyed as a continuous system of grids, and will therefore be described as one area. Transect A was centred around a large upstanding convex outcrop located on low-lying, relatively flat terrain. The immediate setting of this outcrop is fairly unusual as a rock art location in relation to the other sites at Drumirril. It features three motifs; two located on a vertical face of the outcrop (also an unusual feature in rock art across Ireland and Britain), and the third located on the slope of the upper surface. Transect B was centred on a long low ridge-top and a gentle gully lying along its northern edge. The southern edge is relatively steep and tree-covered, and thus did not lend itself to geophysical survey. The rock art in this area consists of what were originally thought to be six large rounded boulders, some upstanding, some at ground level, which are scattered across the ridge. Following the excavation (see Chapter 5) it was found that at least some of these were actually exposed and raised areas of the outcrop that forms the ridgeline. The western-most panel lies approximately 30m from the inscribed outcrop in Transect A. Three further panels are clustered tightly together further along the ridge, two of which stand proud above the ground level and in themselves form the apex of the ridge. These four panels within Transect B each feature small numbers of motifs. A further two panels are located on the northern edge of the ridge, and these are, in contrast, more densely carved. The identification of what seems to be a quarry depression of unknown date suggests that the original assemblage of rock art panels on the ridgeline may have surpassed the current number of known carved surfaces.

Earth resistance survey (Figures 4.8 - 4.11, letters refer to Figure 4.11)

The earth resistance survey predominantly illustrates the presence of large areas of bedrock (A) and possible isolated areas of natural stone (B) at a shallow depth below the topsoil and subsoil. The known rock art panels lie within the main area of bedrock. This is an interesting factor considering that the presence of natural clearings in the local vegetation caused by large areas of shallow outcropping bedrock could potentially have influenced rock art distribution. Several areas of ridge and furrow cultivation (C) are evident across the two transects. As noted above, these are probably of a relatively recent date. Four localised low resistance features are evident across Transect B. The westernmost example (D) corresponds spatially with the probable quarry depression, and the remaining three appear to have been caused by the present day use of a sheep feeder along the ridge, which was located in the centre of one of the features (E) during the survey. A high resistance linear feature (F) runs through transect B along a SW-NE orientation. This feature corresponds to a low bank or wall, the southern extent of which is clearly visible on the ground surface. The southern extent is not visible in the earth resistance results due to the presence of the shallow bedrock as the bank or wall feature continues over the raised ridge. This feature also produced a response on the magnetometry results (see below).

Two further high resistance features (G) are situated to the northwest of the bank or wall. It is possible that these represent natural bedrock. However their spatial correspondence with a rectangular anomaly in the magnetometry results (see below) suggests that they may also form part of a feature of archaeological potential. A very subtle and gently curving low resistance response (H) may indicate the presence of a buried ditch feature. In the vicinity of this response a very low bank-like feature is just discernible on the ground surface in optimal lighting conditions, suggesting that the poorly preserved remains of an enclosing bank and ditch feature might be present. This is of particular interest considering the numerous other enclosures evident across the Deer Park whose locations also correspond with clusters of rock art panels. The highly eroded condition of this curving bank may also indicate that it predates the visible wall. Assuming the curving bank defined a roughly oval area, as seen in the other enclosures, the wall is likely to run across the curved enclosure. Thus, future excavation of these features may offer further evidence as to their chronological relationship. Further west a curving high resistance response (I) is associated with the raised outcrop in Transect A featuring numerous motifs. It was originally thought that this might be of archaeological significance, especially considering the presence of possible posthole or pit type responses in the same area in the magnetometry survey. However, as discussed in Chapter 5, the excavation results revealed the latter to be non-archaeological. It is also possible that it represents an edge of natural outcropping bedrock.

Rock art transects

Magnetometry survey

Transect A and B (Figures 4.12 - 4.15, letters refer to Figure 4.15)

The magnetometry results for Transects A and B provide data that complements the earth resistance survey for the same area. Within 5m to the north of the rock art outcrop in Transect A is a series of six regularly spaced identical features measuring approximately 0.5m in diameter. These are arranged in a broad semi circle 25m in full extent, and opening to the northwest (A). These features are consistent with the response expected from pits or large postholes, exhibiting relatively high readings. However, as detailed later, one of these pit-like responses was investigated during test excavations, and was found to correlate to a highly degraded iron spade-head. This suggests that many of these features may also indicate the presence of ferrous material. Their seemingly carefully arranged positions may be due to the build-up of objects at the edge of an area of ridge and furrow adjacent to the outcrop. A line of five similar features runs from approximately 10m south of the rock art outcrop eastwards for 10m, before doglegging northeast a further 10m creating a rough right angle opening towards the rock art in the northwest (B). A very subtle feature is evident in the southwest of the transect as a narrow curving high magnetic response, opening to the northwest, possibly indicating the presence of a buried ditch, though this might also represent some natural feature in the subsoil or geology (C).

A possible rectangular structure is evident in the gully to the north of Transect B, halfway between the central cluster of rock art in Transect B and the outcrop rock art in Transect A (D). The possible structure exhibits three distinct features (postholes or pits) in a line along the northwestern side, three less distinct features of a similar nature along the southwestern side, and a linear feature along the northeastern side. An area of high magnetic response ‘within’ the possible structure was thought to possibly indicate an area of burning, or a pit-like feature. This feature, indeed a pit, was later excavated and revealed highly significant results (see Chapter 5). A short linear feature runs out perpendicular from the centre of the southwestern side. A further linear feature runs from the southeast corner of the possible structure eastwards for 5m, before doglegging north, while another, just discernible, runs from the centre of this to the northeast for 10m. A small area of possible burning lies just to the north of the structure, while a larger area of possible burning lies to the northeast of Transect B (E).

A series of five regularly spaced features (possibly pits or postholes) runs in a broad curving arc along the northern edge of the ridge, roughly centred on the rock art cluster in Transect B (F). These features are similar in size and response to the arc lying just north of the outcrop rock art in Transect A, and therefore may also represent modern ferrous objects. However, their regular spacing is again cause for suspicion. A number of low bank or wall features, still visible on the ground surface are apparent in the survey results for Transect B. One of these was also identified in the earth resistance survey. This runs perpendicular to the ridgeline crossing the ridge-top just west of the rock art cluster, and then veers northeast along the gully to the north (G). This feature is probably a continuation of the low wall oriented north-south which is visible over the flat terrain to the south of the ridgeline. A second low wall or bank curves around the rock art cluster towards the first (H). A number of areas of particularly high magnetic response, possibly representing burning, are evident in the area immediately surrounding the rock art cluster along the ridge top (I). These are unusual in shape, forming slightly curving short linear anomalies. They were thought to represent burning which took place either up against a sloped bank or sloped rock face, thus restricting the spread of material. This interpretation was later confirmed during excavation. Resolving the precise relationship between these features and the edges of the rock art panels requires further total station survey in the future.

A series of ridge and furrows is again evident along the top of the ridge and on the lower terrain to the north and east of the ridgeline (J). A linear feature (K) in the northwest of the Transect is difficult to interpret, as the readings are generally much higher than those of the linear features that seem to correspond to visible surface archaeology. It is not entirely clear whether this could be a buried ditch and an associated bank or wall, or whether it might represent a ferrous or geological anomaly. The latter options seem more likely given the strength of the readings and lack of surface expression compared to similar features in the Transect.

Transect C (Figures 4.16 – 4.19, letters refer to Figure 4.19)
Transect C was centred on the most well-known and readily visible rock art site in the Deer Park, a site which also features the highest number of decorated panels within a few meters of one another. The rock art is spread across eleven surfaces of nine outcropping stones. These are located at the highest point and towards the edge of a small well-defined hilltop adjoining a long E-W oriented ridgeline. The most prominent and highly decorated of these has been pecked into a near-vertical surface that faces out towards the open area of the hilltop. 'Behind' this the ground drops away sharply. As noted previously, the manner in which the rock art is 'articulated' in this setting makes it tempting to interpret the site as one that was intended to imbue a distinct sense of display specifically directed towards the open hilltop.

The survey focussed on the hilltop, and extended down to the base of the slope which joins a long E-W oriented valley. The visually dominant feature in the transect represents a linear igneous dyke, a geological anomaly resulting in a massive magnetic response and an associated shadow (A). This was the first of several, probably connected, sections of igneous dykes identified across the Deer Park. The features are consistently oriented NW-SE.

Around the western and southern sides of the hilltop a low curving wall or bank feature (B) encircles the natural rise and defines a flat trackway-like area (C), approximately 2-3m wide, running around the base of the hilltop. In places it appears that the inside slope of the hilltop has also been shaped to allow for the flattened area. The low wall or bank then continues to the SE away from the hilltop. Just before this feature meets a second (D), there is a break in the linear response and associated with this are numerous high magnetic responses of varying sizes. These could represent an entranceway (E). The curving wall is in places quite well preserved above ground. As with the other bank or wall and enclosure features, the potential date of the features is difficult to ascertain without further excavation.

The survey also included the area south of the hilltop where numerous low wall or bank features are visible on the ground surface, and in the survey results (F). A straight line of regular posthole-like features at 4-5m intervals is located in the valley to the NE of the hilltop, and may well represent a modern fence line (G). The NW face of the hilltop is covered with gorse bushes and could not be surveyed.

Interestingly the results show very little activity within the hypothetical 'display' zone described above. There are a few possible small pit-like features close to the outcrops featuring the rock art (H). Due to the form of the outcropping rock here, which rises quite dramatically out of the ground, it was initially thought that these were most likely to represent geological anomalies, i.e. pockets between the outcropping stone where soil deposits have built up. However, the features are similar in nature to those identified in Transect G (see below), again immediately adjacent to a decorated stone, which in this case takes the form of what appears to be a large rounded boulder, quite different in form from the outcrop in Transect C. Although proximity to the rock art alone is not grounds for identifying the features as potentially archaeological, it was felt that these features warranted further investigation. The test excavation failed to identify the source of these anomalies, but did recover some archaeologically significant material (see Chapter 5).

Transect D (Figures 4.20 – 4.23, letters refer to Figure 4.23)

Transect D is centred on a small well-defined rocky hilltop immediately surrounded by relatively flat and low-lying terrain. The positioning of the rock art contrasts markedly with that in Transect C in that the passer-by would be totally unaware of its presence unless privy to knowledge of its existence. The motifs are pecked into the horizontal upper faces of relatively small linear sections of outcropping stone that cap the oval hillock. In places the eroding soil has left the outcrops quite raised in comparison to the surrounding ground level suggesting that any deposits of archaeological potential directly adjacent to the panels might well have been washed down slope.

The NE edge of the hillock, along with a more limited area to the south, has been extensively quarried. The NE edge displays vertical walls of solid bedrock where the stone has been removed, as well as substantial soil bunds or mounds, probably where the soil and loose stone was cleared away from the rock surface. The date of this activity is unclear, but its scale and surface preservation, in this location in particular, may indicate a more recent period of quarrying associated with the large-scale construction of local stone walls. To the south is a small rectangular depression cut into the slope of the hillock, probably due to smaller scale quarrying. Thus the quarrying itself may be multi-phased. As in other parts of the Deer Park this activity may have destroyed additional rock art panels in the process. Adjacent to this was a gorse-covered area that could not be surveyed.

The flat ground to the south of the hillock exhibits well-defined ridge and furrow, features that are displayed clearly in the survey results (A). Surrounding the hill and defining the base of its slope is a low bank, visible on the surface. The bank is well preserved at the eastern end of the hill in particular, and disappears from view to the western end where the land also rises slightly, forming a very low ridge. The bank has shown up remarkably clearly in the survey results (B). They also show an internal ditch (C), which gradually fades out towards the western side of the hillock. Here the oval enclosure shape is still defined by the edge of the ridge and furrow, which marks the point where the terrain rises into the low hillock. The response from the ditch continues to be visible even where it becomes covered by the quarry-related soil bunds in the NE of the site, though the response is somewhat more subtle and there is a marked kink where the bund begins. Thus a chronological relationship between this area of quarry activity and the construction of the enclosure is evident, indicating that the enclosure predates at least this area, if not all, of the quarry activity on the hilltop. Other features of archaeological potential include a series of possible postholes associated with the ditch, and also adjacent to a possible entranceway in the bank, located in the SE of the site (D). The absence of similar features along the remainder of the bank's external face suggests that these cannot be explained as debris resulting from cultivation activity. During the test excavation the ditch and bank were investigated and this confirmed the existence of at least one posthole-like feature (see Chapter 5 and below).

Inside the enclosure, two features of special note were exhibited in the geophysical survey results. The first is visible on the ground surface as well as in the survey results and consists of a very low curving wall or bank, which seems to define a small terrace-like area in the lower eastern section of the hilltop (E). The second is situated on a further (possibly natural) terrace-like feature just above the first, and consists of a strong and fairly large magnetic response indicative of a probable area of burning (F). Surrounding this are a number of small, localised high response features, possibly small postholes, in a roughly rectangular arrangement. These anomalies were investigated during the test excavation, confirming this interpretation.

In the western end of the site there is also an arc of possible postholes (G), and a further cluster is located just NW of the possible area of burning (H). The large high response features along the northern extent of the survey are difficult to interpret (I). Their size and nature is suggestive of possible large pits, though these may well be connected with the quarrying activity in the Deer Park, as this appears to have targeted large isolated boulders as well as outcropping rock. They may also represent some type of natural depression in the geology. The linear features surrounding the hilltop may represent parts of the possible field system, though in the case of some of the low response features they seem to indicate the route of farm tracks that are currently in light use (J).

Transects E and F (Figures 4.24 – 4.27, letters refer to Figure 4.27)

This very large combined transect stretches across a long, wide ridgeline, a small hilltop, and a small area of outcrop. Two of the rock art panels are located at the apex of the ridgeline, two towards the edges of the ridge, another at the apex of the hilltop, and the last on the small outcrop. The highest point of the ridgeline also features a large sub-rectangular enclosure, visible as a raised bank. The enclosure follows the form of the ridge edge in the north, south, and west, and in the east it defines a drop in the topography. This enclosure is visible in the survey results only in the eastern part, where it takes the form of a high response linear feature suggesting again that a buried ditch is associated with the bank (A). A low wall or bank is visible on the ground and in the survey results running perpendicular to, and east of, the enclosure (B). At the centre of the enclosure, and in close proximity to the two rock art panels are two small pit-like features, and a cluster of possible postholes in a rough 'L' shape (C). The former are similar to those identified in close proximity to the rock art in Transect C (see above) and Transect G (see below). The latter may also simply represent localised anomalies in the subsoil or bedrock.

To the north of the enclosure, on the flat terrain below the ridgeline is a series of posthole-like structures in a straight alignment and at regular (approximately 5m) intervals (D). This may well represent a modern fence line. Also in this area, and stretching across to the west of the combined transect, are well-defined ridge and furrow features (E). These features truncate a long linear feature, just visible on the surface as a low raised bank, which runs NW-SE from the outcrop featuring a single rock art panel, to the northern face of the ridgeline (F). To the north, the feature becomes associated with a well-defined ditch as it meets the raised ground around the outcrop, and this is also clearly visible in the geophysics. Across the undulating, low lying area surrounding the decorated outcrop there are a number of widely spread high response features, some of which probably represent ferrous material (G).

The highest point of the hilltop to the western end of this combined transect features a single rock art panel on an earth-fast boulder or outcrop. A small sub-rectangular structure indicative of a hut is visible on the ground surface on the lower SE slope of the hill, and the wall foundations of this structure are visible in the survey results as a sloping 'U' shape (H). A low wall is also visible, both on the ground surface and in the survey results, running along the southern face of the hilltop, and up and over the hill in the western extent of the transect (I). The western extent of this wall, however, is obscured by the massive linear response from an igneous dyke that cuts across the hilltop in a NW-SE orientation (J).

The most interesting feature at this hilltop is an irregularly shaped linear feature which, judging from its characteristics in the survey results, represents another hilltop enclosure, this time no longer visible on the ground surface (K). If correctly interpreted, the enclosure encircles the hilltop so as to just include the rock art panel in its interior. Three pit-like features are visible in the survey results. One is located at the northern point of the enclosure (L). A second is associated with an arc of posthole-like features located to the east of the enclosure (M), and the third (N) lies near the hut. In the northwest of the survey transect a cluster of small high response features is located near the edge of a swampy marsh. These features are difficult to interpret, and may simply represent an area of soil disturbance (O).

Transect G (Figures 4.28 – 4.31, letters refer to Figure 4.31)
This transect was centred on a hilltop at the end of an E-W ridgeline. At the highest point of the hill is a cluster of rounded boulders, one of which features a very badly weathered motif, only just discernible even in favourable lighting conditions. A low wall or bank is visible on the ground surface running along the western slope of the hill, and it can be seen to join another wall running perpendicular to it further south, beyond the survey transect.

The low wall is visible in the survey results (A) along with two other linear features (possibly also low walls or banks), all parallel to one another and regularly spaced at around 10m intervals (B). The features are orientated NE-SW. As before, the features are associated with a positive linear response in the survey results, suggesting that buried ditches run alongside the visible walls or banks. Near the centre of the survey transect, and again in close proximity to the decorated boulder, are two small pit-like features that are similar to those seen in Transects C and F (C).

Encircling the hilltop is a series of pit / posthole-like features (D), similar in nature to those identified at Transect B. The features are widely spaced at 15-20m intervals and form a fairly smooth arc around the northern, western, and southern faces of the hilltop (the eastern side of the hill abuts the ridgeline mentioned above). The features are remarkably consistent in terms of the nature of the readings and in their size, and could correlate to small pits or large postholes. However, the results of excavating similar features in Transect A indicate that these might also be the result of ferrous material accumulating at the edges of cultivated areas rather than features intentionally defining the base of the small hill (see below).

There are a number of other clusters of high-response features, notably in the northeast of the hilltop where some appear to follow the line of the highest wall feature (E), and in the southern extent of the survey (F). These features are difficult to interpret, but could represent activity of archaeological interest. Some ridge and furrow features are visible along the low-lying area to the south of the hilltop (G).

Transect H (Figures 4.32 – 4.35, letters refer to Figure 4.35)
This transect, along with a second area in the SE of the Deer Park (which in the end was not surveyed), was initially selected as a control transect not featuring rock art. It was probably only due to the unusual weather conditions during the survey, a combination of hail and summer evening sunshine, that petroglyphs were identified on a single section of outcropping rock on the southern edge of the ridgeline. The ridgeline also features a small raised area of outcrop towards the western end of the transect, and steep slopes to the north, east and south where the land drops down to relatively flat terrain.

In the survey results the eastern end of the survey transect is dominated by the massive response from an igneous dyke running NW to SE (A). A criss-crossing pattern of ridge and furrow is also evident across the flat top of the ridgeline (B). A linear feature running parallel to the dyke is visible in the east of the survey results (C). This might be indicative of a buried ditch, but some of the readings in this feature are relatively high, and it may also represent a linear ferrous response (e.g., buried wire). Just below this, on the eastern tip of the ridge, is a small circular feature around 6-7m in diameter (D). The response is very faint and may be due to a natural geological anomaly, but its perfect circular form suggests that it might be of archaeological interest. An area of large stone cobbles is also visible at this point on the ground surface, again pointing to the possible presence of a small structure.

Towards the western side of the transect is a series of possible posthole type features arranged in an 'L' shape, with each line equal in length (E). Two other possible lines of posthole type features (F), one running westward from the faint circular feature and the other on the western edge of the igneous dyke, are obscured by the response from the dyke and are thus difficult to interpret. It is possible that these minor responses simply reflect small subsoil anomalies. Other than these features, and the ridge and furrows, the survey transect is notably 'quiet' in geophysical terms.

Control Transects

Control transect 1 (Figures 4.36 – 4.39, letters refer to Figure 4.39)

This transect was selected in order to investigate the visible surface features in the area further. These consist of sections of low curvilinear walls or banks that define a small enclosure, and a substantial ditch feature similar to the one in Transect E. The Control Transect 1 features were prominent enough to be recognisable on the OS aerial photograph (Figure 4.5). The enclosure apparent in this survey transect is the only curvilinear structure within the Deer Park so far that is not associated with known rock art panels. It is also the smallest of the known enclosures.

This transect turned out to be one of the 'noisiest' in geophysical terms indicating a multitude of features that are likely to be of significant archaeological potential. A series of three ditch and bank-like features is exhibited as wide bands of low magnetic readings running from NW to SE (A, B, and C). It is possible that the two western-most examples are at least partly natural, and that the natural terracing has been enhanced. The enclosure visible on the surface is visible as two sections of curvilinear high magnetic readings, suggesting the presence of a buried ditch associated with the visible banks or walls (D). A high response linear feature runs from the SW edge of the enclosure and carries on beyond the survey transect (E). This feature is not visible on the surface, and probably represents a buried ditch. The feature is either truncated by, or respects, the western-most ditch and bank. A small circular feature similar to that seen in Transect H is apparent at the western edge of the survey (F). The feature measures around 7m in diameter and is perfectly circular in form, possibly representing a hut-like structure. Adjoining it are curvilinear features suggestive of buried ditches, which may form part of a larger enclosure to the west of the survey transect (G).

An area of ridge and furrow is evident in the western section of the survey transect, and these features appear to truncate the circular feature and the possible buried ditch (H). There are two clusters of pit-like features, the first running alongside the southern side of the linear feature described above (I), and the second arranged in the NE extent of the enclosure (J). A large area of high magnetic readings may represent the dispersed remains of an area of burning (K). They are similar in nature to those seen at Transect B directly adjacent to the rock art panels, and confirmed via later test excavation. Numerous small and localised high response features are dotted across the centre of the Transect (L).

Control transect 2 (Figures 4.40 – 4.43, letters refer to Figure 4.43)
This transect is located on a very wide E-W oriented ridgeline which divides the Deer Park in two. One of the substantial long parallel walls or banks of the field system runs along the northern edge of the ridge, and evidence of further surface features is apparent at the western end of the ridge. The ridge top is wide and flat and features many small areas of outcropping rock. In retrospect, the area covered by this transect does differ slightly from the rock art locations in that the outcrops occur across a fairly flat area, rather than at the summit of a rounded hilltop.

The survey results are dominated by the massive linear response from an igneous dyke, which runs in a NW-SE orientation across the NE corner of the Transect (A). A small area of ridge and furrow is apparent in the centre of the Transect (B). To the north is the linear response of the low wall or bank visible on the ground surface (C), and running perpendicular to this is a second low wall (D). A small raised sub-rectangular feature, probably a hut-like structure, is visible on the ground surface and this has shown up in the survey results as a series of posthole-like responses (E). As in Transect E, this structure is situated immediately adjacent to an ancient field wall, perhaps indicating the contemporaneity of the two feature types. A short section of a linear feature is visible as two parallel lines in the SW of the survey (F). Several small localised areas of high readings are scattered across the transect. Two of these may represent ferrous material (G and H), though the southern example could also represent a small area of burning (I).

Control transect 3 (Figures 4.44 – 4.47, letters refer to Figure 4.47)
Control transect 3 was centred on a raised part of the ridgeline which effectively connects Control Transect 2 with Transects A and B. Some eroded ridge and furrow features are visible across the hilltop. The transect runs down towards the small former lake to the north of this area, and the southern edge is defined by a steep gorse-covered slope.

An igneous dyke, which traverses the NE corner of the survey transect, dominates the results (A). A criss-crossing series of ridge and furrow features is evident across the whole transect, and these are also clearly visible in the survey results (B). A small section of a linear feature is evident in the SW of the survey (C). Several clusters of small high response features are scattered across the Transect. It is not clear whether these might be of archaeological significance or whether they represent general soil disturbance (D).

Control transect 4 (Figures 4.48 – 4.51, letters refer to Figure 4.51)

The final control transect was centred on a well-defined rounded hilltop with steep slopes defining each side. The steepness and rough terrain prevented a full transect from being surveyed, but the six 20x20m grids surveyed were sufficient to cover the hilltop itself and the northern and southern slopes. Some terrace-like features, possibly natural, are visible on the SW corner of the main hilltop overlooking an area of wetland.

The survey results feature an area of ridge and furrow on the summit of the hilltop (A). There are a number of clusters of small pit-like features, two of which are focused on the two highpoints of the hilltop (B and C). One of these clusters is adjacent to an area of possible burning (D). Others are located towards the base of the hill slope. As mentioned earlier, it is not known whether these might represent archaeological features or natural geological anomalies. Their distribution does appear to be somewhat patterned, in that they frequently occur on the summits of the hilltops. This transect demonstrates that they are not always associated with known rock art panels. A second possible area of burning is situated at the edge of the hilltop (E). A ‘noisy’ area, with tiny scattered high response readings is apparent on the northern edge of one of the raised areas of terrain (F). This is suggestive of an area of disturbed ground.

Testing the resolution of the magnetometry survey (Figures 4.52 – 4.54)

As detailed above, the magnetometry survey was conducted at a particularly fine-scaled resolution due to the objectives of the survey. The resolution adopted (0.5x0.125m) meant that four times as many readings were collected than that recommended by the English Heritage Guidelines (David 1995) (1x0.25m), and that regularly undertaken by many commercial consultancies (Ian Elliot *pers.comm*.). In order to test the general quality and validity of the resolution adopted an additional survey was conducted. This aimed to test the degree to which the fine resolution was warranted by the detail obtained in the survey results. Six grids from Transect G were resurveyed using the resolution recommended by English Heritage (David 1995), so that readings were collected every 1x0.25m.

The results from this test survey were encouraging, and generally suggested that the enhanced resolution allows the archaeologist to distinguish between possible archaeological features and geological anomalies or general soil noise. This was particularly notable when comparing the widely spaced arc of possible pits/postholes from the two surveys. This was similar to one identified in Transect A that was later found to correspond to ferrous material. The lower resolution survey did identify each of these features with widely varying intensity. However, it was difficult to distinguish them from the background noise, and the localised response from the features would probably not have attracted attention as potential archaeology. In contrast, the high-resolution survey offered a substantially more detailed picture and each of the features was consistently represented, suggesting consistency in their actual form. This made the features much more readily identifiable as potential archaeology.

Interestingly, one of the features could easily be interpreted as a ferrous response in the low-resolution survey due to the sudden spike of high readings it produced, while the readings established in the high-resolution survey were more consistent with deposits of archaeological potential, giving more moderate readings. It is not clear how this discrepancy should be interpreted at this stage – does it suggest that there could be ferrous material present which by chance fell outside the range of the readings taken in the high resolution survey, or does it suggest that the low-resolution survey is presenting a more simplified picture of an archaeological feature which possibly contains, for instance, burnt material? This quandary can only really be investigated further through the excavation of these specific features. It would perhaps seem unlikely that large ferrous objects on the scale of spade heads could have been deposited fortuitously in such regular arcs in Transects A, B and C.

The linear features in this transect (probably low banks or walls and associated ditches) were readily identifiable in both sets of results, but were especially obvious and well defined in the high-resolution response. This suggests that the technique would aid in the identification of potential structural details such as entrances and postholes. The high-resolution survey also displayed a wider band of low magnetic response, which shadowed the linear high response of these features. This possibly defines the extent of the subtle bank or wall response more precisely than that in the low-resolution survey. In addition, the ridge and furrow features, many of which are visible on the surface of the Deer Park, are clearly displayed in the high-resolution survey, but cannot be readily identified in the low-resolution survey. Such features can be thought of as relatively subtle in terms of their impact on the subsoil below, and this therefore suggests that the use of an enhanced resolution will aid in the identification of low visibility archaeology.

A number of features that were identified as possible postholes on the basis of the geophysics were later targeted during the test excavation. By comparing the locations of the excavated features in Transect D, shown here in green (see Figure 4.55), with the geophysical anomalies, the accuracy of the survey technique in predicting the location and nature of even quite small postholes becomes apparent. It must be said, though, that not all of the trenches were so successful (see Chapter 5). The successfully identified postholes also tended to contain high proportions of charcoal which undoubtedly enhanced their magnetic response. The combination of high-resolution geophysics and test excavation proved to be a highly productive means of approaching what is a relatively low visibility prehistoric landscape where the nature of the archaeology was largely unknown.

Thus, it currently appears that the use of an enhanced resolution may have increased the likelihood of archaeological material being identified. However, the method is time consuming. Reducing the reading transects from 1m to 0.5m spacings doubles the time needed to survey a grid. Furthermore, so that the FM36 could keep up with the large numbers of readings being taken it was necessary to slow the survey speed right down. This again doubled the usual time taken to walk along each transect. In earlier experiments at a higher speed, the FM36 had frequently ‘dropped’ readings leaving an insufficient number to cover the full length of the transect. In some cases this still occurred at the final reading along some of the transects, even at the lower speed, thus incurring a ‘dummy’ reading at these points (e.g. see Transect G and Control Transect 2).

The results of the test excavation are presented in Chapter 5. This work confirmed the existence of small, ephemeral, or low visibility archaeological features in many instances. Thus, the geophysical survey conducted at Drumirril suggests that where the time and resources can be afforded, particular sites will indeed benefit from high-resolution investigation. This is particularly significant for sites where the nature of prehistoric activity is entirely unknown, or is known or predicted to have left only subtle traces in the archaeological record. One of the major benefits for the work at Drumirril was the subsequent ability to pinpoint small features even within closely targeted 1mx1m trenches.

Discussion

A number of features of potential archaeological interest were identified repeatedly in the geophysical survey results. This section summarises those from the rock art transects, and Control Transect 1 (where the anomalies are undoubtedly archaeological), which were considered to be worth further investigation via test excavation. Due to time and resource limitations within this doctoral study, only some of these features could be investigated via excavation. In the future it is hoped that further excavation work can be conducted, particularly in order to investigate features from the Control Transects.

The several curvilinear enclosures and many coaxial field boundary walls identified, remnants of which survive above the ground surface with some notable exceptions, are of unknown date. Comparison of their scale and form with other field systems of known date highlights the difficulty in establishing a probable chronology for such features based on general morphology alone. Coaxial field systems featuring wide, slightly meandering stone built walls and curvilinear enclosures have been dated to a wide range of periods from the Neolithic, such as the Céide fields system (Caulfield 1983) to the Medieval period with examples at Lough Gur (Ó’Ríordáin 1949) and Cush, Co. Limerick (Ó’Ríordáin 1940). Prehistoric field systems are known to be associated with rock art sites in other areas, such as the Loch an Dúin Valley complex (Coileain 2003). A thorough survey of the field system at Drumirril would facilitate more detailed comparisons with other examples.

Likewise, there are other known examples of rock art associated with enclosures of varying types and chronological associations. These include Backstone Beck (Edwards 1986), Routing Linn (Waddington 1999: 190), Knowlton Henge (Lewis et al 2000), Loughcrew (Shee Twohig 2001; Shell and Roughley 2004), Loanleven near Strath Tay (Bradley 1997: 138), Burroo Ned promontory fort (Darvill and O’Connor 2005), and a series of earthworks at Braddon Camp on the Isle of Man (ibid). Attempts to fully resolve the chronological issues, for example through excavation, lie beyond the scope of the current research programme. However, selected areas may be worth further investigation in the near future, particularly in order to resolve the existence of the potential enclosure at Transect E. The condition of this enclosure, which exhibits no visible surface traces, and the possible candidate in Transect B, which is in a similar condition, contrasts markedly with the comparatively well-preserved examples in Transects C, D, E and Control Transect 1. This contrast cannot easily be explained through differential landuse, construction technique, or taphonomic processes, such as differential erosion. This may indicate that the distinction is chronology-based, and that the enclosure features date to at least two different phases. The enclosure at Transect D is also of particular interest owing to the integrated appearance of the various features within it, including the possible entranceway and associated features, and the possible internal division. This Transect was selected for investigation using test excavation, as detailed in Chapter 5.

A second feature type repeatedly identified in close proximity to the rock art panels is low numbers of closely clustered small pit-like responses. These are seen at Transect C, Transect F and Transect G. Their tendency towards location in close proximity to the rock art presents a double-edged sword. This factor could be explained by describing the features as being associated with rock art, or at least rock art locales. However, their association with particular geological formations (e.g., gaps in outcropping rock) might also explain this pattern. Further investigation of one set of these features was deemed to be a valid approach. Owing to the distinctive nature of the Transect C rock art and its setting, as described in Chapter 3, this transect was selected for test excavation (see Chapter 5).

A third feature type of interest consists of arcs of possible pit / posthole-type features. These were identified in Transects A, B and G, and range in form from widely spaced arcs defining ridgelines or hilltops (Transects B and G) to closer spaced arcs adjacent to rock art panels (Transect A). The strength of the readings suggests that in some cases these may contain burnt or ferrous material. It would be beneficial to investigate a sample of both types of features in future work. In the meantime, two of the Transect A features were investigated during the test excavation. In these instances, neither was found to correlate to archaeological features (see Chapter 5).

Several areas of possible burning have also been identified in close proximity to the rock art panels. The possible burning around the rock art in Transect B prompted further investigation, as did the complex hearth-like feature at Transect D. The interpretation of both of these clusters of features was confirmed during the test excavation, as detailed in Chapter 5. These turned out to be some of the most compelling features at Drumirril, though their broad chronological relationship with the rock art requires further resolution or interpretive investigation.

A number of areas have been identified which seem to exhibit a series of small posthole-like features, sometimes in ‘L’ shaped arrangements or arcs. Due to the fine-resolution employed in the survey it would be useful to test whether these represent the postholes of low visibility structures, or whether the resolution of the survey has resulted in the expression of more soil noise than might usually be expected, rendering such anomalies liable to appear as features of archaeological potential. The examples at Transect D and Transect F would be potential candidates for further investigation. Though the excavation work was not able to investigate these features within the given time and resource constraints, the results from the Transect D trenches confirm the capability of the fine resolution survey in identifying small postholes, though this is probably highly dependent on the nature of their fills.

The possible rectangular structure at Transect B was also considered to be an important candidate for further investigation. It was hoped that this would allow the interpretation of the geophysical survey to be checked both in terms of the nature of the structure 'walls' and the possible presence of an area of burning (ie., a possible hearth) at its centre. Excavation confirmed the presence of a central feature, the fill of which was found to hold artefact material of considerable significance (see below). However, time constraints prevented the depth of excavation from reaching the possible rectangular structure, which is thought to lie beneath a thick layer of plough-dragged cobbles. Given its artefact associations and rectangular nature, this feature would be ranked highly for further investigation during any future work.

Lastly, the quarrying activity identified across the site is also of considerable interest. As noted above, this is likely to be multi-phased, and some of the activity in Transect D appears to postdate the construction of the ditched and banked enclosure. Whether some of the quarrying may date to prehistoric periods is an area for larger scale investigation in the future. McCabe and Nevin (in Eogan 1986: 113-4; see also Cooney 2000: 136-7) have described the 'primitive quarries' likely to have been left behind following the procurement of blocks for megalithic constructions: multiple small scale excavations and heaps of broken rock representative of the weaker, finer grained, bedding planes that were discarded in favour of stronger tabular blocks. Given these descriptions, Drumirril would appear to be a compelling contender for further examination.

The Transects that were positioned around rock art panels generally feature a range of anomalies of potential archaeological significance. From this group Transect H is the most 'quiet' in geophysical terms. The complex patchwork of ridge and furrows indicates that intense ploughing and cultivation took place across the raised flat surface of the ridgeline. This factor may well have affected the survival of any archaeological deposits once present in this Transect. Of the eight rock art Transects, five exhibit enclosure type features (B, C, D, E and F), while three (A, G and H) do not. Interestingly, Transects A, G and H also feature panels that are amongst the most difficult to identify in the Deer Park, with all three missing from several previous surveys of the area (e.g. Van Hoek 1997; Nolan 1999). In contrast, the other transects feature either multiple panels (B, D, F) or highly visible motifs (C, E). Does this suggest that the builders of the enclosures were aware of the latter panels, but not the former? Alternatively, were these features simply positioned, as the rock art seems to have been, to take advantage of areas of raised ground, thus creating a coincidental association? The chronological relationship between the enclosures and the rock art remains to be seen. The enclosures may considerably postdate the rock art, though this does not necessarily in itself negate the possibility that the builders were aware of the carvings (see Chapter 5).

The results from the Control Transects vary considerably. As described above, Control Transect 1 displays a rich concentration of archaeological features. These include the only curvilinear enclosure in the study area that is not associated with known rock art. In general, the remaining Control Transects feature fewer anomalies of archaeological potential than the average Rock Art Transect. However, because the sample size for the Control Transects (four) versus the Rock Art Transects (eight) is only small, it is not entirely clear whether the correspondence between rock art locations and increased numbers of anomalies of archaeological potential is significant. However, at this stage this apparent pattern can only be taken as an encouraging sign. Should it be possible to test this idea more thoroughly in the future, it will be interesting to investigate the nature of the features in Control Transect 1 in order to compare them with those surrounding known rock art panels. It is also possible that rock art has been quarried from the Transect, or that buried rock art panels are yet to be identified. However it is also not unexpected that non-rock art hilltops might have seen periods of intense activity. The important issue for future investigation is whether all these activities were broadly contemporaneous or not, and whether they differed between the two transect types.

Conclusion

The rock art landscape of Drumirril is clearly associated with a complex palimpsest of archaeological features. The presence of at least six curvilinear enclosures associated with what appears to be the low boundaries of a field system of unknown date suggests that the area is of considerable significance archaeologically, not only for its rock art. In some cases the manner in which the features engage with the topography and the rock art locations lends an integrated appearance to their spatial relationships (e.g., in Transect D). Evidence for human activity was successfully identified both in close proximity to the rock art, and also in surrounding areas where there is currently no known rock art. In general though, the Transects positioned around the rock art tended to feature higher numbers of anomalies of archaeological potential. However, as stated above, this may also be a reflection of poor sample size. There are also notable exceptions on both sides. For example, the geophysical survey of Control Transect 1 indicates a hilltop totally saturated in archaeological features, including enclosures, linear ditches, banks and possible pits and areas of burning, but as yet no known rock art. As is so often the case in archaeology, the situation is complex rather than clear-cut.

In terms of methodology, magnetometry was found to be the most useful technique for rapidly establishing areas of interest. The earth resistance survey was slow and ill-suited to the shallow bedrock geology and thin overlying deposits of the area. The results largely reflected the underlying bedrock, and only occasionally identified features that had not been recognised using the magnetometer. However, the technique did suggest that the shallow depth of the bedrock surrounding the rock art might have encouraged clearings within what was probably a more widely forested area during prehistory. The application of the high-resolution methodology appears to have been worthwhile. In many instances the use of the high resolution does appear to have enhanced the likelihood of identifying small scale or ephemeral evidence for human activity. As a result of the survey, the potential for obtaining positive results through test excavation at the locations identified above was deemed to be high.

Chapter 5 details the results of the test excavation that followed the geophysical survey at Drumirril. By confirming the nature and (broad) chronology of many of the features identified in the survey, this work allows us to move another step closer towards exploring some of the more complex issues that were raised in the introductory sections of this chapter. These include the potential relationships between the activities identified and the rock art panels, and the idea that these places were specifically ritual locales on the margins of the settled landscape, used by restricted groups of people. These themes form the basis of further discussion in Chapters 5 and 7.

CHAPTER FIVE

Excavating an enigma

Rock art - can you dig it?

The geophysical survey results described in the last chapter indicated that a complex palimpsest of archaeological features is present around the carved outcrops of Drumirril, but were any of these features likely to be the result of prehistoric activity? If so, what would they say about the current theories as to how people used rock art locales in the past? To investigate these questions further, a series of small and tightly targeted test trenches was excavated in the summer of 2003. This work explored the fifth 'nested' scale identified in Chapter 1, individual rock art clusters.

While the use of excavation to investigate archaeological sites is hardly an earth-shattering development, as noted in Chapter 4, excavating *rock art* does represent a considerable conceptual shift. During the early stages of this project a friend who is an experienced archaeologist asked me sceptically "can you excavate rock art?" Though this question surprised me at the time, this has been a common standpoint in the wider archaeological community. Indeed, one of the questions that arose in response to the English Heritage commissioned Rock Art Pilot Project was whether excavation was even a valid means of investigating rock art at all (RAPP Steering Committee pers.comm. 2000; see also RAPP 2000a: 27-8). Archaeologists in Britain and Ireland have essentially been reluctant to risk excavating what, for all intents and purposes, have been viewed as blank spaces in the archaeological landscape. In contrast, within the rock art literature the specific need for excavation was identified well over a decade ago (Johnston 1989: 320-1; see also RAPP 2000b: 28-30). However, until very recently, little action had been taken to test the potential of this method of investigation.

Excavation has developed as a method for understanding rock art in countries other than Ireland and Britain, but this is closely linked to the nature of the art locales in these areas. Such an approach has evidently made good archaeological sense where rock art occurs in caves and rock shelters (e.g. Bellelli et al 2004). In these locations, the 'site' or 'place' can be readily identified as being defined by the contours of these natural structures. Such locales are immediately understood archaeologically as 'places where things happened'. The investigations in the painted and carved Palaeolithic caves of France and Spain, such as Lascaux, Chauvet, Erberua, Tuc d'Audoubert, Fontanet, Aldène, Tito Bustillo, and La Garma, perhaps epitomise such work (Bahn and Vertut 1997: 10-13, 115). In these cases the cave environment has frequently left the remnants of human activity exposed rather than buried. These have revealed pigment preparation activities, footprints, paving, bedding, hearths, scaffolding holes, lamps, occupation debris of flint tools, shells, charcoal, and bone fragments (ibid: 10-13, 19). Excavations have been conducted in these caves as early as those by Spaniard Sanz de Sautuola in the later 19th century (Bahn and Vertut 1997: 17), who excavated at Altamira, amongst other caves (Sanz de Sautuola 1880).

It is curious that outcrops with rock art seem to have fallen through the gaps in terms of our ideas as to 'what can be excavated'. This seems to be at odds with the widespread acceptance in both anthropological and archaeological studies of the idea that outcrops and boulders, amongst other natural forms, can play significant roles in people's understanding of the world around them, as landmarks to which ideological and symbolic significance is attached, and as places that can form a focus for people's daily interaction with their landscapes (Bradley 2000; Tilley 1996; Ingold 1986:145-6; Scarre 2002b; Taçon 1991, 1999: 37-8). Keeping in mind the growing evidence that the production of carved motifs, not to mention entire panels, was a practice conducted over a considerable duration of time, and indeed that individual carving events would frequently have required a significant commitment of time, it seems reasonable to ask whether any other activities were conducted in association with the carving events. If so, would these leave any trace in the archaeological record? Our understanding of the chronology of British and Irish rock art (as discussed in Chapter 2) suggests that both longevity and repetition were features of the practice, and that its origins may lie in the Neolithic. Would excavation results be in keeping with these ideas?

Along with the geophysical survey, the Drumirril excavation represents the first investigation of its kind, to date, to make positive archaeological findings at an *in situ* outcrop rock art site in Ireland. Its *raison d'être* also differed significantly from the small number of previous rock art-associated excavations in Britain. As with the geophysical survey, the work was propelled by the idea that investigating the use of Drumirril as a 'place' was a means of attempting to understand what people did at rock art locales, and the ways people interacted (in the broadest sense) with the sandstone outcrops. As explained in further detail below, the investigation of potential activity surrounding *in situ* rock art panels was rarely a *primary* objective in previous work. In most cases, the excavations were conducted within the context of investigating an associated monument, such as a burial cairn or enclosure. This is also related to the fact that such work often sought to investigate rock art chronology, thus requiring a stratigraphic relationship between the carvings and datable deposits.

For these reasons, the excavation at Drumirril represents a significant development in itself, and one that has already influenced the direction of subsequent research by demonstrating that excavating rock art is both a valid, and fruitful, methodology. The results of the work at Drumirril demonstrated that excavation is a less 'risky' approach than previously supposed. Other researchers have subsequently excavated two further rock art sites (Jones pers. comm.; Waddington pers.comm.). Waddington (2004a, 2004b; Waddington et al in press) investigated the cairn and associated carved outcrop at Hunterheugh Crags, Northumberland, though the trench was extended only a few metres beyond the panel. Jones (2004, 2005) opened a series of excavation trenches around rock art panels in Kilmartin, Scotland. Both projects were highly successful, as discussed in further detail below. It is argued here that if our understanding of the role that these sites played in prehistoric society is to be developed, the further application of such methods is essential.

In addition, the work at Drumirril makes a significant contribution to our knowledge of the archaeology of County Monaghan. Within this county there have been notably few excavations at sites of any period, and Drumirril represents one of just three investigations to date to reveal prehistoric activity (Walsh 2004, 6). The excavation at Drumirril was conducted at the same time as the larger scale investigation, in advance of road realignment, at Monanny, Carrickmacross (Walsh 2004). Located just 6km to the west of Drumirril, the work here revealed the remains of three rectangular structures thought to date to the earlier Neolithic, as discussed in Chapter 3. Neolithic to Early Bronze Age settlement has also been uncovered in the recent excavations along the Dundalk Bypass (see Chapter 3). Since the proposed Neolithic date for rock art is still a relatively new idea in the mainstream literature, prior to these two projects the Cooley Peninsula, Co. Louth, with its series of megalithic monuments, and the cluster of similar monuments further inland on the Drumlin hills of Monaghan (Cooney 2000: 139-142; Brindley 1986: 1-5) had been seen as the dominant areas of (visible) Neolithic activity in the region. Together, the findings from Drumirril and Monanny speak of the significance of this lowland zone, ‘between the monuments’, during the Neolithic. This aspect of the region will be revisited in further detail in the final chapter.

Previous excavations: the global context

Considering the dearth of excavation evidence in general, it is worthwhile setting the few excavations of Atlantic rock art to date within a broader context of investigations from around the world. As detailed in Chapter 2, numerous rock art panels in Britain and Ireland have been revealed by, or are associated with, monument-based excavations (see Simpson and Thawley 1972; Burgess 1990; Corlett 1999). On the basis of the current interpretations that such panels are frequently in secondary contexts, or associated with traditions that are related, but separate, to ‘quintessential’ rock art, this section focuses predominantly on the excavation of *in situ* outcrop or boulder rock art sites. Excavations at *in situ* panels can generally be separated into three categories: firstly, those that aim to reveal the entire panel, primarily in order to check for the presence of additional motifs (examples from Britain and Ireland are detailed below); secondly, those seeking to investigate the immediate context of the panel itself, usually with the aim of identifying ‘associated activity’; and finally, those seeking to explore the use of rock art sites as a significant ‘place’ in the wider landscape.

A brief survey of the range of rock art-associated excavation evidence (while not claiming to be exhaustive) suggests that although in many cases it is ‘early days’ in terms of our use of these techniques to explore prehistoric rock art sites, further work certainly appears to be warranted. The last decade has seen an increasing awareness of the need for excavation work, and an increase in the number of excavations around the world where the research is specifically rock art focused (see Nash in press; Bengtsson pers.comm.; Morwood 1994; Loendorf 1994; Westfall 1998). This trend is probably part of the relatively recent recognition that rock art research has gained within mainstream academic archaeology. However, even on a global scale, examples of rock art excavations are still surprisingly rare, and the results are often published in local or institutional publications (often as ‘grey literature’ reports) that are difficult to access.

These investigations largely fall within the second category described above, and investigate only the immediate context of the panels. However, as in Britain and Ireland, many are focused on structural monuments associated with rock art, rather than the panels themselves. Examples include Goldhahn’s (1999) barrow excavation, which revealed numerous decorated panels, Fedele’s (1999) excavation around a carved stelae in the Italian Alps, and Westfall’s (1988) work associated with a prehistoric alcove structure in Utah. Secondly, others frequently concentrate on caves or rock shelters featuring rock art motifs. Here examples include investigations in Indian rock shelters such as that by Khare (1984), Ouzman and Wadley’s (1997) cave excavation in Australia, excavations of datable materials in rock shelters of New Zealand (Trotter and McCulloch 1981), and Reyman’s (1971) work, and Wagner’s (2001) rescue-based testing, both in Illinois rock shelters. The rock shelter at The Narrows, Crawford County, Arkansas, which features a complex series of anthropomorphic pictographs, was found to contain rich botanical and faunal midden material, stone tools, and ceramics (Hillard 2005). In northern Portugal, both caves featuring pictographs and those devoid of rock art have been investigated. These provide a significant example since the latter featured occupation debris and artefacts whilst, with the exception of one cave with a distinctive assemblage interpreted as a sanctuary, the former did not (Sanches 1997 cited in Bradley 2000: 73; see also Bradley 2005: 111-4). In southern Australia, markings referred to as ‘finger fluting’ along the walls of Koonalda Cave have been found to be associated with flint mining dating back 30,000 years (Wright 1971).

There are also a small number of examples where the excavations aimed to specifically investigate the rock art panels themselves. Areas adjacent to *in situ* carved boulders in Texas (Steinbring and Buchner 1997) and California (Frentress et al 1999; Parkman 1984) have been tested and fully excavated, in some cases revealing substantial tool assemblages. Elsewhere, excavation has been directly employed to resolve dating issues (e.g. Campbell and Mardaga-Campbell 1993). In some cases the excavation of stratified rock art has allowed the chronology of the carvings to be established. This most commonly involves the recovery of loose decorated stones, such as those from a Neolithic hunting campsite in Eastern Jordan (Betts 1987, 1998: Chapter 7). Elsewhere they involve *in situ* motifs such as those in Cape York, Queensland, overlain by late Pleistocene deposits (Rosenfeld et al 1981), and a cave site with rock art reportedly sealed by epipalaeolithic strata at Kobystan, on the western shore of the Caspian Sea (Betts pers.comm.). At Cosquer, France, radiocarbon dates were obtained for both charcoal drawings and charcoal fragments, the latter recovered from the cave floor, allowing actual drawing events to be dated (Clottes 1997; 116). In a related effort, work at Victoria River, Australia, sought to identify painting events in a rock shelter via the abrupt appearance of large amounts of ochre in the micro-stratigraphy immediately beneath ochre-pigmented pictographs (David et al 1994).

Similarly, in Arhem Land, fluctuations in the ochre content of a series of stratigraphic layers has been identified by Taçon and Brockwell (1995), again allowing the repeated nature of painting events to be identified and explored. In Kapova Cave in the Ural Mountains a painted fragment of the wall was recovered during excavations that also yielded beads and a pottery vessel with pigment traces from a 14,000 year old occupation layer (Shchelinsky 1989). Bahn and Vertut (1997: 28-31, 34-7, 61-3) have also described this type of work in Peru, Brazil, Northwest Argentina, Patagonia, Zimbabwe, South Africa, Tanzania, Australia, and France. Such projects are revealing increasingly ancient, and sometimes increasingly controversial, Pleistocene dates for Australian rock art (e.g. Fullagar, Price and Head 1996). From the most recent work in Australia to the 19th century investigations in Europe's painted caves, the apparent antiquity of the art has repeatedly met with widespread public and professional scepticism, that has eventually been overcome by mounting evidence (Bahn and Vertut 1997). It remains to be seen whether the early dates for Atlantic rock art proposed by Waddington (1998) may eventually be accepted in a similar manner.

From quite early on in the development of rock art research, Scandinavian archaeologists have used excavation to investigate the immediate surrounds of large carved outcrops, often with the direct aim of identifying potential evidence for activity around the panels. It is possible that the very nature of the rock art in the Scandinavian countries – consisting of what are frequently extensive concentrations of figurative carvings, and often making up scenes that unfold across massive outcrops – has affected the approach taken to these sites. In comparison with those in Britain and Ireland, rock art sites undoubtedly form a highly visible and well-known component of the Scandinavian archaeological landscape. Furthermore, their figurative nature has aided in the dating of the carvings to particular periods, for instance through the identification of known artefact types in the carved designs (see Bradley et al 2001: 486). As a result, it probably seemed quite appropriate for these sites to be treated in much the same manner as any other archaeological monument. The broad contextual similarities between the rock art of Scandinavia, Britain and Ireland render this work of considerable relevance, and students of British and Irish rock art have much to learn from the Scandinavian approach. By establishing results for a series of sites within which it is possible to compare the activities, artefacts and features uncovered, these investigations offer an important means of exploring whether repeated patterns of activity can be discerned across different rock art sites.

The first recorded Scandinavian excavation was conducted in 1848 (Bengtsson 2004a) in the (unsuccessful) hope of recovering the hammerstones that were thought to have been used to peck the motifs. During the 1920s excavations recovered burnt stone, and occasionally cremation burials, close to rock art panels, and by the 1970s a 20m long enclosure that delimited a major concentration of pottery was identified within a metre from a carved panel (ibid). More recent work has reinforced some of the findings of these earlier investigations (Johansen 1979; Pettersson 1982; Kindgren 1981; Svensson 1984; see also Nash in press; Bengtsson 2004a, 2004b; Kaul 2004).

A significant number of highly successful excavations has been conducted around outcrop rock art panels in Sweden. Despite the use of the site for modern cultivation, excavation by Kindgren (1981) on behalf of the Bohuslän Museum recovered a range of material from two small trenches and six test pits opened in front of a carved outcrop at Tanum. The material included worked flint, quartz, burnt clay, bone, an amber bead and Late Bronze Age to Early Iron Age pottery sherds. The pottery sherds were clustered immediately in front of the panel. In some instances excavations have been conducted as part of a conservation effort, for example to aid in draining water away from the carvings (e.g. Svensson 1982). Petroglyphs in Ireland and Britain have rarely, and only recently (RAPP 2000a: 69-80, 122-151), been perceived as monuments worthy of practical conservation plans more comprehensive than the simple creation of fenced-off or set-aside areas of land (for example the enclosed (and *ex situ*) Panorama Stones, Ilkley, West Yorkshire (RAPP 2000: 130)), or the burial of panels (such as at Gardom's Edge (Walster 1996a, 1996b)). During the Swedish investigation Svensson (1982) uncovered a large area of carefully packed stone that formed a possible platform by filling in a depression in the outcropping bedrock immediately in front of a series of carvings. This feature, along with localised deposits of charcoal and quartz directly in front of two dominant motifs on the panel, was interpreted as evidence for activity of a 'ritual' nature (Svensseon 1982:2).

Having conducted numerous excavations at different carved outcrops, Bengtsson's (Lasse Bengtsson pers.comm., 2004a, 2004b) work probably represents one of the most extensive corpora of investigations of *in situ* outcrop rock art via excavation in Europe. The results of this work also demonstrate the value of such an approach. In the 1980s Yates and Bengtsson (1989-90) excavated an area in front of a large outcrop featuring Bronze Age carvings in the Vette area of Bohuslän. The work revealed a substantial longhouse structure, not earlier than Iron Age in date, and apparently (based on its location on a rocky ledge) isolated from any large settlements in the area. There were some features associated with the structure that may have pointed to a domestic function, but in general there was a marked absence of flint and pottery, possibly pointing to a non-residential function for the site (Yates with Bengtsson 1989-90, 34). Interestingly the area immediately in front of the panel was virtually devoid of archaeological features and artefacts. This is significant for the handful of previous excavations in Britain, as it indicates that to identify archaeological remains we may need to excavate slightly away from the panel itself. Indeed, this aspect may well underlie the fact that previous excavations in Britain have so infrequently identified substantial archaeological material or features.

The recovery of worked flint, quartz, pottery sherds, burnt bone, charcoal and burnt clay and stone is routinely reported from Scandinavian sites, and several excavations have identified enclosure structures (Bengtsson 2004a), paved surfaces or platforms, and hearths (Bengtsson 2004b: 136). Others have yielded glass beads, hammerstones, slag, and votive deposits of Mesolithic scrapers (Bengtsson 2004a). The remains of activities such as *in situ* flint working and 'ritual feasting' have been reported (Bengtsson pers.comm. 2001). Bengtsson (2004b) and Kaul (2004) have also excavated some of the large fissures in carved panels and recovered surprising amounts of cultural material from them, evidently packed into the voids as 'votive' deposits, and in some cases, sealed with stone cobbles. Though panel stripping has not revealed comparable material to date, such an approach would be worthwhile testing at Irish and British sites.

The third category of excavations defined above, where the wider landscape context of panels forms the focus for excavation projects, appears to be a relatively new research direction. Conkey's 'Between the Caves' project has made an important move in shifting the focus of research on Palaeolithic cave art in the French Pyrénées away from the caves themselves, in order to understand them within a broader context of archaeological activity (Conkey 1997, 358-62). Here, the well-established investigations into the use of the painted caves are being complemented by a regional programme of fieldwalking, coring and targeted excavation across the open landscapes between the rock art locales. Given the period under investigation, this approach deals primarily with "lithic landscapes" (Conkey 1997, 360 after Prine 1996), identifying differential densities in worked stone in the areas surrounding the caves. Activities such as the creation and use of hearths have also been identified (Conkey pers.comm. 2002). Conkey also notes the pathways and lines of sight across the landscape, as signalled by the presence of lithic and other materials, as a means of exploring the connections between the caves, materials and people (1997, 360). As a result, the caves can start to be understood as part of a wider pattern of human activity and experience across the landscape, rather than existing in splendid isolation.

A similarly broad focus characterises the recent work of Larsson and Engelmark (2002) in Sweden. Here the work is concerned with reconstructing regional palaeoecology in order to document the placement of the rock art within its environmental setting more fully. This ambitious landscape reconstruction program is employing a wide range of archaeological methodologies including fieldwalking, geomorphology, palaeobotany, geo-chemical and geophysical survey, and small-scale excavation. On the basis of work to date, Larsson (2004) has argued that contemporaneous activity (in this case Bronze Age) tends not to occur directly in the vicinity of panels, but instead around 200m away. In contrast, later Iron Age and Medieval material has been recovered in close proximity to the carvings. Waddington's (1996) work, as described in Chapters 1 and 3, represents the closest comparable project in the British context by integrating rock art into a wider regional study employing, amongst others, fieldwalking techniques.

Britain and Ireland

While excavation has been uncovering significant finds at rock art panels elsewhere, there has been just a handful of recent excavations conducted at outcrop or earthfast rock art panels in Britain and Ireland. Again, the discovery of petroglyphs has typically been incidental or secondary to the primary objectives of excavations to date (Armit and McCartney 2005; Ashbee 1958, Hart 1984, Christie 1985, Vyner 1988, Nowakowski 1991, Wright 1996, see also Corlett 1999). In Donegal, the reuse of a rock art panel as a standing stone prompted a late nineteenth century excavation at Ardmore, which revealed small fragments of bone (Graves 1877: 294). It is unlikely that this excavation would have occurred if the panel had been *in situ*. Such examples were discussed in Chapter 2 in the context of the information they offer on rock art chronology. As this demonstrated, considerable debate continues over chronology and an up-to-date and in-depth understanding of the extent of the reuse of panels in later monuments remains to be attempted (see Burgess 1990, Beckensall and Frodsham 1998, Hewitt 1991 for the most recent assessments). Hewitt and Beckensall (1996) attempted to test the relationship between EBA funerary monuments and rock art by excavating a burial cairn at Blawearie, Northumberland. In this case the monument proved to be devoid of rock art, proving Hewitt's (1991) earlier point that carved motifs cannot be interpreted as an integral part of EBA funerary ritual. The use of the types of geological and weathering observations presented in Chapter 2 to comprehensively reassess known panels from monument contexts in terms of their potential reuse would be a valuable line of enquiry for future work.

The typical problems facing excavations that directly investigate *in situ* rock art panels are their limited scale, questionable chronological evidence, and inconclusive associations between the carvings and other remains. In the light of the Scandinavian evidence in particular, excavations around British and Irish panels ought to consider widening their scope, or using geophysical survey to identify zones of potential across wider areas. As we have seen, these may not necessarily lie directly adjacent to the carvings. In terms of dating evidence, the more excavations that are conducted, the more successfully we will be able to establish the chronology of repeated activities around the panels through diagnostic artefact types and radiocarbon dating. Whilst we must clearly remain cautious in terms of linking the activities to the presence of the art, by excavating a series of sites we might gain insights into repeated associations in both chronology and types of activities, as we have seen in Scandinavia. In a similar vein to Conkey's (1997) work in the areas surrounding the painted caves of the Pyrénées, Bradley (1995c) has employed test pitting as a means of investigating the rock art-rich landscape of Strath Tay, Scotland. Here Bradley was looking for broad trends in the distribution of varying grades of worked quartz. Though not directly investigating the immediate context of the rock art, this work did take the presence of the art into account within a broad landscape perspective. As discussed below, the results from Drumirril suggest that work that operates somewhere between this very broad landscape scale and focused panel investigations, should prove fruitful.

A survey of the British and Irish literature reveals a number of investigations that fall within the first category of excavations, in effect consisting of turf clearance, usually with the aim of revealing the full extent of the carvings (Walsh 1993, Davison and Davison 1935, Campbell 1973). Unfortunately, turf clearance is probably documented and published very infrequently, but as a general rule, such work appears rarely to reveal anything more than additional motifs on the panels themselves. Examples of published excavations of this type include the work at the Boheh Stone, also known as St Patrick's Chair, near Westport, County Mayo (Walsh 1993). This work was conducted for conservation and presentation purposes, since the panel had become overgrown with vegetation. The removal of vegetation revealed an additional cup and ring motif but no further archaeological finds.

Whilst these cases may not seem especially significant in archaeological terms, the site of Ormaig, near Loch Craignish, Argyll, is an important exception. In the early 1970s Campbell, together with the Mid Argyll Society, stripped back the turf from the carved outcrop in order to define the limits of the pecked motifs (Campbell 1973: 12; Morris 1977: 112; Morris, R.W.B. 1973 Letter to the Ordnance Survey, 22 July 1973). During this process what is described as a flint "graving" tool was found on the surface of the panel, and a slate disc, 1cm in diameter, had apparently been deposited in one of the cup marks, though this was not reported in the published note on the work (Campbell 1973; Hadingham 1974: 55). The chronology of the placement of these objects into the motif is not known. Similarly, at Greenland, near Dumbarton, the tip of a flint arrowhead was recovered in association with rock art, though the precise context of the find remains unpublished and the fragment was not datable (Bradley 1997, 60). Several writers have speculated that votive offerings might have been deposited on or at rock art panels (Bradley 2000: 66; Barnatt et al 1996). Though infrequent, these finds serve as an important warning to those recording rock art, indicating that it is imperative that turf should only be removed as part of a systematic excavation in order to ensure that chance finds, not to mention potential deposits, are properly identified, recovered and recorded. The discoveries certainly point to the need for clearance activities to be monitored by trained archaeologists.

The increasing acceptance of, or interest in rock art in mainstream literature has also led to the consideration of *in situ* rock art panels as 'sites' within commercial archaeological investigations. Excavations in advance of a residential development in Furness, Co. Kildare, took into account the discovery of a carved erratic in a neighbouring field close to the development site (O'Carroll 1998). In this case no archaeological remains were identified during test trenching within the footprint of the development. Recent testing by Cryerhall (pers.com. 2005) in Bray, south of Dublin, identified an assemblage of highly weathered struck flint from the topsoil in the vicinity (70m+) of a possible cup-marked erratic. The stone itself is large and 'altar-like' in form with a flat upper surface, and features two arcs of possible cups. This is surrounded by a tree-ring, probably 19th century in date and likely to have been created as a folly. However, the tree-ring may follow the perimeter of a stony bank and associated outer ditch. The antiquity and origin of these features remains to be confirmed, as they might also be the product of animal activity around the perimeter of the site. Earlier work (ibid) had also identified a sub-circular crop mark approximately 20m from the erratic. These cases demonstrate the recent shift in the understanding of the archaeological potential of rock art sites within the wider professional community.

As we saw on a global scale, examples of rock art associated excavations have also occurred in British rock shelters, though not always with the rock art itself in mind. During the late 1960s, Burgess excavated the now well-documented rock art site of Goatscrag in Northumberland (1972; Van Hoek and Smith 1988). At the time, however, these somewhat unique zoomorphic carvings were not recognised as being of archaeological significance, and thus were far from the interests of the project, which was directed at investigating the Bronze Age burials found in a series of rock shelters. A series of rock cut pits (some containing charcoal), scoops and stake holes was identified during the excavation of the carved shelter (Site B), along with a range of small flint fragments and tools. These artefacts were similar to those recovered in a second rockshelter (Site A), which were thought to predate the Early Bronze Age activity, and at least some may be Mesolithic in date.

Beckensall's (1976, 1999: 150-1) excavation at Corby's Crags in Northumberland also made significant discoveries. Here the upper surface of the rock overhang features a basin associated with a surrounding groove and an enhanced natural channel acting as a radial groove. During the investigation, a long curving pecked groove was identified on the rock shelter floor. This appeared to run towards a Food Vessel cremation (Beckensall 1976: 13, Pl. II; 1999: 151). Unfortunately, however, it is difficult to assess the chronological relationship between these two features, and a long groove cannot be seen as representative of cup and ring rock art. However, this case does suggest that there may be further cases where rock shelter floors feature carved motifs. If so, these would potentially offer the opportunity to date deposits overlying the carvings.

There are six British excavations whose findings bear more direct relevance to the investigation of *in situ* panels as an approach to rock art research. Excavations at Fowberry, Northumberland, concentrated around a cairn built along a highly decorated linear outcrop (Beckensall 1983, 131-46, 1999, 142-7; see also Bradley 1997, 143-5). As noted in Chapter 2, there is still some debate as to the age and function of the cairn (Hewitt pers.comm.; Burgess 1990), which apparently featured a double kerb of pinkish igneous stone (Beckensall 1983; Bradley 1997: 143), with associated quarry and ploughing activity and no signs of burial (see Figure 2.2). The only artefact recovered from the area was a flint scraper from a thin layer of soil beneath the cairn. Though the work also investigated a nearby quarry depression, the excavation did not extend far into the wider area surrounding the carved panels. As a major concentration of motifs across a linear ridge of outcropping stone, this site would make an interesting case for further investigation using geophysical survey, with any resulting anomalies tested via excavation.

During the 1996 field season, excavation around the earthfast rock art panel at Gardom's Edge, Derbyshire, also produced very little archaeological material (GardWeb nd.; Barnatt et al 1996; see Figure 5.1). This work formed part of a much wider project investigating a large prehistoric enclosure and the landscape surrounding it, which features a palimpsest of structures and features ranging from barrows and cairns to field boundaries (Barnatt et al 1999-2000). One of the excavation objectives was to identify any evidence for the deposition of material, or the cutting of features, directly around the panel (GardWeb nd.). This idea drew on evidence from small-scale societies of rock art being produced in association with acts of "renewal of spiritual or ancestral connections between people and land" that would sometimes leave other traces in the archaeological record (Barnatt et al 1996: 13). The work was also part of a conservation plan whereby a mould of the stone was cast, allowing a replica to be displayed for public viewing whilst the original was buried to protect it from the elements (ibid). The finds from around the rock art panel were limited to a few flint and chert flakes and a shale ring. Jet rings were used interchangeably with shale rings during prehistory and, though they have been recovered from multi-period contexts, they are also known from Late Neolithic to Early Bronze Age burials (e.g. Annable and Simpson 1964). In addition, two stake hole features were identified within 3m of the panel. The panel also formed part of a linear boundary wall of earthfast bounders, probably largely the result of field clearance that substantially post-dated the rock art. Again, it is possible that a wider area of investigation may well have exposed further archaeological material, slightly away from the edges of the carved panel.

Rock art featured in a similar vein in the excavations at Dod Law West Hillfort (Smith 1988-9; see Figure 5.2). The complex is comprised of an Iron Age enclosure and associated hut structures, these substantial structures being the primary focus of the project. Numerous decorated outcrops are known from the area, and a number of decorated portable stones and small cup-marked stones were recovered during the excavation. One of the excavation trenches incorporated a large decorated outcrop, and this revealed a paved area and wall in close proximity to the panel. Both features were associated with Iron Age and Romano-British material, some of which was recovered from beneath the paved area. This frustrated attempts to resolve the question of the types of activities that might have been associated with the creation of the rock art (ibid 20-21). However a long hammerstone, interpreted as having been shaped at one end for hafting, was recovered in close proximity to the panel. This raised the possibility that such a tool might have been used to produce the motifs (ibid 28, 39).

Of particular interest is the site of Backstone Beck at Green Crag Slack, Ilkley Moor, West Yorkshire (Edwards and Bradley 1999; Edwards 1986; see Figure 2.26). The site comprises a large long enclosure with evidence of activity from the Mesolithic through to the Iron Age. Possible hut circles had been previously identified along the enclosure. A series of carved boulders runs along its interior, and it is tempting to view the linear arrangement of the panels as having influenced the shape of the enclosure, though this might also have been a function of topography. Artefact scatters were recovered from two areas surrounding the panel. These consisted of worked flint (including polished knives, oblique, chisel, leaf-shaped and transverse arrowheads and a high percentage of scrapers) as well as pottery fragments, predominantly Grooved Ware with a single Beaker sherd and some Later Bronze Age to Early Iron Age sherds. There were also six irregular shaped areas of 'heat-affected' soil.

In comparison to the hearth features and artefact scatters uncovered in other parts of the enclosure, this evidence is dispersed over a wider area and within notably shallow contexts. The pottery from near the panel displayed less variation in its material character than that from elsewhere in the enclosure, and it clustered separately in distributional terms to the flint concentration in the trench. A charcoal sample recovered from beneath an uncarved boulder, which appeared to form the focus for one of the artefact scatters, produced uncalibrated dates of 4280± 80 BP (HAR-8748) and 4260±100 BP (HAR8747) (Edwards and Bradley ibid, 76). The general nature of the material, particularly compared to that from elsewhere in the enclosure, seems to correspond to our current ideas that visits to rock art panels were short in duration, but also indicate that possibly a much wider variety of activities took place near the boulders than was previously assumed. As noted previously, the radiocarbon dates and artefact assemblage lend further weight to the proposed Neolithic date for the origins of rock art.

As discussed in Chapter 2, Waddington's (2004) work continues the British tradition of investigating rock art that occurs in direct association with built monuments, and offers a significant contribution to the dating debate. At Hunterheugh Crags a small burial cairn had been constructed directly over a decorated outcrop, offering the potential for revealing a stratigraphic relationship between the carvings and the construction event (Figure 2.3). The excavation was extended two metres into the surrounding area. No evidence for additional features was identified, but two lithic artefacts that are thought to date to the Mesolithic and Neolithic were recovered from secondary contexts, suggesting that the locale was visited repeatedly over a considerable duration. Added to this is the evidence for a series of carving and quarrying events having occurred, again suggesting that this outcrop bore considerable symbolic significance during prehistory. The work at Drumirril, as well as that by Jones

(2004, 2005) (see below), suggests that the excavation of a larger area around the panel may reveal further prehistoric activity.

In response to the success at Drumirril, Jones (2004, 2005, pers.comm.) conducted excavations around two *in situ* panels at Torbhlaren in the Kilmartin Valley, Mid-Argyll. The investigation was fruitful, identifying a built platform beside one of the outcrops. The stone platform appeared to have been used for quartz working, with 50kg of quartz pebbles, tools and debitage recovered from its surface. The tools included scrapers and hammerstones. A further six hammerstones were recovered and these were of a specific stone type still to be identified. Based on their size, Jones (ibid) proposes that they may have been used in the creation of the art. In addition, a small hearth feature was uncovered in front of the platform, from which charcoal, a scraper and a hammerstone were recovered. The motifs themselves appeared to respond to the presence of the platform (or perhaps vice-versa), with several complex designs concentrated in front of it. At the second outcrop the archaeological deposits were plough-damaged, but several 'fire-heated rocks' had been deposited along its edge, and comparable artefacts were recovered from the surrounding plough-soil.

As Jones (2004, 2005) has noted, the discovery of the features at Torbhlaren (Figure 5.3) is all the more significant since a series of platforms or paved areas and hearths is known from Scandinavian rock art sites (Bengtsson 2004; Kaul 2004; Svensson 1982). The Torbhlaren platform is also considered comparable to the paved areas associated with prehistoric cairns and passage graves (Jones 2004, 2005). Until more sites are investigated through excavation the question of whether any consistent patterns in the nature of the activities around panels in Ireland and Britain can be found remains unanswered. As demonstrated above, the Scandinavian excavations raise the question as to whether investigations such as those at Fowberry (Beckensall 1983), Gardom's Edge (Barnatt et al 1996), and Hunterheugh Crags (Waddington 2004) may have revealed further evidence for activity than the very small number of lithic finds recovered from each, had the excavation area been either more substantial, or targeted on areas of potential further away from the carved panels themselves. As the previous chapter demonstrated, geophysical survey prior to excavation is an excellent means of dealing with the question of proximity.

Excavating Drumirril

As the cases above highlight, the issues facing a rock art excavation include the problem of where to excavate in relation to the panel, and the theoretically ephemeral nature of the expected remains, should any be identified at all. In order to combat these issues, the location of the excavation trenches at Drumirril was directly informed by the high-resolution geophysical survey presented in Chapter 4, thus optimising the likelihood of recovering archaeologically significant material (Clark 1996). The density of rock art panels in this townland, and the positive identification of numerous potential features in the geophysical survey results (O'Connor 2003b), suggested that the archaeological potential for the area was high. As the first excavation to specifically investigate an outcrop rock art site in Ireland, the selection of the site was important. Selecting a substantial concentration of panels such as that at Drumirril, as opposed to an isolated single example, was a means of ensuring that if there *was* activity to found at rock art sites, there would be a good chance of uncovering it in this area. In future work it is essential that a wider range of rock art site types, particularly those consisting of a single or small number of panels, be investigated to allow comparison.

Owing to the dearth of positive finds from previous work, the aim of the Drumirril excavation was modest; simply to determine whether subsurface archaeological evidence for human activity could be identified at *in situ* rock art panels. Since the excavation followed a large-scale geophysical survey program which had revealed numerous, potentially archaeological anomalies in close proximity to the rock art panels, the excavations aimed to confirm the nature, and wherever possible the chronology, of these features. The excavations investigated selected anomalies using a tightly targeted series of small test trenches. At this early stage it seemed productive to prioritise the anomalies in close proximity to the rock art panels over those from control transects. In the event of a positive outcome, a series of more detailed objectives was defined thus:

I To determine whether evidence for human activity can be identified in the area immediately surrounding the panels (<10m radius) and within the wider surrounding area (<30m radius)

II To determine whether there is evidence for repeated activity at the panels

III To determine the age of any datable archaeological materials at the panels

IV To investigate whether any evidence of activity offers information as to the frequency and length of visits

V To establish whether any evidence of activity conforms to archaeological notions of 'ritual' versus 'secular' action (the complexities of these notions are discussed further below)

As described in Chapter 4, a coaxial field system and six curvilinear enclosures, four of which were visible on the surface and two that were identified through the geophysical survey, are also present at Drumirril. Initially it was thought that these were most likely to considerably post-date the rock art, though their apparent spatial association was intriguing – five of the six enclosures directly encompass between one and nine decorated outcrops. With this in mind one excavation trench was positioned across an enclosure bank to explore further the nature of these features.

Methodology

The excavation (Licence No. 03E1231) took place over a ten-day period (22/08/03 – 31/08/03) with up to nine crew, almost all of whom were experienced graduate archaeologists. Weather conditions during the excavation were predominantly sunny and dry. A total of twelve locations had been identified on the basis of the geophysical survey results as areas for initial testing. Due to the complex nature of some of the features, as well as time and resource constraints, trenches were excavated at seven of these twelve locations. The locations of these trenches and the associated geophysical anomalies are shown in Figure 5.4. The excavation of the small test trenches (ranging in size from $1m^2$ to 2x6m) proceeded entirely by hand. Turf was removed in sections so as to be restored after completion. Due to the shallow nature of the topsoil, the ploughing activity in evidence, and the potential for erosion of soils from the raised hillocks to have impacted on the preservation of archaeological deposits, the topsoil layer was trowelled by hand down to archaeological or subsoil deposits. Selected deposits, predominantly those which were organic in nature, or which contained fragments of charcoal and bone, were bulk-sampled for future analysis.

Due to the focused nature of this investigation, and to ensure that resource constraints were met, in some cases it was deemed appropriate to partially excavate (e.g. half section) some of the larger features, allowing deposits to be preserved for future investigation. Trench size was kept to a minimum wherever possible, with each trench positioned so as to answer specific questions (see below). Where trenches were devoid of archaeological features or objects, an attempt was made to determine whether any natural features or modern topsoil disturbance was responsible for the geophysical anomalies. Where archaeological features were revealed they were excavated by hand, and fully recorded using written, drawn and photographic methods. A single context recording system was used throughout. Following their completion the trenches were restored to their original condition.

Numerous specialists were consulted or produced full reports for particular finds and materials that were recovered. Formal analysis was conducted by Graeme Warren on the flint and quartz, Jonny Geber on the cremated bone, and Ingelise Stuijts on the charcoal. Following the wood identification analysis (Stuijts 2004), the successful application for Licences to Alter and Export from the National Museum of Ireland, and the generous offer of support from the Institute of Archaeology Groningen, a total of eight samples were sent to Groningen Isotope Laboratory for radiocarbon dating. Seven of the samples were charcoal fragments, whilst one (GrA-26156) consisted of cremated bone. All were collected by hand during the excavation. Two of the samples (GrA-25963 and GrA-26156) required AMS dating due to their small size, whilst the remainder were dated using conventional methods. Two further samples (GrN-28651 and GrN-28653) were less than 5g in weight and so larger than usual standard deviations were incurred in the results. A detailed excavation report, including specialist reports, is in preparation for future publication, and a preliminary report (O'Connor 2003c) has been submitted to the Department of the Environment, Heritage and Local Government, and the National Museum of Ireland.

Excavation results

Deceptive anomalies: Transect A, Trench 1a and 1b

A regular arc of small but consistent geophysical anomalies had been identified in close proximity to a large upstanding outcrop that features several rock art motifs. Trenches 1a and 1b aimed to determine whether the anomalies were archaeological in nature. Trench 1a (1mx1m) was excavated over one of the anomalies that featured a slightly stronger magnetic response than the others. The topsoil was removed down to a thin patchy layer featuring rust coloured staining indicative of natural gleying, and patchy clayey subsoil and natural gravel (Figure 5.5). No immediate explanation could be offered for the anomaly. A small sondage was then excavated as a further test. The natural subsoil was removed and an area of underlying bedrock was uncovered. A depression in the bedrock (filled with natural stony material) was noted. At this point, it was not entirely clear whether this might have caused the prominent geophysical anomaly, or whether a piece of modern metal embedded in the turf might have been removed without detection.

In order to further investigate the nature of these anomalies a second 1x1m trench was opened over the location of a second example that also exhibited a strong magnetic response. Immediately underlying the topsoil the head of a highly degraded iron spade was uncovered (Figure 5.6). The find was left *in situ*. Although it represents modern activity, the find indicates the potential success of the high-resolution geophysical survey in pinpointing small objects or features for investigation through tightly targeted test excavation. The remarkable consistency of this series of geophysical anomalies supports the idea that the first anomaly was caused by a metal object embedded in the turf. The arrangement of the anomalies in a regular arc might be explained by the fact that each occurred around the edge of a relatively flat and low lying area of ground featuring evidence for tillage. This activity might have caused discarded metal objects and debris to build up along the margins of the cultivation zone, giving the appearance of a semicircular formation. The regular spacing of the anomalies appears to have been simply coincidental in this case. The first trench was extended to the north and west by 0.5m, but no further ferrous objects were uncovered. Fortunately, the remaining trenches proved more interesting!

Pits, pots and possible structures: Transect B, Trench 2

This trench (2x6m in size) was positioned so as to investigate one side of a faint rectangular-shaped geophysical anomaly (c.12.5m x 7m) with an internal anomaly at its centre. These were interpreted as a central feature, possibly an area of burning or a pit containing burnt material, surrounded by a possible rectangular structure. Part of the response from the rectangular anomaly was very similar to that from a nearby linear field bank that forms part of the fieldsystem in evidence across the Deer Park. It exhibited two parallel lines of higher response either side of a lower response centre. This would seem to indicate ‘walls’ that are each defined by two linear cut features. It also featured a series of associated posthole-like responses. This cluster of anomalies was located in a small valley or gully adjacent to a ridgeline featuring numerous rock art panels, with the long axis of the rectangle lying perpendicular to the axis of the gully (Figure 5.7).

Beneath the topsoil was a ploughzone layer (C9) of solid subangular cobbles, pebbles and large stones, several of which featured plough scars oriented along the axis of the gully. During the removal of this layer several small fragments of pottery were identified, some of which came from the vicinity of the possible pit or area of burning. Underlying the stony layer, a medium-sized pit (1.35m diameter, 0.22m depth, C44) that corresponded to the location of the central anomaly was identified (Figure 5.8). Photographs of the pit are shown in Figures 5.9 and 5.10 where the feature is visible due to differential moisture retention. The pit cut was half-sectioned and found to be roughly square in plan but with rounded corners. It contained two fills (C30 and C42), the uppermost of which featured moderate amounts of charcoal from a notably wide variety of tree species (see below), including some possible burnt hazelnut shells. The upper levels of the feature appeared to have been badly truncated by repeated ploughing, and by a deep plough furrow (C29) that cut through its northern edge. The pit was cut into a subsoil deposit (C31), which also bore some plough damage, and a more intact natural clayey subsoil layer (C36) below. The ploughzone layers yielded a very small amount of struck flint fragments (03E1231:40-44), charcoal and tiny fragments of burnt bone, as well as pottery sherds, all from the vicinity of the pit.

A total of 39 pottery sherds, all very small in size, were recovered from the pit (mostly from the upper fill (C30), with a single sherd from the interface with the lower fill (C42)) and from overlying and adjacent plough-zone layers (C9 and C31 respectively). All but one of the sherds (03E1231:1-39; see Figure 5.11) were body fragments. One diagnostic shoulder fragment indicated that the sherds represent an Early Western Neolithic shouldered bowl (Helen Roche pers.comm.). The sherds were small and thin walled, ranging in size from 10 to 28mm. Though the homogenous nature of the sherds makes it likely that they are derived from a single vessel, their small size and weathered condition made it difficult to assign them to identifiable vessels. The sherds were buff-brown to buff-orange in colour, some featuring fire-blackened surfaces. The fabric was relatively coarse with occasional to frequent angular quartzite grit used to temper the fabric, and slightly smoothed surfaces. The grit frequency varied considerably between sherds, and sometimes protruded from the sherd surface, possibly indicating the use of water to smooth the vessel surface during its manufacture (see Brindley 1997: 272). The white quartzite grit was comparable to cobbles recovered from this trench, though its origin obviously remains undetermined.

The pottery was very similar to that recovered from earlier Neolithic contexts at Knowth some 30kms to the south (Helen Roche pers.comm.), an assemblage comparable to Case's 'Ballymarlagh style' (1961: 175-7; Eogan and Roche 1997:5). These vessels consisted of round-based bowls with simple-angled shoulders, simple rims, and friable fabric (ibid.). Closer to home, an assemblage of over 2000 sherds, currently undergoing analysis, was also recovered from the early

Neolithic settlement at Monanny, Carrickmacross, 6km west of Drumirril (Walsh 2004, Helen Roche pers.comm.). This assemblage consisted predominantly of fine undecorated early Neolithic pottery, though some sherds feature simple linear decoration (Walsh 2004, 16).

The distribution of the pottery finds suggests that the upper fill of the pit is probably the origin of the sherds, some of which appear to have been dragged several metres from the pit cut by ploughing activities (see Figure 5.10). The associated flint, charcoal and burnt bone from the plough soil may also have originated from the pit. Embedded in the base of the pit cut were numerous cobbles, including a large cobble of granular-textured quartzite. As the pit was only half sectioned, it is not clear at this point whether these cobbles (which were left *in situ*) might have had a structural purpose. The nature of the finds and inclusions in the pit fill indicate a feature that is well in keeping with early Neolithic practices. For instance, excavations at the Neolithic enclosure at Thornhill, Derry, uncovered a pit that also contained quartz cobbles deliberately positioned at its base, along with charcoal and carinated pottery (Logue 2004).

The northern half of the plough-zone deposits (C9 and C31) was excavated in an effort to identify the source of one side of the rectangular anomaly, and this again revealed a compact and fairly stony subsoil layer (C36), as well as areas of outcropping bedrock, some of which appeared to be aligned along the eastern side of the geophysical anomaly. A distinct difference was noted between the nature of this layer to the east of the linear anomaly compared with that to the west. To the west (which would represent the interior of the 'structure', if correctly interpreted) a subtle drop in slope was apparent, and the area featured rounded and flat stones. Unfortunately time constraints did not allow this context to be further investigated. To the east, the layer rose uphill slightly and featured much jagged outcropping bedrock. This observation could be explained by the 'interior' having been levelled out to define a usable area, while the 'exterior' still featured outcropping stone, which rose gently up the natural slope of the small surrounding valley. Other than the band of outcropping bedrock, no linear features that might correspond to that identified in the geophysics could be detected at this level, but it is possible that C36 overlaid further archaeological contexts. Unfortunately time did not allow for the full resolution of the rectangular anomaly, and further investigation of the entire feature down to deeper levels would be required to confirm whether it is structural in nature. Certainly the central pit feature suggests that the other pit or posthole-like anomalies in the immediate vicinity, some aligned along the rectangular anomaly, may well be archaeological. Its central position also hints at contemporaneity with the possible structure.

A large quantity (122 pieces) of quartz fragments and unworked quartz pebbles was recovered during excavation, the majority coming from Trench 2, with fragments of water-rolled quartzite pebbles also recovered from Trenches 1, 2 and 6. Two of the fragments from the Trench 2 plough soil (03E1231:56-7 from C9 and C31) may be worked, exhibiting fresh fractures and, in one case, flake-like characteristics. Nine additional quartz chips from the Trench 2 plough soil also featured fresh fractures, something not noted outside the finds from Trench 2. This concentration of fresh material is of some interest. Whilst water-rolled quartz pebbles are not especially common in the area, several large water-rolled quartz pebbles were noted during a reconnaissance survey of a ploughed field immediately to the south of the site prior to excavation. It is not clear whether the streams in the immediate vicinity would have been capable of bringing such material into the area, or whether the stones could have been carried in by hand, perhaps from the banks of the nearby Fane River, or further afield. Mitchell (1992) proposed that the Wicklow Mountains were the most likely sources of the quartz used at Newgrange, though this material was angular rather than water rolled, probably directly acquired from quartz veins. Three small chips of flint, one burnt, were recovered from the plough zone (C9 and C31), and a heavily abraded and edge-damaged flint flake fragment (03E1231:43) was also recovered from C9. This features a possible area of retouch that may form a denticulated 'scraper' edge. As at Monanny (Walsh 2004, 20) flint was evidently a resource at a premium, incurring much retouching and producing mainly tiny remnants of the material in the archaeological record. The flint assemblage for the earlier period at Knowth was also poor in comparison to the Later Western Neolithic phase (Eogan and Roche 1997: 5).

Though it might be too much to ask for the early Neolithic pit to be positioned within a contemporaneous rectangular structure, such a combination is well documented in the corpus of known Neolithic timber buildings from Ireland, for example at Coolefore, Co. Louth (Ó Drisceoil 2003; see also Grogan 1996: 50), and Thornhill, Co. Derry (Logue 2003), as well as further afield (e.g. Darvill 1996: 86-90, 98; Topping 1996: 162-3; Mercer 2003; Oxford Archaeological Unit 2000). In some cases, the contents of these features have been interpreted as votive deposits (Topping 1996: 163-7; Bruce et al 1947). The possible structure also features an obliquely angled or curving extension radiating from the narrow southeastern side of the rectangular anomaly. These give the appearance of possible postholes. Neolithic timber buildings frequently feature curving porch or screen-like entrance features and other structural appendages (e.g. Logue 2003; Simpson 1996). At 12.5m x 7m in size, this structure would lie at the larger end of the spectrum of measurements for Neolithic buildings in Ireland, comparable to those at Ballygalley, Ballyglass, Knowth, and Tankardstown (see Grogan 1996: 52). There are further parallels for other aspects of the feature. At Monanny the Neolithic buildings were positioned close to an area of rock outcrop that might have provided a convenient source of quarried stone (Walsh 2004). At Cloghers, Co. Kerry, the foundation trenches of the building were cut into bedrock (Kiely 2003: 182).

Though the plough damage in this area is unfortunate, the further examination of this tantalising anomaly in the future is a high priority. Clearly, should structural evidence dating to the Neolithic be recovered in such close proximity to rock art panels, this would be of considerable significance in terms of the proposed marginality of these sites within the settled landscape. It would also be an important development in terms of the use of high-resolution magnetometry in the identification of low visibility Neolithic structures. However, developing this interpretation any further at this stage would be ‘counting one’s chickens’!

Two charcoal samples from the pit fill were radiocarbon dated. This material represented some of the best evidence for Neolithic activity at the site, and so confirmation via radiocarbon dating was an attractive proposition. In retrospect, the dating of samples from this feature was problematic from the outset. The feature had been severely truncated by ploughing, activity also thought to be responsible for scattering the pottery from the pit’s upper levels several metres across the surrounding area. Perhaps not surprisingly then, the two charcoal samples returned radiocarbon determinations of Iron Age and Early Christian date (see Table 7 and Figure 5.12). The mixed dates returned from this simple feature supports the idea that contamination is involved, and does not rule out the possibility that the pit itself was indeed early Neolithic in date. The body of evidence provided by the finds and the condition of the deposits suggests that, until further investigations can be made, the feature is most likely to date to the early Neolithic period.

Fire on stone: Transect B, Trench 3

Trench 3 aimed to investigate several short linear anomalies interpreted as possible areas of burning. These were situated immediately adjacent to three outcrop rock art panels that are located at the apex of the long ridgeline in Transect B, and which overlook the small gully where Trench 2 was located. A 1mx2m trench (later extended with a further 1x1m area) was used to investigate one of the strangely shaped anomalies which, spatially at least, appeared to be directly associated with the carved faces of the large upstanding rock art outcrops. It was thought that, should they represent burning, the presence of the outcrops could have caused the unusual linear shape of the anomalies, as burnt material might have built up along their bases.

The turf was removed and immediately a large rounded area of outcropping sandstone was revealed. This demonstrated that what had previously been thought to be several raised outcrops or large earthfast boulders were in fact exposed areas of one massive outcrop forming the E-W oriented ridgeline. Indeed it is possible that each of the six rock art panels on the ridge forms a part of a single outcrop. The thin topsoil indicated that this ridgeline might have been characterised by large expanses of exposed outcrop at different periods in the past, which would have given the prominence a more dramatic appearance. Waddington (2004) made similar observations at Hunterheugh Crags. This is significant as it demonstrates the extent to which present day vegetation can directly impact the ways we perceive rock art panels today, versus the ways they may have appeared in the past.

A linear band of discolouration was apparent on the surface of the outcrop (see Figure 5.13). The discolouration (dark reddish brown through to black) appeared to be the result of an intense burning event, an interpretation that is supported by the associated heat fractures across the surface of the stone, and by the vitrified effect on some surface areas. A linear band of angular cobbles (C10) ran parallel to this discolouration (Figure 5.14). These were removed and a smooth and shallow natural linear 'gully' in the outcrop, which contained a shallow charcoal-rich deposit (C11), was revealed. The discolouration ran in bands either side of this gully, but did not extend down into its very base (Figures 5.15 – 5.16). Though the position of the geophysical anomaly appeared to correspond more closely to the burnt outcrop than the gully, the position of the spade in Trench 1b had been slightly offset (c.25cm to the northwest) from its anomaly. Such an offset is regularly reported in geophysical surveys (Ian Elliot pers.comm.) and would point to the charcoal deposit in Trench 3 as a source of the linear anomaly. The trench was extended 1m to the SE so as to further investigate this deposit. Here, the gully continued and rose up towards the edge of the trench. No cultural material could be identified in the deposit.

It is possible that the burning event represented by the charcoal and discoloured outcrop might simply represent a recent burn off. However its location immediately in front of an area of decorated outcrop and the evidence in the geophysical survey for further identical bands of burning alongside two other decorated outcrops just a few metres away is compelling, particularly in the context of ideas as to the potentially 'ritual' nature of rock art sites. The fact that the resulting charcoal rich deposit was sealed with a layer of cobbles also seems suspiciously archaeological. The likelihood of this occurring accidentally, or the need for recent burn-offs to be positioned in such a way, and the resulting charcoal to be so neatly sealed with cobbles, seems negligible. It is not clear whether gorse or other light vegetation might have had sufficient soil in which to grow at this location during the past, but this remains a possibility, particularly given the presence of the gully. However, the discoloured surface indicates that the majority of the outcrop here was exposed at the time of the burning event, and came into direct contact with material burning at very high temperatures. This leaves only a shallow 35-40cm wide gully that does not feature discolouration, a zone that would seem a little restricted for the growth of gorse or other substantial vegetation that might have been the target of burn-offs.

Nash (in press) has argued that excavation evidence and personal experiments suggest that petroglyphs in Bohuslan, Sweden and Campo Lameiro Valley, Spain were viewed (and actually 'animated') using artificial light sources in the form of fires at the bases of the carved panels, or lit 'torches' carried by visitors. In other cases, charcoal has been found in concentrated areas immediately in front of particular motifs, such as the two dominant and central *lurblasaren* and *voltigoren* figures at Hogsbyn, Dalsland (Svensson 1982). Nash (ibid) does not explain why artefacts such as pottery, quartz and worked flint might have accompanied these hearths in the excavations he notes, but the general idea is an interesting one which attempts to explain the common difficulties encountered when viewing weathered petroglyphs during daylight hours. Bengtsson has proposed that well over 30% of the carvings in Askum Parish, Sweden, feature prehistoric fire damage, and has used experiments to demonstrate the effects of this activity on outcrop surfaces (2004b: 39-40, 135). As noted above, several Scandinavian excavations have also reported the cobbled sealing of votive materials deposited in fissures, and the cobbling of depressions adjacent to carved panels. These examples, and the ambiguous nature of the evidence from this trench suggest that further investigation at this location would be warranted in future work.

Burnt flint and open spaces: Transect C, Trench 4

A 1x5m trench was used to investigate two small pit-like geophysical anomalies in very close proximity to a significant cluster of rock art panels. These lie at the highest point of a small hillock that adjoins an E-W oriented ridgeline. As noted in Chapter 4, the hilltop was surprisingly quiet in geophysical terms, surprising given that this particular location represents the most dense concentration of panels in the Louth / Monaghan region. The turf and shallow topsoil were removed to reveal immediately stony subsoil (C13) and protruding angular segments of outcropping bedrock (Figure 5.17). The very shallow topsoil, down to just a few centimetres in places, suggests that the hill had been subject to erosion. The newly revealed sections of outcrop were checked for previously unrecorded rock art motifs, but none were identified. Two very heavily burnt thermal fragments of flint (03E1231:45-46) and a fragment of charcoal were recovered from the interface between the topsoil and the natural. The presence of the outcropping rock means that ploughing or other cultivation is unlikely to have occurred here. Whilst these are hardly ground breaking finds, they do indicate that burnt flint was deposited directly in front of a significant outcrop either following a burning event or as part of a burning event, the remains of which were not evident within the area excavated.

No further archaeological material was identified, and the source of the two anomalies was not successfully resolved. It is not clear whether the anomalies could have been caused by natural variations in the topsoil content, whether archaeological or other material might have been masked by what was interpreted as natural subsoil, or whether the source of the offset anomaly lay just beyond the extent of the trench. Due to time constraints the latter two possibilities could not be tested further during the excavation. In light of the results from the enclosure excavated in Transect D (see below), it would be worthwhile exploring the partial enclosure surrounding this cluster of panels in the future.

A complicated enclosure: Transect D, Trenches 5 and 6

Trench 5

Trench 5 was positioned so as to explore a significant set of geophysical anomalies located on a terrace-like area on the southwestern side of a small hilltop. This distinctive oval hilltop features four rock art panels at its centre, and an extant bank (see Figure 5.18), which was investigated in Trench 6 (see below), encloses its perimeter. The anomalies suggested that a relatively substantial pit or hearth-like feature, probably containing burnt material, was located near the centre of the terrace, and was surrounded by several smaller pit or posthole-like features which also might contain burnt material. This interpretation was remarkably close to the actual findings of the excavation, which are related below from most recent to most ancient.

A notably thin layer of turf and topsoil (C1) was removed, and a small piece of iron (03E1231:49), two tiny fragments of fine post-medieval pottery (03E1231:50-51, probably late 18^{th} to early 19^{th} century creamware), and a piece of burnt flint (03E1231:47) were recovered. As described in Chapter 4, the hilltop features evidence for substantial quarrying, its northern slope having been reduced to sheer rock faces with large associated spoil piles. The scale of this activity may suggest that it occurred during the construction of the substantial stone wall surrounding the Deer Park during the late 18^{th} to early 19^{th} century. The topsoil finds may well have been deposited during this period of activity on the hilltop. A smaller quarried depression is also evident on the southern side of the hilltop. Its less obvious appearance and lack of spoil heaps may indicate that this depression dates to an earlier phase of quarrying. Further evidence from Trenches 5 and 6 suggests that several episodes of quarrying occurred at this location over a considerable duration of time.

Directly beneath the topsoil was a substantial deposit of large angular cobbles and slabs of local sandstone (C2), with several of the larger examples apparently defining the outer edge of the flatter terrace area (Figure 5.19). The stone deposit thinned out dramatically as the outer edge of the terrace sloped away. Though the layer provided a rather rough surface, initially interpreted as possible 18^{th}-19^{th} century quarry spoil, randomly built up, it also defined the terrace area, suggesting that it may have been a deliberately built cobbled surface. This idea is supported by its direct relationship with much older archaeological contexts below it. The fact that this stone surface was capped only by a thin layer of topsoil which yielded Post Medieval finds, suggests that an erosion event may have occurred at the hilltop, causing two contexts with quite different chronological origins to have been juxtaposed. This idea is discussed further below.

Below the stony layer was a gravelly deposit (C6 / C7) that covered the excavated terrace area (Figures 5.19 and 5.20), and from which a quartz hammer-stone was recovered (03E1231:52; Figure 5.11), along with fragments of slag-like and other vitrified material. This material seems to represent varied floor debris from a range of activities on the terrace. The hammerstone took advantage of a small ergonomically shaped water-rolled cobble, and its surface featured pitting and flake removal caused during use. Beneath the terrace material was a series of features, themselves relating to at least two phases of activity (Figures 5.21 and 5.22). A large, roughly square setting of stones (C20), measuring c.1.6m across was uncovered (Figure 5.23). The stones exhibited both smooth weathered faces and quarried surfaces, suggesting that they were sections of outcrop that had been quarried from the hilltop. Based on the geophysics, this was positioned in the centre of a timber structure (approximately 6x6.5m in size) that was constructed using large stone-packed postholes, two of which were excavated (Figure 5.24).

The upper stone layer (C2) along with the terrace deposit (C6), filled the uppermost levels of the central pit-like feature. The inner surfaces of the majority of the stones used in the square setting were fractured, and featured a deep red discolouration on their inner and upper surfaces, indicating heat alteration. The stone setting defined the upper edge of a large pit-like feature, which seemed to have taken advantage of a natural depression in the bedrock. There were no definite signs that the depression had been enhanced through the removal of sections of natural bedrock, except at its base, which featured a central stone-lined posthole (C35, containing fill C33 and stone lining C34). The roughly square pit-like depression (see Figure 5.25) featured fairly steeply sloping sides and an irregular base that flattened out slightly, before descending into the posthole cut (C35). The upper stone setting (C20) was placed directly onto the natural clayey subsoil and bedrock. This suggests that any older deposits or former ground surface had been cleared away down to sterile subsoil and bedrock during the construction of the feature.

The pit-like depression contained a charcoal rich fill (C22) that also yielded some burnt bone and highly vitrified but extremely light geological material. There was however, no evidence for heat-alteration of the *in situ* natural subsoil or outcropping rock (C17) forming the base of the depression, or the subsoil directly around the stone setting itself, which might have been expected had the feature acted as a regular hearth. The remnants of a burnt post (C33) associated with the internal posthole (C35) were discernible within the fill (C22) surrounding it. Thin angular sections of local quarried sandstone had been rammed vertically into the posthole cut which had then been packed with natural clay (C34). The posthole fill (C33) contained charcoal and some burnt hazelnut shell fragments, and at the base of the cut was a layer of vitrified material.

Immediately next to the former post, in a central position within the pit-like depression, a small flint round or disc scraper (03E1231:48) of Late Neolithic to Early Bronze Age date was recovered (Figure 5.11). This finely made and heavily worn scraper was the only formal worked stone artefact recovered during the excavation. These types of scrapers are common on Late Neolithic to Early Bronze Age sites, such as the Late Neolithic and Beaker contexts at Newgrange (O'Kelly et al 1983). Unfortunately, scrapers can rarely be dated with more accuracy, not least because of a lack of detailed typological analyses, but it is most likely to be Late Neolithic in date (Warren pers.comm.). Perhaps surprisingly given the position in which it was recovered, it does not show signs of heat alteration, perhaps suggesting that it was thrown into the ashes after the fire had died down. Its form is unusually small, flat and perfectly round. Its upper surface appears to have been worn smooth over time though contact, perhaps with human hands or a soft fabric or other material. This wear indicates that the object was probably made a long time before it was deposited, and it is tempting to interpret it as something like an 'heirloom' or relic which eventually became a votive deposit (Warren pers.comm.; see also Woodward 2002). The apparently intentional deposition of the scraper in the centre of the complex pit feature suggests that the act of its deposition held some symbolic or votive significance.

The retouched and heavily burnt flint flake (03E1231:47) recovered from the topsoil features a possible scraper edge that was truncated through breakage. Together with the very unusual and heavily abraded and edge-damaged piece from Trench 2, these artefacts 'have very similar forms of retouch to the disc scraper, short neat subparallel removals' (Warren 2004), suggesting broad contemporaneity. The assemblage from Drumirril as a whole includes a notably high proportion of retouched pieces, and repeated evidence for the burning of flint.

Towards the outer edge of the terrace the upper levels of a series of posthole fills (C21/25), rich in charcoal, and including some burnt hazelnut shell fragments, formed a continuous linear spread. The geophysical survey results suggest that this series of postholes and localised deposits of burnt material continues beyond the area excavated. These can be interpreted as two lines of slightly converging postholes defining a roughly trapezoidal shaped structure (maximum dimensions c.6.2m x 6m), the narrow end of which lies to the southwest. The positions of four postholes were verified during the excavation (C37, C43, the unexcavated posthole filled by C25, and a possible further posthole, the fill of which was just visible in the north-eastern baulk). Two further charcoal spreads were identified on the terrace. These corresponded to a charcoal-rich deposit (C24) that had been dumped onto the surface of the terrace, and a shallow circular scoop-like pit (cut C46, fill C23). The scoop (C46) continued very slightly underneath the central stone setting (C20) indicating that a series of events involving burnt material took place on the terrace. These features are all contained within the timber structure, though it is not clear whether they are directly contemporaneous with it.

Two of the postholes were fully excavated, revealing a stone lining (C45) using flat angular slabs of quarried local sandstone. The southern posthole cut (C37) was circular in plan, while the northern posthole cut (C43) was less regular, and more sub-rectangular. In section, the cuts were very similar, featuring an irregular 'U' shaped profile with a steeply sloping western side and a more gently sloping eastern side. A third posthole was left unexcavated, but its vertical lining stones were visible above the surface of the fill (C25) and it is probably similar in form to the excavated examples. The southern-most excavated posthole (C37) contained substantial pieces of oak charcoal, probably the remnants of the former post, and a vitrified material. Although there was little evidence for scorched subsoil or heat alteration of the stone lining slabs, the charcoal spreads lying above the tops of the postholes seem to be indicative of a burning event, rather than the use of fire to preserve the tips of the oak timbers. A blue glass bead (03E1231:53), charcoal, and burnt bone fragments were recovered from the fill (C21) of the adjacent posthole (C43).

The terrace itself featured a fairly smooth flat surface comprised of gravelly natural subsoil (C17). It was not possible to discern whether this was artificially levelled out based on the current evidence, though the absence of a buried soil or former ground surface might suggest that such a deposit had been cleared away. As a complex sequence of events is represented in Trenches 5 and 6, it is quite possible that the terrace had been used prior to the construction of the timber structure. The substantial size of the central pit, especially in relation to the overall floor space of the structure, and its very specific structural design, suggests a highly specific function. Interpretation is difficult without the benefit of clear parallels, but its characteristics would seem to point to some industrial or 'ritual' purpose, rather than a domestic one.

In Trench 5 it was important to establish a date for the large pit feature and the postholes, whose chronological relationship appeared to be closely based on their spatial arrangement and stratigraphy. The finds from the Trench were slightly confusing in terms of their chronological associations, with the Late Neolithic-Early Bronze Age scraper recovered from the pit, and the blue glass bead, only rarely found in Neolithic and Bronze Age sites, from one of the postholes. Two samples (one charcoal, one bone) from the main pit fill, two samples from the large oak fragments within two of the postholes, and one sample from an associated terrace deposit, were radiocarbon dated. These produced a series of closely clustered Early Christian dates (see Table 7 and Figure 5.12).

Assuming the dates do not reflect contamination, close parallels for the central pit feature of Early Christian date have not yet been identified. However, a truncated fire-reddened pit that yielded a blue glass bead (Ó'Donnchadha 2004e: 363), and a series of iron working structures at Aghnaskeagh (Buckley and Sweetman 1991: 94) featuring stone settings that bear a superficial structural resemblance to that at Drumirril are possible (broad) parallels from the Louth region.

Trench 6

Trench 6 was located a few metres down slope from the terrace and investigated the banked enclosure surrounding the hilltop. This feature, while clearly visible on the ground, had shown through only subtly on the geophysical survey and appeared to be associated with a high magnetic response that would typically be interpreted as a ditch, as well as some possible postholes. The excavated trench is shown in Figure 5.26. Directly beneath the upper levels of the topsoil was a substantial deposit of large angular stones (C3) corresponding those in Trench 5 (C2). This deposit ran the entire length of Trench 6 and seems to represent quarry spoil, the stones being angular in form and irregular in their deposition. Unfortunately, other than a small amount of burnt bone, there were no finds associated with this material that might have provided immediate evidence as to the chronology of this activity. The stone overlay a second stony deposit (C8) which itself contained a charcoal rich lens (C14), and which narrowed to form a shallow layer over the enclosure bank (C4). A small amount of burnt bone, some quartz pebbles, fire-cracked stone and quarried stone slabs were recovered from C8. Beneath it was another charcoal rich lens (C16). This series of deposits equates stratigraphically to the gravelly and charcoal rich terrace deposit in Trench 5, and the associated deposits of burnt material in the shallow scoops and surface deposits on the terrace surface. This indicates that this activity substantially postdates the original construction of the ditch and bank features, which lie several layers below it. It also indicates that the burning and deposition of material was occurring on both the upper and lower terraces of the hilltop.

The ditch contained a total of three fills and had been re-cut at least once, and probably more than once, as shown in Figure 5.27. The upper-most ditch deposit (C18) was found to fill a narrow re-cut (C27, c0.6m maximum width), which truncated the lower fill (C15) of the original ditch (C39, 1.3m width). The original ditch also contained a well-sorted and gravelly upper fill (C26) that may have been used to provide a firm surfacing or metalling of the original ditch fill. This deposit overlay C15 in the western side of the ditch but did not extend quite as far as the re-cut to the east. Thus while the exact chronological relationship is unclear, it was probably associated with the re-cutting of the ditch. A small number of bone and charcoal fragments were recovered from the upper ditch fill (C18). A small fragment of prehistoric pottery (03E1231:54), possibly Middle Neolithic in date was recovered from the very base of the lower ditch fill (C15) (Helen Roche pers.comm.). This fill also featured angular slabs of quarried sandstone. The southern extent of the ditch appeared to curve inwards towards the interior of the enclosure. Just to the south of this, and beyond the excavated Trench, is a visible break in the extant bank. This break may well represent an entranceway into the enclosure, the presence of which would explain the ditch’s apparent change in direction as a slightly curved terminus.

The bank is constructed from sterile clayey subsoil (C4), but appears to pre-date the earliest detectable ditch cut (C39), which truncates the lower levels of its inner slope (Figure 5.26 and 5.28). The bank was left intact so as to preserve its form, but a mid brown silty layer (C48) was visible halfway down the inner slope, covered by the built-up clayey subsoil (C4). This ‘sandwiched’ layer probably represents a buried soil or ground-surface predating the construction of the bank, and may be significant in terms of providing future dating evidence. The inner slope of the bank also featured a possible post-hole (C38 and C49; see Figure 5.29). This corresponds well in terms of location to the high magnetic response identified on the geophysics as a possible posthole. The fill of this feature was dark, gravelly and charcoal rich, and the cut was wedged between two pieces of outcropping bedrock. The feature seems to have been disturbed, possibly by animal activity or root action, as its sides and base were irregular and extended almost horizontally into the natural subsoil at the base of the bank (C19). It is not clear whether this possible posthole predates and was truncated by the lower ditch cut (C39), or whether it was contemporaneous with it.

A small section (less than 1m in length) of the inner enclosed area, or possible terrace, was revealed in this trench (Figure 5.29). This terrace-like area is positioned below that investigated in Trench 5. The natural subsoil (C19) making up the area was found to feature large sharp outcropping sections of rock. It is not entirely clear, due to the small area revealed, how the terrace was used with such jagged rock outcrop in place, or whether some of the large angular stones in the deposit (C8) overlying it were meant to provide some kind of surfacing effect which could not be detected within the confines of the Trench. An alternative explanation can be proffered on the basis of the geophysical survey. The Trench is located immediately to the NE of what appears to be an internal division, in the form of a bank and ditch, which defines the inner edge of the terrace. The jagged outcropping rock that was uncovered could feasibly have been incorporated into the edge of this internal bank feature. This hypothesis would require further excavation in order for it to be confirmed or disproved. Thirdly, it is possible that the angular condition of the outcrop is due to quarrying activity that postdates the active use of the lower terrace.

The outer surface of the enclosing bank (C4) was not entirely exposed, but sloped down fairly sharply for at least 1.25m. Layers C3 and C8 extended over the slope of the bank, and over a possible stone revetment (C40; Figure 5.29)). This feature consisted of a line of large stone slabs that seemed to define a break in slope towards the base of the bank. Beneath C8 was a deposit (C41) which yielded a second sherd of prehistoric pottery (03E1231:55), again possibly Middle Neolithic in date (Helen Roche pers.comm.), a small amount of burnt bone and a discoloured, fire-cracked stone. Below this were several large and angular horizontal slabs of quarried local sandstone (C47). Due to time constraints these were left *in situ* along with any further deposits that might be sealed by them. As a result, it is unclear whether these represent some form of paving, or further quarry spoil.

The presence of both the stone slabs and the deposit that yielded the Neolithic pottery sherd indicates that it is not only the internal area within the enclosure which offers considerable archaeological potential, but that activities were also occurring immediately outside its bank. The stone slabs lie at a depth of 0.45m below the current ground surface surrounding the hilltop. This depth suggests that the modern ground surface has been raised or evened out, perhaps due to erosion, quarrying and twentieth century ploughing activity that created a raised margin. The potential for further deposits to be preserved below the extent of excavation in the eastern end of the trench, and the successful identification of the source of the possible posthole on the inner slope of the bank, suggest that the geophysical anomaly interpreted as a possible *external* posthole has probably not yet been exposed. The present evidence suggests that a series of postholes may have been cut into the natural subsoil adjacent to the inner and outer margins of the bank. Their exact chronological relationship with the bank is not yet clear.

The precise identification of two body sherds of what is thought to be Middle Neolithic pottery remains tentative, though they are certainly no later than Middle Neolithic in date (Helen Roche pers.comm.). The fabric of these sherds differed from those recovered from Trench 2, being finer, more homogenous, apparently untempered, and with smoother surfaces. This echoes the shift in the later Knowth material, which although still round-based and shouldered, featured harder fabric with a corky texture (Eogan and Roche 1997: 5). This material was generally of a higher quality than the earlier vessels, and was comparable to Case's 'Lyles Hill style' (1961: 178-80; Eogan and Roche 1997: 5). One of the Drumirril sherds may feature indented decoration, though the size of the sherd renders this observation tentative. One surface features a single roughly circular indentation, similar to the bird-bone impressions on some of the Decorated Pottery Complex sherds from Knowth (Eogan and Roche 1997: 77). Though the sherds were recovered from the very base of the primary ditch cut and from a context overlying the bank in Transect D, the radiocarbon dates tell a different story. These offer an Iron Age date for a charcoal sample from the upper ditch fill. In Trench 6 very little organic material was recovered from the lowest ditch fill and there were no basal charcoal accumulations. The date of initial construction of the ditched enclosure remains uncertain. On the one hand the sherd from the ditch base may have been in primary context, i.e. in a Middle Neolithic ditch. The long series of events on the hilltop and the presence of Neolithic finds raise the possibility that the enclosure is prehistoric. Enclosures of a range of sizes and forms are known from the Irish Neolithic (Cooney 2000: 15-16, 69-70). On the other hand it may be in secondary context within a much later feature, even as late as the early Christian horizon, which would suggest that much disturbance (in line with the quarrying and terrace clearance) had occurred at the site. A priority for future excavation would be to extend the investigation beneath the bank in the hope that datable material might be recovered from a sealed context. Clearly the hilltop was in use of a considerable duration of time. Considering the recurring relationship between rock art and curvilinear enclosures, the secure dating of this structure is crucial for the understanding the Drumirril palimpsest.

Taphonomic issues for Trenches 5 and 6

As in Trench 5 the chronology of the upper stony deposits in Trench 6 remains problematic. Large scale quarrying might well have occurred in the area during the later 18th to early 19th centuries, for the purposes of constructing the Deer Park wall. The scale of the vertical quarry faces on the northern slopes of the hilltop and the well preserved spoil heap support the idea that these were associated with relatively recent, large-scale activity. However, there is no solid evidence linking this activity to the extensive deposits of broken and jagged rock slabs uncovered in Trenches 5 and 6. These deposits also appear to lie directly over contexts with prehistoric finds and Iron Age / early Medieval radiocarbon dates in both Trenches, rather than being separated from them by a sterile period of abandonment.

Two interpretations are possible. First, all but the upper levels of the topsoil (which, in Trench 5, yielded a Post Medieval pottery fragment and piece of iron) might represent relatively ancient activity, the lower levels of which are at least as early as the Middle Neolithic. Later, periods of erosion, perhaps following quarrying or other activity requiring the clearance of surface vegetation, could have resulted in the removal of any soils that might have built up over the stony layer. This would leave the current topsoil, complete with Post Medieval finds, juxtaposed with much earlier contexts. Alternatively, at some stage after the early activity occurred, and before the deposition of an 18th-19th century quarry spoil (if this interpretation is correct) the exposed rocky surface covering the hilltop had prohibited natural soil development and may have contributed to taphonomic processes such as substantial erosion, resulting later in the juxtaposition of Post Medieval and much earlier deposits. Though a hypothesis involving a bare rocky hilltop would be difficult to sustain over several hundred years, it should be remembered that the topsoil in the area is exceptionally thin (down to a few centimetres in places), whether over bedrock or subsoil, and would be especially vulnerable to periods of erosion. The fact that the upper stone layer fills the upper levels of the pit-like depression in Trench 5, and is not separated from the much earlier secure contexts by an in-washed deposit, suggests that the first interpretation is more likely. This would imply that the laying down of the terrace surfacing and deposition of quarry spoil was also a relatively ancient event, rather than the result of 18th-19th century quarrying.

Finds

Some of the finds deserve further comment here. Specialists analysed or commented on a range of material recovered from Drumirril, including the pottery, flint and quartz (Warren 2004) (already described above), cremated bone (Geber 2004), vitrified material, and charcoal (Stuijts 2004).

Burnt Bone

A small quantity of burnt bone fragments was recovered by hand during the excavation. This was examined by Jonny Geber, a specialist in cremated bone. The greatest quantity came from the upper terrace in Trench 5. The majority of the fragments that were identifiable to species were animal bones, including fragments of pig, small and large bovides (sheep, goat and cow), a small mammal (possibly dog), and an unidentified small carnivore. A wide range of bone types was present including cranium, long bones, ribs and teeth. Pig bone fragments were recovered from the main pit fill (C22), a posthole fill (C21), and the shallow scoop (C23). These included fragments from a cranium, tooth (from a sow) and ulna. The large and small bovide bone included fragments from ribs, teeth and an ulna, recovered from the ditch fill (C18), the main pit fill (C22), and the terrace deposit (C6 / 7).

Only two possible human bone fragments were identified, though the size of the fragments precluded a definite identification. These were a tibia fragment recovered from a posthole fill (C21/25) and a possible femur fragment from the terrace deposit (C6). Due to the initial difficulty in identifying the small deposit (C24) and scoop-like feature (C23) against the charcoal rich surface of the terrace (C6 / 7) during the excavation, it remains a possibility that that the latter fragment was derived from one of these features rather than the general terrace deposit. The fragments were mainly white in colour and were notably clean (Geber 2004). This might suggest that the fragments were removed from pyre material before being deposited (ibid). This factor remains speculative due to the small size of the sample, but if confirmed, would support the idea that some of the fragments may have been intentionally deposited within, for instance, the posthole cuts, possibly for symbolic reasons. The bone fragments, including the possible human tibia, recovered from the upper levels of the northern posthole (C21 / 25) certainly appeared to be tightly clustered, as if intentionally placed between the stones that lined the posthole.

Because the bone was recovered from pit and posthole fills, it would seem unlikely that their highly cremated nature could have occurred *in situ* as a result of the burning of the oak structure. The presence of cremated bone raises the question as to whether the central pit and posthole features served some specialised heating function. The potentially symbolic nature of some aspects of the site (the substantial size of the stone setting, the deposition of the worn flint scraper and the sealing of the features with a cobbled surface) raises the possibility that at least some of this heating process, which raised temperatures of up to 700-900˚C, was for purposes other than culinary ones. The consistently highly fragmented and highly cremated condition of the bone would also not appear to support a more economic function such as the cooking of food, though it is also possible that larger unburnt fragments have not survived as successfully in the acid soils of the site.

Blue Glass Bead Fragment

The bead fragment recovered from the fill of one of the stone-lined postholes (C21 within cut C43) in Trench 5 is comprised of deep ‘bottle’ or ‘Prussian’ blue translucent glass, where cobalt or copper was probably employed as the colourant (Guido 1978, 9; 1999, 90). Based on Guido’s (1999, 13) classificatory system, the fragment represents almost one third of a relatively fine but simple undecorated barrel-shaped bead (Figure 5.11). The bead fragment is irregular in height with the fragment ranging from 4.5mm-5.5mm, and one end sloping more sharply than the other. The bead probably narrowed at one end, based on the estimated original diameter range. The long axis of the bead runs perpendicular to its wide cylindrical perforation. Very frequent small opaque inclusions or possibly air bubbles are visible within the matrix. The surface of the perforation is rough, with traces of what appears to be sediment adhering to its surface. Microscopic examination revealed that this material is vitrified and cracked, and features moderate quartzite sand inclusions. This substance may compare with the baked clay, possibly the remains of an ‘interstitial material’ separating the glass and the core onto which beads were moulded, which was observed in some of the Rathgall beads (Raftery 1987), though confirmation of this would require expert analysis. The ends of the perforation are smooth and rounded.

DIMENSIONS:

Maximum external width of fragment:	6.9mm
Estimated maximum original external width:	7.8mm
Maximum internal perforation width of fragment:	4.2mm
Estimated original diameter of perforation at either end:	5.0mm-6.2mm
Height of fragment:	4.5mm-5.5mm
Maximum thickness of fragment:	1.7mm

A thorough and detailed classification of Prehistoric, Roman and Anglo-Saxon beads has been established by Guido (1999, 1978). Unfortunately the Drumirril bead does not feature a particularly distinctive form, and thus its morphological characteristics alone cannot be relied upon to determine its chronology. Undecorated blue glass beads were produced over a very long time period and are thus amongst some of the least helpful types in terms of chronological distinctiveness (Guido 1978,14), with even many Anglo-Saxon blue beads morphologically indistinguishable from Iron Age or Roman examples (Guido 1999, 48). There is secure evidence as early as the second millennium BC, for occasional examples of glass beads reaching some areas of coastal and southern England and Scotland (Guido 1978, 19). As well as the secure finds from Bronze Age contexts (Early, Middle and Late), and their more common occurrence in Iron Age and later sites, blue glass beads have been very occasionally recovered from Neolithic proveniences. At the megalithic tomb in Agnaskeagh, to the north of Dundalk, a blue glass bead accompanied Neolithic and Bronze Age pottery and cremations (Buckley and Sweetman 1991: 25). However, it is not until the Early Christian period that there is definitive evidence for active bead production in Ireland, though this specialist technology probably dates back to the Iron Age when the beads start to exhibit “advanced and original technique and design” (Guido 1999, 9; see also Hencken 1950 for a discussion of the Lagore workshop).

A thick layer of quarried slabs of local sandstone overlay the posthole from which the bead was recovered. It therefore seems unlikely that the bead was intrusive, as the deposits appear to be securely sealed and undisturbed. Considering the potentially votive nature of the scraper it is tempting to view the contents of the postholes as also representing a symbolic deposit rather than an incidental one. However, whilst the interpretation is based on only two excavated postholes out of a possible nine or more, this idea remains speculative. The juxtaposition of the prehistoric scraper with Early Christian radiocarbon dates indicates that we cannot necessarily rely on the dates to prove the chronology of the finds. However, a blue glass bead would fit comfortably with the Early Christian dates from the oak posts.

Vitrified material

Several fragments of vitrified material were recovered from Trench 5 all of which were very porous, light in weight, but hard in texture. Two main types were identified. The first consists of a pumice-like substance ranging from mid grey to mauve in colour fragments of which measured up to 4.5cm in size, and which feature very frequent tiny through to ‘rice-bubble’ sized voids. These fragments were recovered from the terrace deposit (C6 / 7), and the fill of the central pit (C22) in Trench 5. This material was observed to be similar to that excavated from a Bronze Age kiln at nearby Richardstown, which was identified as Bronze Age slag (Emmett Byrnes pers.comm. and 1999). However when tested with a metal detector, the presence of metallic material could not be verified. The honeycomb texture also prompted the idea that some of the material might represent vitrified bone. Vitrified and porous concretions known as ‘clinkers’ have been observed in some cremations that were heated to over 800˚C (Schutkowski et al. 1987), but these are usually only a centimetre or so in diameter. This idea was ruled out during the specialist examination of the material (Linda Fibiger pers.comm.). Following examination by a geologist the material is now thought to represent highly vitrified fragments of stone that contains volatile or dissolvable inclusions, such as pyroclastic tuffs or evaporites, which would have been available (though at some distance from the site) within the wider surrounding region (Stephen Mandal pers.comm.). What appear to be fragments of stone, which had not been vitrified but did have a slightly ‘metallic’ quality, were also recovered from C8 and C14 in Trench 6. Together these finds demonstrate that specific geological materials were being brought to the site, possibly in connection with burning activities on the terrace.

The second type of vitrified matter consists of a black material with an almost coal-like appearance, save for its porous quality. These fragments came from the fills of posthole cuts and the pit-like depression (C21/25 and C33). Some fragments of this type feature burnt plant material, evidently a grass-like species. Ingelise Stuijts (2004, pers.comm.) has suggested that this is likely to represent a building material consisting of clayey daub mixed with grass or straw. Its context at the base and in the fill of posthole cuts suggests that it may have functioned as a means of securing the wooden posts in their sockets. This also fits in with the presence of the non-vitrified clay packing from posthole C35.

Both types of material demonstrate that the temperatures produced in what seems to have been a series of burning events (possibly both intentional and unintentional) were high enough to substantially vitrify and alter the morphology of some of the geological materials present within the timber structure. It seems likely that both types of material were intentionally deposited either as part of the building process (in the case of the daub) or during other heating activities (in the case of the vitrified rock) conducted at the site.

Wood Identification

The charcoal samples recovered during excavation were identified by Ingelise Stuijts (Stuijts 2004) whose report provides the following environmental insights. A notably wide range of tree species, 11 in total, was identified suggesting that wood for burning was collected randomly from the immediate area. Oak and hazel were the most common species present, alongside smaller amounts of sloe, alder, and apple type trees. Less common was spindle tree, ash, ivy, holly, willow and elm. The presence of alder fits in nicely with historical information that wooded areas in the Barony of Farney were known as ‘Alder Shrubb Wood’ and ‘Alder Bogge’, during the 17th Century (Shirley 1845:1). Oak, a wood highly resistant to decay, is commonly present on archaeological sites owing to its suitability for construction. Not surprisingly then, the samples from the postholes, which contained large chunks of what seem to represent the former posts, consisted entirely of oak. The samples, with the exception of two charcoal fragments, were generally free from signs of insect damage, suggesting that fresh wood was in wide use.

The species present suggest that the area featured mixed oak-ash-elm woodland with hazel undergrowth. The later enjoyed a widespread distribution from Neolithic right through to Medieval times. There is also some evidence for hazel coppicing from the charcoal assemblage. The presence of a small amount of alder and willow, species preferring the margins of bogs, lakes and streams, is consistent with the availability of several wetland habitats in the immediate area. Elm was present in just one context, the pit deposit containing early Neolithic pottery. This was in steady decline from the Neolithic period onwards, until it became largely absent in the Medieval period. This supports the proposed Neolithic date for the pit. Apple type trees, such as hawthorn and sloe, were commonly put to use in hedges, since their thorns made them resistant to animals. The presence of these species may be indicative of such activities. The mixed range of species and oak content identified from contexts C18 (Trench 6 upper ditch fill), C30 and C42 (both Trench 2 pit fills) would generally be viewed as consistent with a prehistoric date, particularly in context C30 which features 10 species. This context also contained both wetland and dryland species and the range of species may indicate clearance. However, the resulting dates indicate that, probably due to ploughing, the context has been contaminated and may represent the mixing of charcoal from several periods; Neolithic, Iron Age and Early Christian.

Discussion

The work at Drumirril aimed to explore the potential of excavation and geophysical techniques for the purposes of rock art research. The general approach employed proved to be highly successful, allowing a wide range of features, from small and subtle through to substantial, to be precisely identified and excavated. The resolution of the geophysical survey, and the verification of selected features through test excavation, has enabled a detailed picture of the archaeological landscape to be built up without needing to excavate vast areas. The results reveal the benefits of applying the two techniques in an integrated manner. They have demonstrated that activities other than carving were conducted at rock art sites, and that we sometimes need to excavate a few metres beyond the position of the panels themselves in order to identify features.

The excavation also provided a test for the success of the high-resolution method applied during the geophysical survey presented in Chapter 4. Five of the seven trenches successfully located the source of the geophysical anomalies, while those investigated by two trenches remained unresolved. Overall, the integrated use of high-resolution geophysical survey and small-scale test excavation demonstrated the success to which very small, subtle or low visibility features can be identified and their locations pinpointed using tightly targeted trenches. Such features included a small posthole within a ditch cut and a shallow ploughed out pit, as well as major features such as a banked and ditched enclosure and a pit and posthole complex. The excavation revealed that a surprising degree of detail as to the nature of the features could be attained from the high-resolution geophysical survey alone. The use of small scale testing allowed a select sub-sample of the features to be initially investigated, whilst further features were interpreted on the basis of the evidence recovered. This offers a precise, and economical means for establishing the nature of features making up an archaeological landscape. The greatest challenge here proved to be distinguishing between highly degraded ferrous objects and small features containing burnt material. Further test excavation to explore the repeated large posthole or small pit-like features that appear in wide arcs surrounding rock art locations, such as those in Transects B and G, would be a useful avenue for future work.

The approach used at Drumirril necessitates a shift in the way rock art sites are perceived, broadening the focus from the panels themselves to the use of these locales during the past. The findings also have important implications for the management of these sites. Rock art in Britain and Ireland has frequently been relocated during land improvement to museums or simply to the sides of fields, without any further archaeological investigation of the location itself, or the adequate recording of the original provenience. The logic underlying these solutions has been brought into question by the results from Drumirril. The wide range of material was uncovered during the course of a very small-scale testing programme, suggesting that there is still much to be learnt from the landscape at Drumirril. Inevitably this work has raised many questions that cannot be answered without further excavation. However it also offers a series of significant insights.

Dating evidence

One of the key areas of interest at the outset of the project was the date of any activity that could be identified. Only a few diagnostic finds were recovered, but these are of considerable significance given the argument for a Neolithic date for classic rock art that was presented in Chapter 2. The finds included Early Neolithic and Middle Neolithic (or earlier) pottery, and a round scraper most likely to date to the Late Neolithic. There were no definite Bronze Age finds, and what was originally thought to be slag similar to other Bronze Age material turned out to be vitrified rock. Though it is not yet possible to fit the creation of the rock art motifs into this sequence, the results offer a picture of a complex series of activities taking place over a substantial period of time. The evidence should not be mistaken for secure evidence of rock art as a Neolithic practice, but it certainly indicates that communities were actively using the Drumirril area during this period. The difficulties in linking the artefact assemblages at Drumirril to the practice of rock art via proximity alone have been raised above. Nevertheless, the recovery of Early, Middle and Late Neolithic material a few metres from carved panels is well in keeping with current interpretations of rock art as a long-lived practice to which people returned, generation after generation. It is also significant considering the presence of the broadly contemporaneous settlement nearby at Monanny. Just how early the proposed Neolithic date for rock art might be has yet to be established (see Waddington 1998; Burgess 1990). Whilst the recovery of early Neolithic material clearly does nothing to resolve the issue, the presence of the Western Neolithic sherds forces us to ponder whether at least some of the Drumirril motifs were carved during the same period.

The radiocarbon dates, which were awaited with bated breath in the hope that they would confirm the presence of extensive prehistoric activity at the site, came as quite a surprise. Though the blue glass bead raised the possibility that the Transect D features significantly post-dated the rock art, the deposition of the scraper, lack of later diagnostic finds, and rare examples of beads in early sites lead to the general conclusion that the features could have been broadly contemporaneous with the carvings. Despite these prior expectations based on the finds, the dates speak of a major Early Christian horizon at Drumirril, preceded by an earlier period of Iron Age activity. The clustered nature of the Early Christian dates from the terrace features in Trench 5 strengthens their significance. Together with the sealed nature of the pit and posthole deposits, this also renders the possibility that the dates represent contamination of an earlier prehistoric context relatively unlikely. With the unusual combination of finds and dates at Drumirril, it would be helpful to pursue a more stringent radiocarbon dating programme in the future, particularly in order to rule out contamination.

The site is situated in the heart of ringfort country, surrounded by crannógs and souterrains, and so activity that substantially postdates the rock art is not unexpected. Around Dundalk there are also significant complexes of prehistoric and Early Christian sites (Buckley and Sweetman 1991). The horizon at Drumirril probably best explains the presence of the glass bead at the timber structure in Transect D, as this would have been unusually early had the samples returned dates more in line with the prehistoric finds. If this interpretation is accepted though, the apparently votive deposit of a prehistoric find in an Early Christian context is important. Though as archaeologists we generally consider the prehistoric and medieval periods to be sharply divided, and often treat them as entirely unrelated, the presence of a prehistoric artefact in an Early Christian context is not without parallel. A range of recent research provides a context for such practices, and suggests that the artefact may have been deposited near to its original provenience. Thus, though tenuous, and in a secondary context, the presence of the scraper at Drumirril may lend further evidence for prehistoric activity in the area.

The continued use, or the intentional and meaningful re-use, of prehistoric sites into much later periods is now widely acknowledged (Bradley 1987; O'Brien 2003, 67-9). Iron Age material has been recovered from one of the Neolithic cairns at Loughcrew (McMann 1993: 15), Roman finds from the Boyne Valley tombs (e.g. O'Kelly 1982: 36-7), and Palaeolithic and Neolithic stone artefacts from Roman sites (e.g., Turner and Wymer 1987: 55-8). Carelli (1997) has documented a large number of cases in Sweden that together point towards a complex and meaningful phenomenon, whereby prehistoric artefacts and 18th Century activity come together. In relation to finds from the town of Lund, Carelli (ibid: 396) has described their deposition as specific rather than haphazard. The majority occur in domestic contexts; "in many cases they … lay on a shelf, on a chest, or in a bag. It was also common to hide them in a special place, divorced from the everyday chores in the house, walled in, placed under the floor or on the threshold, on top of the four-poster bed, or in the ceiling" (ibid: 404). They have also been found beside chimneys, beneath eaves, under thresholds, and even in beds (ibid: 404-5). In the past, the distribution of these prehistoric finds has simply been interpreted as indicative of the extent of prehistoric settlement in the area. However, this phenomenon has recently been reinterpreted as the result of Saxon collecting practices (Merrifield 1987, 9-14). There are also examples from Iron Age contexts, and this practice is thought to have lasted through to the 1930s (Carelli 1997: 414-5). Carelli has proposed that their later collectors may have recovered these prehistoric votive offerings during cultivation and pit excavation activity (ibid: 410-11).

On the basis of classical tradition, ethnography, folklore and historical evidence, Carelli points to the magical, supernatural and healing powers attributed to ancient artefacts, as well as their 'symbolic-moral meaning' as a means of explaining this phenomenon (ibid 398). These folk beliefs continued to be important alongside Christianity (ibid: 408), and the possession of ancient artefacts evidently ensured good fortune of all kinds in the minds of the possessors; 'He who carries one will not be struck by lightning, nor will houses if the stone is there; the passenger on a ship travelling by sea or river will not be sunk by storm or struck by lightning; it gives victory in law-suits and battles, and guarantees sweet sleep and pleasant dreams' (Merrifield 1987, 11 quoted in Carelli 1997, 402). As 'lightning bolts' the finds were usually kept in places that were close to their original find locations, since it was this area that was protected (Carelli 1997:404). Ironically, or perhaps poignantly, considering the context of the Drumirril find, such artefacts were also believed to aid in protection against fire as well as thunder and lightning, acting as fire insurance for the building in which they were housed (Carelli 1997, 403-4). In addition, it is well known that the dust scraped or ground from ancient artefacts has been used to treat illness around the world, perhaps suggesting a symbolic link to health and fertility (ibid: 405-6; Callahan 2000). Interestingly, the damage inflicted during the pulverising in some cases leaves cup marks on the artefacts surfaces (Carelli 1997: 406-7). An example of a cup-marked stone axe from a Bronze Age context in Ireland was noted in Chapter 2 (Read 2000: 29).

As discussed above, excavations in Scandinavia have demonstrated that rock art sites were in use during the Iron Age and Medieval periods. Bengtsson (2004b: 136) has reported continuous activity over 1000 years, from prehistoric through to Iron Age periods, at rock art sites in Sweden. In Britain, rock art has been associated with Iron Age and Romano British material, as outlined above. In Portugal, rock art panels were revisited during the Medieval period, during which Christian motifs and copies of Copper Age motifs were applied to the same panels (Martinez 1995; Costas and Pereira 1998 cited in Bradley 2000: 74). Some prehistoric rock art sites even became the destinations of much later pilgrimages (Sanches et al 1998 cited in Bradley 2000: 74).

In Ireland too we see Christian crosses occurring on panels with cup marks and classic rock art motifs, for example at Clehagh, Co. Donegal (Van Hoek 1993), and at the Mass rock at Loughcrew, Co. Meath (Shee Twohig pers.comm.; Shell and Roughley 2004). It seems unlikely that these simply represent fortuitous reuse of carved panels. Corlett (1997) has also argued that prehistoric monuments (including rock art) and Christian traditions came together at Croagh Patrick, Co. Mayo, in the form of ritual pilgrimage. At Drumgonnelly, Co. Louth, what appears to be a poor copy of a cup and ring motif occurs alongside earlier motifs (see Figure 5.30). The addition consists of a roughly pitted central area of pecking surrounded with an irregular linear incision with two radial extensions. Both elements appear to have been produced with metal tools, and the area of pitting exhibits a freshly exposed, unpatinated surface. It seems likely that the motif was carved some time from the Iron Age onwards.

Hadingham (1974: 90-8) has summarised the folklore links between rock art, and in particular cup marks and basins, and Early Christian traditions. Cup-and-ring motifs are found in prominent locations in numerous souterrains in Scotland (ibid: 91). In Argyll, folk traditions such as the leaving of milk in basins to ensure good milking have persisted into the early 20th Century (ibid: 92). Hadingham has proposed possible links between rock art and bullaun stones whose watery accumulations are said to cure warts, rheumatism and infertility, 'cursing stones' where the hollows were ritually ground, and hollows said to be the footprints or knee prints of saints (ibid: 95). On Innishmurray a cup-and-ring marked stone was found on an altar (Wakeman 1893), and cup-and-ring style motifs occur on Early Christian grave stones from churchyards in Tullagh and Ballyman, Co. Dublin (ibid: 96-8).

The possibility that the people who used the Drumirril hilltops so intensively during the Early Christian period were aware of the presence of the rock art, and that this may even have influenced the nature of their activities, must be considered. The recovery of the prehistoric scraper from an Early Christian context puts a comment made to me by local resident Mrs Cecelia Cunningham (pers.comm.) that the carvings may have been created by 'monks from Inishkeen', in something of a new light. We absolutely need to take care that we do not read 'meaningful action' into all of the activities recovered at rock art sites. However, the unusual nature of the Drumirril finds is cause for special consideration. This makes the date of the enclosures that encompass the high visibility rock art clusters in the Deer Park all the more crucial.

Chronology remains a highly problematic issue – even with the radiocarbon dates in hand, it is impossible to say precisely where the practice of rock art creation fits in relation to the series of events that occurred at Drumirril. However, with our current acceptance of a LN-EBA date for rock art, and some arguing for an EN date, it seems somewhat unlikely that the creation of the motifs was totally unrelated to any of the other activities, which, based on the artefacts, span these very periods. It seems that shifting from the impasse of 'rock art as un-datable' to dating the use of that place (alongside investigating the development of scientific methods (see Dorn 2001) to date the carved surfaces) may be a useful way to proceed at this point.

Quarrying stone

The apparent longevity of the quarrying activities at Drumirril is also of particular interest. Within the wider Louth / Monaghan area we have an example of a quarried cup-marked outcrop from a Bronze Age cairn at Carn More (O'Connor 2005), the use of quarried stone for decorated megalithic tombs at Newtownbalregan (Bayley and Roycroft 2003), Tateetra (Avril Hayes pers.comm.), and possibly at Carrickrobin (Tempest 1933), and the use of quarried slabs to which carved designs were added before being used in a cist burial at Crumlin. There are other instances where there appears to be evidence for the quarrying of decorated outcrops. For example during the field survey of the panel in Carrickallen, Co. Louth, it was noted that a section of outcrop appears to have been removed immediately adjacent to the carved surface, probably along a natural fissure (see Figure 5.31). The unusual motif here, three concentric semi-circles that have been truncated, surrounds a heavily and roughly pitted centre. This motif is likely to have originally consisted of a central cup or natural hollow, and more (if not entirely) complete rings. The pitting would seem likely to have been caused during the removal of part of the outcrop. This particular hilltop is still in use by the farmer for quarrying, and the resulting freshly exposed surfaces and associated debris are visible at its base. The activity at its decorated peak appears to be much older, though exactly how old remains unclear. The sandstone of the region was clearly prized for its high quality carving surfaces, so much so that we also see this rock type used in the Boyne Valley passage tombs, several kilometres to the south of its full extent (Eogan 1986).

The excavation evidence from Drumirril indicates that quarrying phases extend back as far as the initial periods of the use of the enclosure in Transect D. There are numerous quarried faces and quarry depressions across the Deer Park, frequently in close proximity to rock art panels, and these appear to date to several phases rather than simply to recent periods of construction. In Transect B, between the carved panels along the ridgeline and the Neolithic pit in the gully, is an odd piece of quarrying evidence. This consists of a neat triangular depression in an area of exposed outcrop. This is no more than a metre across, but it retains water quite successfully. Such activity is not in keeping with large scale modern quarrying. A few metres from this, and immediately adjacent to three decorated outcrops, lies a sub-rectangular depression. This measures just a few metres across and there are no obvious spoil heaps associated with it. Again, this activity may be of considerable antiquity. As noted previously, Drumirril features just the types of subtle and small-scale quarrying evidence that prehistoric extraction techniques are predicted to have left behind. The localised depressions at Drumirril are comparable to the stone extraction pits at Great Langdale (Bradley and Edmonds 1993: 69). It is quite possible that some of the phases of quarrying at Drumirril involved the removal, intentional or otherwise, of rock art panels.

There is increasing evidence for quarrying at numerous rock art sites in Britain as well as the quarrying of carved outcrops for use in later burial monuments. These include the quarried outcrops at Fowberry, Dumbarton and Hunterheugh Crags, as described in Chapter 2. In these instances there appear to be palimpsests of quarried, decorated and redecorated surfaces. There are also numerous examples of quarried panels used in later funerary contexts in Britain, as noted in Chapter 2. Hewitt (1991) has proposed that particular stone types may have been specially selected for these monuments. Recent research indicates that monument builders paid considerable attention to detail in terms of the colour, texture, geographical origin and structural qualities of various types of building materials during prehistory, including stone (e.g. O'Sullivan 1997; Lynch 1998; Jones 1999; Cummings 2002; Meighan et al 2002; Tilley 2004). With important exceptions, such as the axe quarry at Lambay (Cooney 1998), we seldom have the opportunity to investigate the origin of these valued materials. The possibility that Drumirril offers such an opportunity would be a valuable area of future research.

'Ritual' and 'everyday' landscapes

Another starting point for this project, as raised in Chapter 1, is the extent to which the current interpretations of rock as isolated ritual locales would be verified or challenged by investigating their archaeological context. This has implications for the way we think about the types of audiences that visited the carving sites, and the degree to which access and knowledge was restricted. These ideas are bound up with modern western understandings of sacred and profane, and ritual and domestic, which emphasise the mutual exclusivity of such dualisms, and as a result, imply spatial segregation. As Brück (1999) has discussed, this is tied up with our ideas about ritual versus practical action. The 'odd' Bronze Age depositional practices Brück discusses highlight the fact that the (to us) 'irrational' actions resulting in these deposits seem to have been perceived quite differently by their protagonists, who were likely to have understood them as playing highly functional roles, with logical and tangible outcomes. This raises doubts as to whether there would have been a requirement for them to be conducted separately from what we might term 'functional' activities.

As numerous recent studies have noted, during prehistory there were apparently 'ritual' aspects to everyday events (such as erecting or leaving a house) and, vice versa, 'everyday' activities (ploughing, discarding broken pottery, flint working) occurred at 'ritual' monuments, such as barrows (see Brück 1999). These two modern categories were evidently very much intertwined in the past. In this way, it may have been imperative that, for example, the burial cairns described by Eogan (2002) were positioned correctly within the surrounding field system in Coolnatullagh, Co. Clare, for that system to operate properly. So, just because rock art appears 'non-functional' *to us*, it does not mean it was to those who used the panels. Yes, rock art production may have required specialist skills. But then so did pottery production and flint knapping. This challenges the need for rock art to be positioned in isolated, marginal locales, simply because it was non-functional and, by implication, separate from the 'domestic' world.

With reference to Native American rock art Whitley has emphasised that “although sites were sacred, this did not preclude mundane activities from occurring at and around them, as the ethnohistorical record demonstrates in many ways. The sacred inhered everywhere, even though its presence was more strongly felt (or, in essence, rested closer to the mundane) at some spots because…. the sacred is an embedded, intrinsic attribute lying behind the external, empirical aspect of all things, but not a domain set aside or forbidden…. the belief that simple locational associations between rock-art panels and adjacent artefactual assemblages in all cases will reveal ‘functional’ information about the art …. is clearly naive. For such an interpretation assumes precisely the kind of segregation of sacred versus profane space which is nowhere suggested by the western North American ethnohistorical record “(Whitley 1998, 25).

This argument is well established for more ‘high profile’ monument types. For example, Bradley has warned against the assumption that Late Neolithic and Early Bronze Age monuments cluster in ‘ritual landscapes’; “This is because the very concentration of monumental architecture has encouraged the notion that domestic sites must have been excluded from the same areas. Such a hypothesis needs to be investigated on the ground, but all too often the idea remains unexamined because of a deep-rooted assumption about the character of ritual itself. Prehistorians have supposed that it must have taken place in areas removed from daily life.” (Bradley 2005: 201-2). These problems may also be linked to gender issues that are related to those described by Cooney (2001), which involve the assumption that ‘specialist non-functional activity’ that played an important role in social and ‘political’ endeavours took place well outside the home. This carries the implication that some social groups within prehistoric communities may have been excluded from these activities. As noted in Chapter 1, this is contradicted by numerous ethnographic studies.

Bradley (2005: 201-2) has proposed a scheme whereby both physical and conceptual distances between types of activities are investigated, and where ritual forms a continuum extending outwards from the ‘domestic sphere’. This provides two means of testing the isolated ritual locale scenario for rock art. Firstly we need to ascertain whether rock art is physically located at a distance or in close proximity to evidence for settlement activities. Secondly, we need to investigate whether the activities that occurred at rock art sites, and the artefact assemblages associated with them, bear any resemblance to those that occurred in settlements, or whether their character is altogether different. This will aid in exploring whether the sites were perceived as special or different from the everyday world, by those using them.

In exploring these broadly contemporaneous features, the main challenge is our inability to determine whether the rock art was already present or not. A range of activities was uncovered at Drumirril, though not all of these can be shown to be broadly contemporaneous with the rock art. We have evidence for the working of quartz, an activity also identified at the Torbhlaren rock art site by Jones (2004a, 2004b) at Kilmartin. As seen in Scandinavia, and at Backstone Beck, worked flint was deposited, sometimes having been burnt in fires beforehand. Pottery sherds were deposited on rocky hilltops, something we also saw at Backstone Beck (Edwards 1986). We have (undated) evidence for burning right up close to rock art panels, and the sealing of the burnt material with cobbles. The hearth at Kilmartin, those in numerous Scandinavian excavations, and the areas of burnt subsoil at Backstone Beck parallel this, and the sealing of votive deposits at rock art sites is known in Scandinavia. In the early Neolithic, people excavated a pit in a gully next to what may already have been a carved ridgeline. A series of objects and materials was deposited into it, including a large quartz cobble that was wedged into its base, pottery sherds, charcoal, flint and burnt bone. This may represent the type of site maintenance practices described by Brück (1999: 334-5). The geophysical survey indicates that more substantial activity, including the building of an undated rectangular structure, may have occurred in the same gully. People were living in rectangular timber buildings a few kilometres to the west. 'Ritual' aspects have been found in association with prehistoric quarrying across Europe (eg Lambay Cooney 1998, Bradley 2005: 104-5). Could rock art have formed part of these practices at Drumirril?

When viewed within the context of British and Scandinavian examples, the evidence of activities performed at rock art sites conveys some degree of consistency. However, the activities are also highly ambiguous. Some of those at Drumirril bear possibly 'ritual' elements, such as the sealing of the linear burnt deposit, the placement of the quartz cobble in the pit base and the apparently deliberate burning of flint. If there were specific ritual practices associated with rock art then we might expect them to have taken place repeatedly at a site like Drumirril. The geophysical survey indicates that particular activities, such as burning and pit-digging, may be repeated at rock art panels across Drumirril, though further excavation and dating evidence would be required to confirm the significance of these features. A useful way of understanding these activities can be gained from Brück's work; "Birth, marriage, death and other rites of passage may each have formed the context for particular acts of deposition….Important points in the annual subsistence cycle may likewise have required the deposition of certain objects or materials. As such, these acts would have had quite practical implications" (Brück 1999: 334). In this way these activities may have been intimately linked to the everyday worlds and experiences of those using the site.

At the same time, however, most of the activities described would be equally at home in Neolithic settlements and other site types, where we also see evidence for deliberate 'non-functional' burning and 'votive' depositions (e.g. Gibson 2003: 141; Ó'Drisceoil 2003: 181). The geophysical survey indicates that the Drumirril landscape is littered with archaeological features. The date of the enclosures and field system is not yet clear, and certainly some of the most substantial features excavated date to the Early Christian period. It is more than possible however, that more Neolithic material and features would be uncovered during further excavation. In this way, Drumirril seems a lot less isolated, a lot busier, and a lot more everyday, than before.

It also highlights the crucial nature of settlement evidence in terms of the theories discussed earlier, which posit rock art on the edge of the settled landscape. With the site at Monanny, and other settlement and temporary occupation activity so close by (see Chapter 3), and evidence for pit digging and pottery deposition within a few metres, the 'domesticated landscape' seems to be closing in on the Louth / Monaghan rock art. Certainly features such as pits are not usually seen as especially marginal. In fact, in many cases they are conceived specifically as settlement evidence, especially where evidence for actual 'houses' may be lacking, forcing a broader definition of 'settlement' to be taken into account (e.g. Gibson 2003; see also Thomas 1999). Furthermore, the gully where the pit is located exhibits numerous other potential features. Determining whether these may date to a similar period is a crucial step for future work.

At this stage, the prehistoric activities identified at Drumirril would not have necessitated the involvement of large numbers of people, or visits to the site of long durations. They do indicate repeated visits over considerably long periods (Early, Middle and Late Neolithic). This establishes a sense of continuity of use, with material from a wide range of chronological periods having been built up on and around the rock art hilltops. Together, the survey and excavation results also indicate that the rock art represents just a small (visible) part of a much wider pattern of landscape use. The diagnostic material from the banked and ditched enclosure begs the question of the dates of the other enclosures identified within the Deer Park, all but one of which also enclose known rock art panels. These enclosures are also abutted to the long banks or walls making up the coaxial fieldsystem, further raising the question of the antiquity of the system itself. These features, along with the possible rectangular structure, indicate much more substantial commitments of both time and people. However, at this stage it is not clear whether any of these features are broadly contemporaneous with the rock art, or whether they relate more closely to the later Iron Age and Early Christian horizons. As described previously, we have evidence for rock art co-occurring with enclosures and prehistoric field systems at several locations. The co-occurrence of 'ritual monuments' and everyday lived landscapes including dwellings and field systems has been well documented for the Irish Neolithic (e.g. Jones 2003; Caulfield 1983). These demonstrate that it is not beyond the realms of possibility that some of the more substantial features at Drumirril could be prehistoric in date. At Drumirril, the integrated appearance of the rock art and other features strengthens this possibility. Was the use of this area of rocky hilltops really restricted only to select specialists from communities living several kilometres away?

It is too early to say whether any of the excavated features are representative of Neolithic settlement; a single pit does not necessarily make a settlement. However, there is no reason to rule out the possibility that the people who used the rock art locales were living in essentially sedentary settlements in the local area, possibly in quite close proximity. These locales seem to be embedded in a complex landscape, and it seems reasonable to ask whether people might have been living very close by, perhaps even closer than the settlements at Monanny in the west (Walsh 2004), and

Newtownbalregan, Donaghmore, Littlemill, and Plaster in the east (Ó'Donnchadha 2002; 2003; Bayley 2004b; Keogh 2005). The fact that both major road developments either side of the rock art distribution have revealed settlement material from the early through to later Neolithic / Early Bronze Age makes it highly likely that there are more as yet undiscovered sites between these areas. In this way, it is possible to imagine that, rather than having been created along routeways or viewpoints which relate to but are in isolation from other archaeological activity, the rock art may have operated in an embedded manner within a complex landscape where people were living, working, and creating monuments. Though the current evidence from Drumirril is on a much smaller scale, such imaginings are much more in line with current interpretations of monument complexes featuring the related phenomenon, megalithic art, which are increasingly found to be part of a broader pattern of landscape use, including settlement and, potentially, agricultural activity (e.g. Eogan and Roche 1997). All this seems to call into question the marginal and restricted image of rock art sites within the prehistoric landscape.

The results presented here necessitate a shift in some of our preconceptions. They highlight the potential benefits of acknowledging rock art locales as archaeologically significant places in themselves, and open up the possibility of broadening our knowledge of how people interacted with these places. The unexpected nature of the results seems to challenge some of our usual assumptions – this site does not seem to fit particularly comfortably with the idea of rock art on the 'isolated periphery' of settlement, or the theory of transient visits leaving only ephemeral remains. The results also raise the question of potential variation in the ways different rock art sites were used. Is Drumirril representative of other sites, or unique within the Louth / Monaghan group? Might sites consisting simply of single panels represent something quite different? Were some of the single or paired panels dispersed across the lowlands of Louth and Monaghan used locally, whilst regional clusters such as Drumirril and the Isle of Doagh represent areas visited by wider groups of people at certain times or for certain events? If so, should we expect different types of activities between these two types of rock art sites? The idea that different panels may have served quite different purposes highlights the importance of integrating motif analysis into landscape rock art research, for this may aid in identifying these different panel types. Such work represents the last of the nested scales of analysis described in Chapter 1, and forms the subject of the following Chapter.

CHAPTER SIX

Enduring forms & hidden depths

Introduction

The last three chapters have dealt with the landscape and archaeological context of rock art at ever decreasing nested scales, from inter-regional, to intra-regional, local and site levels. This chapter seeks to address questions relating to a final, more intimate, and yet highly important scale – that of the motifs, their composition, structural relationships, and stylistic variations. This investigation also comes full circle by acknowledging the potentially dynamic and significant relationship between the carved forms themselves and the wider landscape, as demonstrated in Bradley's work in Britain and Iberia (1997; also see below and Chapter 1). As noted in Chapter 1, one of the weaknesses in the development of recent landscape approaches to rock art has been their tendency to simplify, or at worst gloss over, the potential archaeological value of design and compositional variation. Stylistic analysis still represents a major challenge in rock-art research, and there is a danger of a dichotomy forming between strictly interpretive approaches to symbolism, and landscape-oriented research that ignores the rich information offered by the motifs. Work by Bradley (1997), Purcell (2002), Ramqvist (2002), and Sognnes (2002) represents attempts to cross this divide, by integrating experiential landscape or distributional studies with motif analysis. Landscape approaches have brought a much-needed fresh perspective to, and have essentially reinvigorated, rock art research. If a landscape perspective can be successfully aligned with a new sensitivity to motif variation, this will potentially open up a new degree of understanding, addressing how meaning was actively constituted and communicated using rock art in different ways, in different contexts. If rock art, as the recent focus on landscape suggests, provided a means of expressing and producing meaning in terms of people's relationship with and to the land, then motif variation might offer a window on the ways people went about achieving this.

As noted in other rock art analyses (e.g. Layton 1991b: 150), variation can be observed at a series of different levels. Firstly, motifs tend to be combined in different ways on different panels, prompting the idea that it might be possible to identify different 'panel types', whatever such types might actually 'mean', or not mean, in both the past and the present (see below). To the analyst, a very different message appears to be communicated by, for instance, inscribing an entire surface with a dense array of simple cups, versus pecking a large multi-ringed design in the centre of a panel. Secondly, a range of different individual motifs can be observed, defined, and repeatedly and consistently identified. These vary from simple cups through to multi-ringed designs with radial lines, and enclosed and satellite cups, to repeated parallel grooves encompassed by cartouche forms. Within these motif types there are also more subtle variations in the particular forms and 'grammatical' relationships of the design elements – their basic structure may be equivalent (e.g. a cup, ring and radial groove), but there may be differences in the precise ways these are combined. Lastly, there are also variations in the formal qualities and techniques used to depict the motifs (see below).

This chapter presents three approaches to the investigation of formal variation in the Atlantic rock art corpus. The link between motif variation and landscape is established through the consideration of the spatial dimension of rock art as a form of 'natural monument', fundamentally linked to place. This is made possible by investigating the patterning in the motif distributions at a range of scales via a GIS, thus further enriching the analyses presented in Chapter 3. In this way it can be seen that the four key strands of analysis applied here (landscape modelling, geophysical survey, excavation, motif analysis), are actually intimately linked as approaches to the interpretation of rock art. In practical terms, it is the use of GIS that makes this possible. The relative success of these strands in shedding new light on our understanding of rock art is in many ways reliant on this interrelationship. Although the motif analysis was originally conceived as a major component of the overall research project, the unexpectedly complex findings of the work presented in the previous chapters has restricted the degree of detail and depth that has been possible here. As a result, the motif analysis takes the form of a pilot study that focuses on the development of the three classificatory approaches (described in more detail below), and demonstrates the potential for these approaches to be investigated spatially by integrating them with the GIS. In future work, it will be important to develop these approaches in more detail, by thoroughly documenting and quantifying the variation within and between each study area, and assessing the significance of the associated spatial patterning.

The first approach presented here explores the broad variation in the composition and degree of motif variation present on individual panels by identifying a series of panel classes (see Table 8). These broad classes were identified on the basis of simple visual assessment, such as whether the motifs appear dispersed or clustered, and whether the motif types were varied or limited. The results for the three study areas are compared in graphical form below. The second approach investigates whether the variation of panel attributes can be addressed in a more detailed, specific and objective manner, by documenting the presence and absence of 100 different design elements, and the variations in their specific 'design grammar' (see Table 9). The Louth / Monaghan group is used to illustrate how the resulting data can be further analysed using specialised seriation software to order panels into common groupings. The third approach discusses an additional form of stylistic variation that only became apparent towards the very end of the study; one that essentially relates to the technique used to produce the carvings (see Table 10). Photographs of examples from all three study areas are used to illustrate the different formal or technical characteristics identified using this approach. In addition, a series of worked examples are presented for the first and second approaches in order to demonstrate the way that this data can potentially be integrated with the GIS to investigate spatial patterns. These examples are predominantly from the Louth / Monaghan area, with some additional cases drawn from the Inishowen Peninsula, where somewhat different patterns are evident on the basis of the second approach.

Thus, though the work is very much preliminary, it contributes three important steps forward. Firstly, it develops ways of addressing the considerable variation evident in the rock art corpus without resorting to simplistic or restrictive classificatory schemes. In this way a continuum, rather than a dichotomy, of different panel types can be explored. Secondly, it suggests that at least three forms or levels of stylistic variation are evident in the corpus. Each of these may result from and reflect quite different influencing factors, from chronological variation, to the differing roles of particular panels, individual and regional identity, and the context of production. Thirdly, it demonstrates the degree of subtlety and detail achievable by integrating this qualitative data with the GIS to explore spatial variation across the landscape.

‘Style’ and aesthetics

Although the concept cannot be fully dealt with in all its complexity here, conducting a motif analysis inevitably raises the thorny issue of ‘style’, its definition and significance. Style is an ambiguous and subjective term ultimately derived from an art historical perspective. The definitions employed in the archaeological literature are notoriously varied, and form a wide continuum from style as highly active, through to style as relatively passive (Hegmon 1992; Conkey 1990; also compare Dunnell 1978; O’Brien and Holland 1992 and Bettinger et al 1996). From a strict evolutionary perspective, particularly for those who have approached style as a chronological indicator (e.g. Dunnell 1978), only the variations at the ‘selectively neutral’ end of the spectrum would be considered to be ‘truly stylistic’. In contrast, a rather more open definition was proposed by Bettinger *et al.* (1996), who viewed style as having a communicative function, the importance of which can vary across a continuum from functionally neutral to highly communicative. Thus it depends on the definition of style being employed as to which formal variations in material culture might be deemed to be ‘stylistic’.

Post-processual approaches have critiqued definitions that have emphasised the ‘transmission’ of style through deterministic processes to the detriment of individual agency and choice (Hodder 1985). Wiessner (1990) has emphasised the importance of understanding ‘stylistic behaviour’, focusing on the fundamental idea of style as non-verbal communication to negotiate identity. In contrast to the idea of style as a neutral trait, this approach argues that it plays an active role in the negotiation of power, the expression of social boundaries, and the reinforcement of social differentiation in terms of both group and individual identity (ibid: 10; see also Wiessner 1983; Wobst 1977, 1999). Despite the diverse range of definitions for style evident either explicitly or implicitly in the archaeological literature, Wiessner (1990: 108) has emphasised what she sees as an underlying unity in terms of the role of style role in expressing and creating identity. Drawing on Hodder's idea of a 'way of doing' (1990b), style is seen as a means of "non-verbal communication through doing something in a certain way that communicates information about relative identity" (Wiessner 1990: 107; see also Wobst 1999). Identity and social difference need not be linked simply to social groups, social interaction, chronology, or function, but could also reflect subtle variations in, for instance, the context in which style was created and used (e.g., see Conkey 1997). Wobst (1999: 120) also noted that through his career his understanding of style became increasingly encompassing and broad, rather than more tightly defined. This inclusiveness provides a useful basis from which to commence new studies, particularly one where we have so little control over which types of 'style' might, for example, reflect chronological, regional, or context-specific variations.

Thus, the literature presents numerous theories regarding the nature of style, the social conditions it is capable of expressing, and the relationships it is capable of negotiating. However, it becomes very difficult on a practical level to test these ideas using actual (prehistoric) archaeological data, mainly as we have restricted access to information that will enable the most likely source(s) of stylistic variation to be identified within the given range of possibilities. Unsurprisingly, Wobst (1999: 119) has noted that experiments with archaeological data are only rarely used to test (rather than promote) our theoretical understandings. In interpreting the variation apparent in a given assemblage, we are reliant on contextual information to determine what was being communicated, since this cannot be gleaned from "patterns of similarity or differentiation alone" (Wiessner 1990, 108, see also Plog 1990, Davis 1990). The variation evident in Atlantic rock art may reflect a wide range of social issues. Untangling these varying issues, and identifying which types of stylistic variations correspond to them, is likely to be a complex process. It is here that the integration of information gleaned from contextual studies such as landscape modeling and observations, geophysical survey and excavation presented in previous chapters might prove beneficial. This chapter focuses on exploring ways of identifying, documenting and analysing stylistic variation in Atlantic rock art, and integrating the patterns of variation with the contextual information gleaned from the studies of rock art's archaeological and landscape context. In future work it will be important to develop these analyses more thoroughly, and to explore which types of social identity the variations are likely to have reflected and / or created in more detail.

From Layton's (1991a) perspective, there is little optimism that we will be able to interpret rock art motifs from areas where ethnographic information or living informants are unavailable. Although some interesting work has recently been developed comparing Irish rock art and Australian Aboriginal Panaramitee art (Martin 2003), in the absence of direct ethnographic evidence for the role of rock art in Ireland and Britain, most work has relied more heavily on what Chippendale and Taçon (1998) have termed 'formal methods' of analysis. These approaches look to the formal qualities of the designs and panels themselves, and often investigate variation via the quantification of motifs or by documenting their presence and absence. Whilst these methods may not always seek an interpretation of the art in the sense of a ‘translation’, they do seek an understanding of *how and why* rock art produced meaning. More recently rock art researchers have also begun to explore the ‘generative grammar’ (Chippendale 1992, see also Layton 1991b, Tilley 1991, Purcell 1994) apparent in many bodies of rock art. Such approaches acknowledge the importance of structural principles, which play a key role in the production of meaning (e.g. Tilley 1991, 1999). Before addressing some of these formal methods of analysis in more detail, some fundamental assumptions regarding the nature of rock art, and the significance of formal variation need to be explored.

As highlighted in the ‘is it art?’ debate (Heyd 1999, Layton 1981: Chapter 1), we cannot assume that rock art was viewed during prehistory in the same way we view ‘art’ in the modern sense of the word, and indeed it most likely was not (Conkey 1996). The approach taken here is that rock art is a potential vehicle for style in the same way that other types of material culture, from stone axes to megalithic monuments, potentially carry stylistic information. However, though we may now understand rock art as a phenomenon that differed significantly from our modern conception of art, the notion of aesthetics, and the range of reactions invoked by aesthetic qualities, may still be relevant since these reactions carry social implications and inform social relations (see Gosden 2001; Gell 1992). It has been argued that aesthetics can be used to express identity, particularly in the promotion of positive self and group image:

“Style may not be the most efficient way to send a message in terms of cost, but it is often very effective. One factor that adds to its effectiveness is the fact that it can be a form of visual art and thus play on aesthetic perception in sending a message.” (Wiessner 1990, p106)

It is the “attention binding” and “aesthetically rewarding nature” (Eibl-Eibesfeldt 1989: 673 in Wiessner 1990, 106) of particular forms of material culture that is recognised as being able to enhance the effectiveness of communication, and invoke certain reactions in the viewer. Gell (1992) has referred to this phenomenon as the ‘enchantment of technology’. Bradley (1997, 74) has described the “visually arresting” effect of the multiple concentric rings found in British petroglyphs. Repetition, density, symmetry, detail, and scale might each have contributed to the effectiveness of Atlantic rock art as a communicative device, and it is possible that some of these qualities were recognised (directly or indirectly) in the past as a means of reinforcing the message(s) conveyed. The skilful arrangement of motifs in response to the natural features of the stone, and the use of an appropriate (delimited) series of designs, might also be seen as carrying aesthetic value (see Gosden 1999: 176-7, 2001; Pollard 2001). These qualities might also have served to emphasise differences in social identity between and within a range of social groups - those who made the rock art, those actively involved in using the locations or perhaps even in some sense ‘commissioning’ the carvings, those permitted to view the carvings or possessing knowledge of their locations, and those whose access to them might have been restricted. If so, it is possible to imagine that the degree to which the rock art was imbued with different aesthetic qualities might have varied through both space and time, and in a context-specific manner. As noted by several authors (Thomas 1996, Wainwright and Longworth 1971, Evans 2003) the spiral and circle motif is prevalent across a wide range of cultural materials and architectural designs of the Neolithic and Bronze Age. According to Thomas, whilst traditions such as megalithic art, grooved ware, carved stone balls and chalk drums are not necessarily found in direct association with great frequency (as a kind of 'cultural package'), their occurrence can be interpreted as "a series of overlapping and mutually referential artefact traditions" (1996: 156). Thus, aesthetic qualities should be viewed as relevant to a stylistic analysis of rock art. As described below, the compositions, motif types, carving techniques and even the dialogue between the carved motifs and the stone 'canvas' all lend Atlantic rock art panels particular aesthetic qualities.

Approaching petroglyphs in Ireland and Britain

As noted above formal variation is evident at a range of levels within the Atlantic rock art corpus. Yet, embodied in the widespread use of the term 'cup-and-ring art', is a tendency towards the oversimplification of motif variation in studies of rock art in Ireland and Britain. Dowson (2004) has wisely recommended abandoning this term due to the reductive image it presents to both archaeologists and others, and its "debilitating effect" on research. When viewing a range of rock art sites it soon becomes apparent that a substantial amount of variation is present within the corpus. In some cases, the addition of a single site to a regional inventory will entail the addition of a new motif class to a classificatory scheme, as panels can feature motifs that are rare or even unique to the area. This capacity for endless novelty is also a feature of megalithic art (Eogan 1986), as well as the art practices of contemporary non-western communities (e.g. Küchler 1987).

There are no precedents of a motif analysis as detailed as that presented here for rock art in Britain and Ireland. As a result we know little about the extent of the variation or the nature of its spatial distribution, and it therefore seems appropriate to be as inclusive as possible in terms of the types of variations we are investigating, hence the investigation of three different kinds of formal variation here. It is quite possible that any motif analysis applied to this material will produce results that include chronological variation, variation relating to social groups, variation introduced by individual carvers, and differences reflecting the different functions or messages being conveyed by different panels in different landscape contexts. One would be ill advised to assume that these can be identified and separated out at this stage in the proceedings.

In Ireland and Britain we currently have a relatively poor grasp of rock art chronology in general, let alone the potential chronological variations that may be present *within* the rock art corpus, with the exception of the interrelated traditions identified in Chapter 2. However, we are beginning to understand rock art as a form of expression that was practised and retained some significance over an extended period of time. Panel clusters in particular areas, and even individual panels themselves, may well represent palimpsests, rather than a single creative event. Waddington's (2004a) recent work demonstrates a clear argument for the creation of groups of motifs on the Hunterheugh Crags outcrop as a practice that occurred over a series of different phases. In spite of this, there are strikingly few examples of superimposed motifs that are so common in other bodies of rock art (see Chapter 2). There has also long been the suggestion that the carving of simple cup marks, which tend to occur in a much wider range of contexts than other rock art motifs, may be both a considerably more ancient practice, and also may have continued over a much longer duration than the classic 'cup and ring' form. As explored in Chapter 2, cup marked stones have frequently been approached as if they represent an entirely separate tradition (Morris 1989; Johnston 1989), and they are commonly differentiated in distributional studies (e.g. Morris 1977: 2). We also have possible chronological indicators in the form of monuments that incorporate rock art. However, as discussed in Chapter 2, there is still no unequivocal evidence for the carving practice entirely predating, post-dating or being contemporary with the monument construction phase, and the circumstantial evidence currently points towards the idea that all three scenarios occurred.

As in the analyses in previous chapters, the issue of chronology represents a major weakness in our ability to interpret motif variation. However, as elaborated below, motif variation may also help us to formulate chronology-based questions for future research. These glimpses of the potential longevity of rock art as a practice, and the evidence for repeated carving events at single locations, suggest that we cannot rule out the very real possibility that formal changes in the motifs occurred through time, for a variety of reasons. However, we also need to be wary of reverting to a cultural-historical approach that rigidly and simplistically equates formal differences with chronologically or culturally diagnostic traits (e.g. Shapiro 1953: 288, see also Schaafsma 1985: 246).

It seems then that a motif analysis of this corpus of rock art must remain open to the potential range of possible social conditions responsible for formal variation. It might be possible to describe some of these conditions more closely, whilst those that are more complex will inevitably remain ambiguous. Partly because this analysis traverses new and unfamiliar territory, it does not seem particularly useful at this stage to select one definition of style (e.g. as indicative of cultural contacts, or of chronological trends) over another simply because it will enable the analysis to 'prove' a point. As ethnographic and anthropological work has demonstrated, style is capable of conveying a series of layered meanings, and our interpretations as archaeologists will always be partial. Even if they are correct, they may in fact reflect an ideal reality (e.g. in relation to social organisation), rather than actual reality (Bradley 1997, 11, 131).

Although criticisms of the 'high Structuralism' advocated by Conkey's "capital S Structuralists" (2001, 276) have rendered the approach untenable in view of the current interest in plurality or multiplicity of meaning and historical specificity, a readily identifiable legacy remains – that of the “little-s” structural approaches to analysis (ibid. 285). What follows here probably falls into this category in many respects since, though the analysis does not attempt to tie specific meanings to specific forms, analysis of the patterns in motif combinations and ‘grammatical’ relationships are investigated as a kind of first step towards untangling the dizzying array of variation present in the rock art corpus, in search of an underlying structure or set of rules. The analysis works on the assumption that the spatial distribution (whether at the panel level or the landscape level) is structured rather than random, and that particular messages were being communicated using certain motif combinations and compositions at certain places in the landscape for specific reasons. This opens up exciting ways of thinking about future research, and allows for more detailed theories about the manner in which people engaged with these sites to be explored and investigated. The useful nature of a question-and-answer based dialectical approach to rock art has been argued by (Tilley 1991). Though it is not assumed that the ‘types’ identifiable to the archaeologist are necessarily representative of types that were meaningful to the producers of the carvings, this approach opens up the material, allowing questions regarding potential patterns in spatial variation to be posed and answered.

Because Atlantic rock art is not characterised by a series of readily identifiable styles with a known (e.g. chronological or regional) interpretive significance, the corpus represents a major challenge for motif analyses. In light of this, the investigation of ‘grammar’ has a special relevance for British and Irish rock art (see Purcell 1994). This approach emphasised the importance of looking at design structure, rules, and “assemblages” of motifs, rather than individual motif types (Bradley 1997, 42-3; see also Tilley 1991). These analyses inevitably lead to comparisons with linguistics drawing on the idea that material culture can be ‘read’ like a text. It is tempting to view the motifs as a language within which meaning is created and dynamically altered through subtle grammatical rules and compositional structures – words are combined and ordered so as to communicate specific meanings, and they become versatile building blocks from which statements can be made. However, Conkey (1990, 11) has pointed to the potentially restrictive effect of envisaging style as possessing a textual quality:

“This literary metaphor – style *as if* communication – thus encourages and perpetuates both analysis and interpretation that emphasizes style as speaking to us, rather than also encouraging our inquiry into the particular historical contexts of how and why style may have been not just a means whereby social marking may have taken place (as is assumed in the first place), but how and why style *was* social marking in those contexts, and in the particular media, forms or attributes so observed” (Conkey 1990: 11, original emphasis)

If we can look at the conditions that evoke the use of style to signal differences and similarities in the social significance of places, then Layton’s (1991a) point (see above) regarding the critical role of ethnography in our ability to interpret stylistic variation becomes less debilitating when dealing with assemblages where this information is not available. This emphasises the importance of relating stylistic analysis back to the contextual studies presented in Chapters 2-5. It also brings the definition of the anthropological art object as defined by Gell (1998: 7) to the forefront, whereby the “art object is purely a function of the social-relational matrix in which it is embedded” and “has no ‘intrinsic’ nature, independent of the relational context”.

Previous approaches to motif classification

Establishing an explicit, rigorous and widely applicable means of documenting motif variation is particularly important for Atlantic rock art. Currently, any researcher analysing a new area can draw on the range of current classifications established for other areas, but will undoubtedly find that some classes are not relevant, and additional classes are needed. In addition to this, it is apparent that the current methods of classification may fail to express some of the more subtle variations in the actual morphology and design structure of the motifs themselves, and in the compositional characteristics present.

A range of approaches can be identified in the previous literature. Morris (e.g. 1977, 1979) and Van Hoek (1987, 1988) have investigated the occurrence of particular motif types and particular motif associations across space. In his Donegal work, Van Hoek (ibid) identified a series of motif categories and their possible variations, and compared their frequency between different areas, notably Mevagh and the Isle of Doagh, as well as other parts of Ireland and Britain. In doing so he identified a number of regional trends, such as the lack of grid motifs in Donegal (1988: 40). He also compared the number of rings on cup and ring motifs between Mevagh and the Isle of Doagh. Similarly, Morris investigated the varying distributions of particular forms, such as double-ringed cup and ring motifs, gapped rings or radial grooves (1977). Here, Morris also plotted the spatial distribution of the motifs allowing the shifts in motif occurrence across space to be addressed, and emphasising the very different spatial behaviours of various motif types, such as plain cups versus ‘Boyne types’ (ibid: 23, 26). However both of these approaches focus on individual motif types, and as a result have tended to neglect variations in both the combination of motifs occurring on individual panels and their composition or ‘grammar’.

Johnston (1989: 59-97, 1991a: 86-9, 1993: 261-4) classified Irish motifs into four primary categories; cups, cup and rings / circular motifs, linear / rectilinear motifs and ‘other’ unclassifiable motifs, and compared their frequency in Ireland. Whilst an overly complex classification might in fact obscure meaningful patterns, the reduction of a wide variety of motifs to just four classes seems highly likely to have obscured significant variations. For instance, Johnston noted that her ‘circular motif’ category included cup and rings, cup and rings with radials, rosettes, keyhole motifs, and motifs with between one and ten concentric rings (1993: 262). The overall frequency of particular motif types was compared, with some consideration for motif associations (e.g. cups and cup and rings), and design variation across boulders, outcrops and standing stones (1989: 353-78). Using this approach, the focus falls on establishing general trends for Irish rock art as a whole as a way of understanding the intentions of the carvers (e.g. whether the compositional linking of motifs was intentional rather than due to the use of small or densely carved surfaces) and the broad degrees of variation present (1989: 94). In addition whole categories of motifs (linear forms, cup marked stones and those motifs classed as 'other') were excluded from many of Johnston's analyses (see 1989: 15-17), primarily owing to concerns over the date of these forms and our ability to distinguish them from similar natural forms on stone surfaces. Unsurprisingly this overly simplistic motif classification leads to the conclusion that "in general, none of the observed variation in motifs or in surface configuration seemed to have any consistent spatial patterning" (1989: 317). This is ironic given that Johnston (1989: 96) also noted that linear motifs were more frequent in Donegal than anywhere else in Ireland, and as emphasised later by Purcell (1994: 103), they are also a major feature of the Iveragh Peninsula rock art.

Purcell's (2001) detailed and sensitive study of specific rock art clusters on the Iveragh Peninsula, County Kerry, moved on from these previous studies by highlighting the importance of composition and grammar, following Tilley's work at Nämforsen (1991). This work approaches rock art compositions as 'text', comprised of syntagmatic chains that can be thought of as comparable to sentences, where it is the sequence and association of particular words, or in this case motifs, that allows the formation of meaning. To apply these ideas to the abstract art of southwest Ireland, Purcell recorded the presence and absence of 24 motif types across each panel within particular valley groupings (1994: 107-9), and compared their occurrence and associations. The results highlighted the local distinctions and idiosyncrasies between different rock art clusters, and the exclusivity of particular motifs to particular areas (e.g. the rosette in Derrynablaha, or the keyhole in Coomasaharn) (ibid: 142-3). Purcell (ibid) also identified the frequent occurrence of paired multi-ringed motifs, and the tendency for some designs to occur on a mutually exclusive basis (e.g. the cup and ring versus the cup and ring with radial). Interestingly, a repeated pattern whereby particularly elaborate carvings were situated in isolation (e.g. at Maulagallane, Ballinahowbeg, and Dromtine) was also observed (1994: 143, 161, 2001: 89). As noted below, this situation is also apparent in the study areas investigated here. In contrast to Bradley's work (1991), Purcell found that simple and complex types were not limited to particular parts of the landscape, noting that this binary classification represented a considerable oversimplification of the actual variation apparent within the Iveragh Peninsula rock art (1994: 145). In this way she established that on the Iveragh Peninsula there was more motif variation between the panels in different valley systems than between particular zones of the landscape. Whilst the classification scheme employed was successful in the analysis of the Iveragh sites, and represented a relatively detailed and inclusive series of types, it would, for instance, be impossible to classify many of the Inishowen panels on the basis of Purcell's 24 classes (1994, 106; 2001, 72).

As described in Chapter 1, Bradley (see 1997) has developed a framework for integrating landscape and motif analysis in a manner that is highly sensitive to both the subtle patterns in the rock art corpus, and the dynamic interplay with the surrounding cultural and natural landscape. By investigating patterns in rock art location and design variation, the importance of audience was also brought into focus (Bradley 1997, 9, 78, 120), along with connections to particular parts of the landscape (upland / lowland, settlement / hinterland / monument complex, routeway / viewpoint). In much of his work Bradley (e.g. Bradley 1991, 1996, 1997: 77, 128-31, 101-4) has focused on distinguishing between ‘simple’ and ‘complex’ panels. Simple panels are defined as those featuring only single or double ringed motifs, and lacking in linked design elements and motifs from megalithic art, whilst complex panels feature motifs with three or more concentric rings, and are more likely to exhibit linking design elements and motifs from megalithic art (Bradley 1997: 128-31). In addition to this binary classification, increasing complexity was also explored via the investigation of shifts in exact numbers of rings in cup and ring motifs across individual panels (1991). In some cases, the number of rings increased with the panels’ increasing proximity to monument complexes.

The binary opposition between simple and complex rock art would seem to oversimplify the situation in Dingle, Inishowen, and Louth / Monaghan, as also noted by Purcell with regard to the Iveragh Peninsula (1994: 145). Though there does seem to be a distinction in the Inishowen Peninsula between cup marked and other panels, the same cannot be said of the Louth-Monaghan area, which currently features only one simple cup marked stone. Rather, across the three study areas a continuum between different types of ‘simpler’ through to ‘more elaborate’ compositions is apparent. Perhaps having recognised this problem, in later work Bradley (1997: 128-9) developed a more nuanced classification system, and elaborated on his earlier scheme in order to acknowledge more subtle variations within the ‘complex’ category. Here he defined six panel types, based on their design grammar, emphasising spacing and degree of linkage between the motifs as key criteria (1997, 128-9). While this classification scheme was not put forward as a strict typology, it sought to describe the grammatical rules that apparently underlie the panel compositions, which seem to have been restricted to or directed towards particular kinds of motif arrangements (1997, 128).

Classification – problems and challenges

Numerous authors have discussed classification as a concept that archaeologists *impose* on material culture. Layton (1991a) has described classification as both culturally and individually arbitrary. As Francis (2001: 226) notes, “stylistic sequences of prehistoric rock art defined by modern analysts do not represent something that is intrinsic to the rock art itself. More often, these sequences represent individual perceptions of overall aesthetic appeal imposed upon a panel or series of figures. At this most basic level, we must question whether stylistic definitions based upon qualitative assessments of aesthetics can be assumed to represent culturally meaningful phenomena” (Francis 2001: 226).

Chilton has emphasised the benefits of defining theoretical units (dependant on the means of measurement and the scale selected) for use in positivist approaches, over empirical methods (1999: 44). Empiricist models aim to ‘discover’ an underlying system of artefact classes via intuitive or statistical methods, classes which tend to become canonised in the subsequent literature. Meanwhile, positivist approaches begin with defined research questions and hypotheses on the basis of which specific attributes are targeted for investigation. The latter acknowledge that the units are ‘real’ only in the mind of the researcher, and that any answers achieved and classes defined in the analysis are a direct product of the attributes or criteria selected, and will therefore vary depending on the purpose of the analysis.

Discussions of archaeological approaches to classification have distinguished between non-classificatory, taxonomic and paradigmatic systems (Dunnell 1971). In non-classificatory schemes (ibid), types are described rather than defined on the basis of the attributes of specific groups of specimens. This is problematic, as they tend to be historical and contingency-bound, in turn stifling variation, and restricting their application to new assemblages. In taxonomies (ibid), classes are created through a systematic series of hierarchical oppositions. As a result the classes are not equivalent, and may overlap in certain traits. This can lead to classificatory errors unless the hierarchical ordering is strictly adhered to, and again the comparison of different assemblages can become difficult. In contrast, in paradigmatic systems (ibid) the selection of particular attributes for classification purposes is based on hypotheses as to the function of the classification. Therefore, the class definitions, formed by the intersection of various traits, are problem-oriented rather than assemblage-specific, therefore facilitating their application to new assemblages. This makes for an economical means of classification.

Paradigms are distinguished by a series of characteristics (Allen 1996: 101): “each class is defined by the same set of criteria (e.g. if size is an attribute then this is considered for all types not just some); the attributes are not weighted: no feature is more important in type separation than any other; the modes are mutually exclusive: only one value can be displayed at a time; and the modes are exhaustive: one value must be displayed”. In this way, all of the classes are equivalent and comparable, there is less ambiguity between them, and yet they can be expanded to take into account an infinite range of variability (ibid). Clearly, paradigmatic classifications are the ideal systems for investigating stylistic variation. However, one of the problems with determining a paradigm or series of paradigms for the Atlantic rock art tradition is that we currently have few hypotheses as to the purpose of specific attributes, with the exception of general ‘complexity’ as a signifier of audience. As shown in Chapter 1, this hypothesis is already replete with ambiguities and inconsistencies. Furthermore, as highlighted in the present research, different variations may reflect conflated issues. For example, simple versus complex panels may reflect chronological shifts, audience differences, the specific role of particular locales, or a combination of these characteristics.

Thus, whilst it is possible to consistently identify different types of panels based on composition and motif range, and to consistently identify particular motif types, it is far from clear what they may signify. Because of the embryonic state of motif analyses for Atlantic rock art, it is currently very unclear as to how we should best classify the panels. In this way, it is currently difficult to propose the hypotheses required by paradigmatic classifications, other than in a very broad way: that composition, motif range, and motif type worked together to convey different messages. These can be expected to have varied across time, between regions and locales, and according to the different roles of different panels or locales. Thus the interpretation of the significance of these classes relies partly on their spatial behaviour. Because we currently lack a defined series of chronological indicators, we cannot successfully identify stylistic variation that reflects chronological distinctions. However, based on the analyses presented in Chapter 3, we *would* expect the frequency and type of the classes, and the presence of motifs to vary between the different study areas as a means of expressing regional identity, and between different locales as a reflection of their different roles, or association with different social groups. Also, if the identification of regional clusters versus dispersed panels in Chapter 3 is at all meaningful, we would also expect to see class and motif variations between the panels in these two different contexts.

New approaches

As outlined above, this chapter presents three separate new approaches to motif analysis. This work is highly experimental and represents the least resolved, and most problematic, of the various analyses presented here. In some ways what follows here is an experimental play with data to begin to ‘feel’ out an understanding of it. I begin here by openly acknowledging that there is currently no way of knowing whether the classifications presented below ‘mean’ anything at all, since, for this to be the case there are numerous underlying assumptions, many problematic, that would have to be accepted (see below). The objectives of the motif analyses presented here are firstly to acknowledge the extensive range of very subtle variations present within the Atlantic rock art corpus, and secondly to investigate whether a readily applicable approach to classification can be established to facilitate interregional comparison in a meaningful way, something that has seldom been attempted in a detailed manner in previous work. Thirdly, the potential utility of integrating the results with the GIS is illustrated using worked examples, demonstrating the ways in which variation across the landscape can be explored at a range of different levels and scales.

In the first approach presented below, each class of panel is defined on the basis of both composition and range of motif types, and these conform to the four basic requirements of a paradigmatic classification listed above (Allen 1996: 101). In the second approach presented below, a set of attributes is defined. This allows individual panels to be analysed in terms of the presence and absence of these traits. This classification method relies on both design elements and their grammatical behaviours and it is therefore hierarchical – a feature of taxonomic classifications. For example, a panel may or may not have cups, and these may or may not have other 'behavioural' attributes, such as a linear arrangement, and individual panels may display all, none or some of these attributes. As noted above, this leads to ambiguity in assigning the panels to specific classes – not an ideal result according to those favouring paradigmatic approaches, and an inherent weakness in this particular scheme as it currently stands. However, further paradigmatic classifications can potentially be devised on the basis of these attributes in future work, as we refine our hypotheses as to the purpose of specific traits. For example, if the hypothesis is that the number of rings is related to increased complexity reflecting the different roles of different panels, the data can be used to define classes of panels on the basis of the maximum number of rings present. In this attribute-based classification there is currently no assumption that the types were meaningful to the makers, or that they reflect chronological or cultural differences; they are defined purely by the investigator. It is also possible that in future work, the separation of 'design elements' and 'structural principles' (after Conkey 1980) may prove useful.

Defining the unit of analysis

The unit of analysis in rock art studies can be at the 'site', panel or motif level. The unit of analysis used in this study is the rock art 'panel' (see Table 11). This allows variation both within and between what might be thought of as 'sites' or panel clusters to be investigated. In comparison with many Scandinavian rock art sites, the relatively small size of rock art panels in Britain and Ireland makes the identification of individual surfaces relatively straightforward. Individual motifs seldom continue across major breaks in the stone, which provides a little reinforcement for the idea that the breaks we use today as a basis for identification may have held some significance in the past. In the case of large outcrops with petroglyphs occurring on more than one face (e.g. Drumsinnot; see Figure 6.1), the added requirement that all the motifs can either be viewed simultaneously, or are compositionally connected, aids the analyst in identifying separate panels. There was just one case that posed a problem in terms of defining the unit of analysis. In the Drumirril nexus one panel is unusual as it features petroglyphs on three of its surfaces, and is a relatively small piece of outcropping rock. On the basis of the definition requirements this was divided into three panels, recognising the fact that it would be difficult to establish a cut-off point for panel size to be used as a defining criterion.

Motifs themselves can also be somewhat difficult to define in some cases. The majority are spatially separated from one another, aiding in their identification for classification purposes. However, some panels can feature a tangle of interconnecting elements, and it can be difficult to define where one motif begins and another ends. This is not necessarily a problem to do with imprecise definitions, but rather a characteristic of the rock art – the forms appear to deliberately intermingle in a highly organic and ambiguous manner. This can be observed in a more obvious way in the representational rock art at Nämforsen (Tilley 1991), where elk antlers sometimes transform into boat-like forms. In the British and Irish material a similar effect is created using abstract symbols so that a single element can be used in more than one way. For example, a radial line can extend to take its place in one of several parallel grooves (e.g. Figure 6.2), the radial line of a multi-ringed motif can curve around a small natural depression to create an additional cup and partial ring (e.g. Figure 6.3), and a small cup and ring can be directly joined to a larger multi-ringed motif by virtue of its radial intercepting the larger motif's outer ring (e.g. Figure 6.4) – where does one motif begin and another end? For this reason, noting the presence and absence of attributes (as demonstrated in the second approach here) can be useful, since this does not require linked designs to be separated out into distinct individual motifs.

There are several problems that need to be kept in mind when it comes to classification and the unit of analysis. One of greatest areas for potential error is that classifications of Atlantic rock art assume that the exposed panel size visible today is equivalent to that originally experienced by the carvers, and this might not be the case. It also deals only with what might be an end product of a series of carving events. Although attributes and classes may well have chronological values, this is largely undocumented at this stage. It is through necessity then, that the motif analysis conducted here investigates the 'finished product'; the final composition. It is possible that a more chronologically sensitive analysis could be conducted if a significant sample of chronologically varied panels could be securely identified in the future. As explored further below, the observations made in the third approach presented here render this a possibility for future work. A further problem is that differential weathering in some cases renders particular types of motifs difficult to identify. This is particularly pronounced in 'dimple' forms and dispersed pecking. As a result, it is likely that some subtle motif variations have not been successfully identified on highly weathered panels.

Recording method

Documenting any archaeological feature involves a degree of subjectivity on behalf of the recorder. This is even more notable in the case of recording Irish petroglyphs. The recorder is dealing with fairly shallow and often highly weathered undulations across a rock surface, which is often encrusted with lichen and moss. The visibility of the motifs is highly dependant on lighting conditions, time of day, and weather, with the application of distilled water often optimising the visibility of the carved forms. As noted in Chapter 2, the effect of the microbiology of the stone on visibility is emphasised when it is possible to view a panel that is usually covered with turf. The 'cleaning' effect of being covered in soil, preventing plant life from taking hold, often reveals subtle details down to individual peck marks – detail which can be crucial in detecting the presence of particular motifs, such as dispersed pecking. Added to this is the tendency for rock art recorders to hone their skills in detecting subtle forms and irregularities in design, simply through experience -

something that can only be gained gradually via the patient inspection of many panels. Multiple visits under different weather and lighting conditions can improve the situation.

A key question posed during the proposal phase of this project, was whether published motif plans could be relied upon for detailed motif analysis. For Louth and Monaghan, Van Hoek had completed drawings of some key sites, notably for Drumirril (n.d., 1997) and Ballinloughan (1985). These plans were generally found to form a good basis for analysis, though it became difficult in some cases to distinguish between natural fissures and depressions, and pecked motifs. Nolan (1999) had also traced and included drawings of many of the Louth and Monaghan stones. Unfortunately, following comparison with the panels themselves, many of these drawings were found to be erroneous in terms of scale and composition, the latter due to the accidental inversion of the cellophane tracings, probably during the reduction process. Despite the lengthy written descriptions included in Johnston's (1989) inventory, it also proved impossible to use this descriptive text as the basis for the motif analysis developed here, largely due to the difficulty of envisaging compositional relationships without the aid of drawings or photographs. Analysis at this level of detail necessitated the availability of clear and detailed motif plans, ideally recorded consistently by one researcher.

Because of the difficulties with the existing sources, and the number of stones for which drawings remained unpublished, new motif plans were recorded for as many of the Louth / Monaghan panels as possible (excluding destroyed and buried panels). As a result of previous experience experimenting with rock art recording techniques and also conducting commercial building surveys, a unique approach dubbed 'epigrammetry' was devised for this study so as to allow detailed and accurate motif plans to be attained (see below). This approach to recording was used for the Louth Monaghan study area. In the Dingle and Inishowen study areas Finlay's (1973) and Van Hoek's (1987, 1988) published drawings formed the basis of a ground proofing exercise for the majority of panels. For the Dingle Peninsula, the majority of the panels had been recorded in a highly accurate and successful manner by Finlay (1973). In these cases an enlarged copy of Finlay's plan was taken to site for direct comparison with the panel itself. This proved to be instructive in some instances and slight changes were made to the published plans. However, very few changes were necessary overall, indicating the high quality of this work. A few newly discovered panels were also recorded during the Dingle fieldwork using the epigrammetric technique, and in a small number of cases antiquarian drawings and chalked photographs were the only available source for destroyed panels or those that could not be successfully located. In future work, it will be important to address the potential problem of whether these various recording sources have introduced their own variations as an artefact of the documentation process more closely.

In Donegal, a huge number of panels had been recorded and described by Van Hoek (1987, 1988). However, motif plans of those featuring only cups had generally not been recorded. Owing to the sheer number of these panels, it quickly became apparent that recording these cup marked panels as part of the present project would not be feasible. An approach was settled upon, with some reluctance, to ground check all of Van Hoek's published plans. Where errors or omissions were identified, copies of Van Hoek's plans were annotated accordingly. Wherever plans had not been made for panels featuring more than cup marks, for example for newly discovered panels, these panels were fully recorded in the field. The fact that cup marked panels were not ground checked remains problematic. In some cases, new cup and ring motifs, often highly weathered, were identified on previously published panels during the field work for the present research, for example at Altashane, Ardmore and Magheranaul (cf. Lacy 1983: 74; Van Hoek 1988: 24, 43). Thus, it is possible that a small number of panels published as exhibiting only cup marks in fact feature more complex motifs. Several previously unrecorded panels were also identified during the Inishowen site visits and it is likely that systematic survey would identify a significant number of further panels in the future. Thus, a considerable amount of motif detail will remain unacknowledged until further recording work can be conducted on the Inishowen Peninsula. At the very least, the detail of the presence and absence of many attributes which are possible in 'cup only' panels remains, at present, invisible for the Inishowen area, and has restricted the motif analysis conducted here. Though outside the scope of the present study, this emphasises the importance of developing the motif plans recorded as part of this project into professional archaeological illustrations so that detailed inventories comparable to Finlay's (1973) work can be built for these areas. It also indicates that much more field recording work is required in the future.

This new recording technique developed for this project combines epigraphic survey, a method tested on rock art in West Yorkshire during the Rock Art Pilot Project (1999), with a very basic form of photogrammetry using a portable purpose-built meter square grid. First the panel is photographed with the meter square grid lying parallel against the decorated surface, and the aperture set to Fstop 50 or below to ensure no distortions creep in due to the use of a wide-angle view (Figure 6.5). Multiple photographs may be required for large or undulating panels. Second, the developed print (the larger the better) is then brought back to site and an ink pen (such as the Rotring brand) is used to outline the motifs onto the surface of the photographic print (Figure 6.6). These outlines, as well as natural features, can then be digitised and calibrated using AutoCAD software and a digitising tablet in order to correct for any distortions in the photographic image, and create a finished scale drawing (Figure 6.7). There is then the option to create a finished ink drawing of the panel that follows standard archaeological illustration techniques for artefact drawings (Figure 6.8).

The disadvantage of the technique is that (unless a top of the range digital camera and high quality printer are available on site) two site visits are required. However, this can often be necessary in terms of ensuring that the weather and lighting are adequate for photographic purposes, and can also be useful since observations of the same panel under different conditions can reveal new information. In addition, knowledge of drawing software is required to calibrate the motif plan from the epigraphic drawing to an accurately scaled two-dimensional plan. Lastly, the technique reduces one view of the panel (preferably perpendicular to the surface) to a two-dimensional plane. Whilst this was found to be well suited to the study areas in question, this would not be the case for all rock art regions, particularly of the decorated surfaces are highly convex or concave in form.

Though long-winded, this process optimises time in the field (a major benefit for this project), and is notably quicker and giving better immediate results than attempting to produce an accurate measured drawing by hand, or using the cellophane tracing method. The latter technique can be hampered by the elements (rain and wind can be disastrous) and by the time-consuming process of reduction back in the office, particularly for large panels requiring multiple sheets. The need to view the panel *through* the cellophane sheet can also be difficult in some lighting conditions. Unlike rubbing methods, the technique used here is also almost entirely non-contact, other than the need to rest the square itself gently against the panel surface, and allows the direct interrelationship between the carvings and other subtle characteristics of the stone (such as fissures) to be observed at leisure, back in the office.

Spatial aspect

The first two approaches to classification have resulted in databases that can be directly linked to the GIS, and this would also be possible for the data relating to the third approach. This renders the exploration of stylistic variation in response to a range of landscape characteristics and archaeological datasets an achievable task, and allows patterning at multiple scales to be addressed. Spatial patterning in the series of classes employed in the first approach are investigated via a series of worked examples from the Louth / Monaghan area. Using the results of the second approach to classification, examples from both the Inishowen Peninsula and the Louth / Monaghan area are presented, since these two areas exhibited quite different types of formal variation with their own distinct spatial patterning. Though this work could not be fully developed and interpreted within the confines of this chapter, the preliminary results indicate that this may be a powerful means of resolving the impenetrable detail and variation of these abstract compositions, and relating this to the landscape context. Clearly, such work could also readily be applied to other types of material culture. This level of detail is rarely attempted in GIS studies, but should prove fruitful well beyond the sphere of rock art analysis, for instance in studies of architectural monuments and a broad range of material culture.

Approach 1: Classes based on composition and motif range

This approach deals with panel classes that are defined on the basis of panel composition and motif range. The very concept of ‘panel types’ comes from viewing a wide range of panels and observing how ‘different’ some appear from others. While some consist of large arrangements of widely varying, complex and interlinking forms, others consist of a line of cup marks. This approach was born out of the desire to establish a classification system that would be readily applied to all panels, and all study areas across Britain and Ireland. This method is a somewhat classic approach to rock art classification whereby inductive observations as to the composition and quantitative assessment of motif range allow different classes to be identified. In this way it is a highly subjective approach, as it relies on the viewer's perception of the composition, which, as Layton (1991a) has noted, is both individually and culturally constituted.

By taking into account the different approaches to spatial arrangements of motifs across individual panels, this bears some resemblance to Bradley's (1997: 128-31) later classification scheme, where widely spaced, closely spaced and abutting motif variations are distinguished. However, the importance of 'linking' and 'subdividing' grooves in Bradley's (ibid) system was found to be less applicable to the three study areas investigated here. As a result, this does not form a defining criterion in the approach devised here. The approach is also related to some of the classes proposed for megalithic art (Shee Twohig 1981; Eogan 1986). The ability to compare rock art and passage tomb art in this way represents a distinct advantage, particularly given the contemporaneity and ambiguity between the two traditions, as highlighted in Chapter 2. Here, the classification also introduces the degree of motif variation, to separate panels exhibiting a single dominant motif type, limited types and varied types. Again, whether these distinctions would have meant anything to those who produced the rock is far from clear. However, the scheme does enable similar groupings of panels to be readily identified, and enables the impressions of panels gathered in the field to be ordered in a consistent manner and investigated in spatial terms. These groupings are graded in terms of both motif complexity and compositional complexity.

Table 8 defines six compositional subclasses and three motif range subclasses. These can be combined to produce a total of 17 possible classes. For example 1A denotes panels with dense compositions and a single dominant motif type, while 1B denotes panels with dispersed compositions and limited motif ranges (note that 6C cannot exist by definition). Examples of panels from each class are shown in Figures 6.9 – 6.25. As many of the panels as possible were included in the analysis, using published drawings of destroyed panels, published drawings ground-checked in the field, and panels recorded as part of the present project. Clearly, the possibility that discrepancies have been introduced by using these varied records remains problematic, and will need to be addressed more thoroughly in future work.

As the graph in Figure 6.26 illustrates, there is considerable variation between the three study areas in terms of class occurrence. This confirms Bradley's prediction that variations in composition and structure are potentially regional (Bradley 1997, 11). One commonality is the significant percentage of class 6A panels, simple compositions with a single dominant motif type, in each of the study areas. This reflects the large number of panels where the carvings were probably undertaken over a short period, with little evidence for repeated carving events. Beyond this there are numerous distinctions between the three areas. The Inishowen Peninsula exhibits the widest range of class types (17), though this may simply reflect the larger number of known panels in this area. It is the only area featuring classes 3C (irregular varied), 4A (prominent dominant) and 4C (prominent varied). The latter two classes reflect the presence of large central motifs surrounded by a series of smaller motifs. This type of composition is not seen in the other two areas. The Inishowen area also features a notably high frequency of class 6A (simple: dominant), which primarily reflects the number of cup marked panels in the area. Again in the Dingle Peninsula and Louth / Monaghan area cup marked panels are relatively rare. This is an interesting contrast given the considerable significance of cup marked panels in the British corpus, in both northern and southwestern regions (see Chapter 2). As we shall see, the Inishowen also shares some of its unique motif types with rock art in parts of northern Britain.

The Dingle Peninsula features 11 classes. With the exception of the large proportions of classes 1C (dense varied) and 6A (simple dominant) the panels are spread out in small numbers across the remaining classes. This study area features the smallest number of panels, and the differences between the frequencies of particular class types is predictably less marked. Similarly, in the Louth / Monaghan area only 12 classes are present. The panels cluster into fewer types in this area, notably 1C (dense varied), 4B (prominent limited), 6A (simple dominant) and 6B (simple limited), indicating more homogeneity across the regional corpus than seen in the other two areas. This may be related to the fact that this is the smallest study area in terms of the extent of the distribution.

To illustrate the integration of this qualitative data with the GIS, figures 6.27 – 6.29 display the spatial shifts in panel classes across the Louth / Monaghan area. As Bradley (1997: 119) remarked, and as has been discussed here in previous chapters, the complex cluster of rock art panels in the Louth / Monaghan region occurs on the southwestern edge of the distribution in Drumirril. In addition, one of the most complex individual panels outside Drumirril, a complex seven-ringed motif at Miskish More, occurs at the northwestern extent of the distribution. The use of the classification system based on composition and motif range enables us to investigate this increase in complexity towards the western extent of the study area in more detail. The use of GIS also allows the spatial relationships between the classes to be explored at a range of different spatial scales. Here, the panels are colour coded on the basis of motif range (single dominant motif type, limited range and varied range), with increasingly varied ranges shown in increasingly darker shades of blue. They are also coded using different shaped symbols that correspond to the compositional types. Though in some cases the lack of coordinate resolution obscures some of the panels in these figures, several significant patterns can be identified. Although the Drumirril cluster itself features all three motif ranges, it also features a higher frequency of limited and varied range panels compared to the surrounding dispersed panels. The dispersed panels exhibiting varied motif ranges are limited to two sites immediately east of the Fane River, and the Drumirril cluster, and these panels also feature dense compositions. With the exception of the southern Tullagee panel just across the Fane River (the same panel that presented an exception in the visibility study, and one that could not be located during the survey), the majority of panels exhibiting a single dominant motif type lie on the outskirts of the distribution. In contrast, the limited range panels (particularly those with a simple composition; class 6B) lie in a linear sequence running from the site nearest the confluence of the Castletown and Kilcurry Rivers, towards Drumirril. Miskish More, the outlying panel in the northwest that lies along the banks of the River Fane, also falls into this group. In this way, an increasing sense of complexity towards the Drumirril cluster is indicated. More marked patterns are apparent in terms of motif range subclasses, whilst subtler patterning can be discerned in the distribution of different compositional subclasses.

Moving in to the Drumirril cluster itself (Figure 6.28), the range of different panel types is dispersed across different hilltops. Here too, the panels with a single dominant motif type tend to lie on the edges of the cluster, with some exceptions. Within the central nexus (Figure 6.29) the arrangement of panel classes again reflects the broader regional patterning when one's approach towards the panel group is taken into account (note that here coordinate resolution only allows for the positions of the panels to be depicted in a diagrammatic manner). This series of distinctive hilltop outcrops is most readily approached from the southeast, with the northern, northwestern and northeastern sides of the hilltop defined by steep slopes. As one approaches the panels the degree of motif range increases from panels with single dominant motif types, to limited ranges, to varied ranges.

Whether this reflects the ideological or symbolic distinctions made as approaching regional and local clusters of panels, or the accumulation of motifs over repeated visits, remains unclear. However, few of the panels demonstrate definite signs of a palimpsest effect (Drumgonnelly may be an exception as discussed below), with many of the more complex compositions exhibiting carefully planned and consistently formed arrangements of elements and motifs suggesting they were devised and executed in one sitting. This suggests that the slow accumulation of motifs at certain places in the landscape alone does not explain the shifts in the complexity of the panels. Furthermore, it is significant that the patterning identified in the panel classes resonates with the kind of patterns described on the basis of the landscape modelling exercises in Chapter 3. The wider regional patterns tend to be echoed within the regional cluster, and the local nexus, with the more intimate scale patterns representing the wider world in miniature. Again also, these spatial patterns are reminiscent of the relationships between complex focal passage tombs and their associated satellite tombs, as described in Chapter 3. With the evidence for contemporaneity between passage tomb art and rock art presented here, it is not surprising that these two traditions should share certain underlying structures. As noted earlier, the complex focal tombs are seldom the earliest monuments in these groupings, so this too supports the idea that the differences in motif ranges do not simply represent chronological distinctions. The fact that these patterns echo and resonate across the different methodological approaches presented in this study indicates that they are likely to represent genuine patterns rather than artefacts of classification, or subjective landscape observations.

Approach 2: Attributes: the presence / absence of design elements and structural principles

In the second approach a more detailed and objective classification method was explored. This approach focuses on the structural or grammatical relationships created within individual panels by documenting the presence and absence of particular design elements and structural principles. One of the difficulties in dealing with Atlantic rock art is that the researcher is faced with a mass of abstract geometric forms, the subtle variations within which are often difficult to define and organise according to typical classificatory schemes. In comparison with studies of representational rock art where objects and animals may be readily recognisable (e.g. Tilley 1991), when it comes to British and Irish petroglyphs we cannot rely so directly on our contemporary understanding of representative visual symbols. However, in some ways this might be viewed as a blessing in disguise – because we cannot rely on pre-established categories, this in itself necessitates a more sensitive and thoughtful approach.

A key question in approaching the issue of classification was at what level of detail the variations should be deemed to be of significance. For instance, is it sufficient to record the presence of a cup, three rings and a line? Or do we need to scrutinise the motifs, and the 'design' grammar employed more closely? For example, does the line extend beyond the ring or is it contained by it? Does the line commence at the central cup, or at one of the rings? If the latter, at which ring does it commence – the first, second or third? Does the line truncate the rings or are the rings gapped? To illustrate the significance of the structural relationships between design elements, three examples of motifs from the study areas are shown in Figures 6.30 – 6.32. It is possible that these could have fallen into the same basic 'types' based on a simple motif presence / absence classification scheme – that is, all three feature cups, rings and grooves. However, the visual effect, their compositions and the relationship between the individual design elements are strikingly different. The approach applied here directly acknowledges, and essentially thrives on this factor. By employing a presence / absence based method that seeks to identify the use of particular ways of combining design elements the analysis also overcomes the problem of attempting to dissect and categorise individual parts of the composition into rigid motif classes. In this way the aim is to move beyond the limits of simply investigating which elements are present, and address the immense variability in the choices made by the carvers in terms of putting these separate elements together.

Because such an approach had not been tested before on a per panel basis (see Johnston 1989 for the application of related approaches to the Irish corpus as a whole), it was impossible to tell whether such seemingly minute details might prove to be significant. As a result, the analysis attempts, within reason, to be as inclusive as possible, even if a particular motif or element occurs only once or twice across the three study areas. Table 9 defines and illustrates the full range of 100 attributes used here, and those present on each panel are listed in Appendix A. To assume that these subtle differences are insignificant is to reduce the motif range to a more homogenous phenomenon, and such a move would seem short-sighted at this stage. As explained by Francis (2001: 235), "classification systems should not only bring order to a data set, they must also seek to maximise variation between groupings in order to examine and explain variability and change between those groupings". Thus, the analysis operates on the assumption that any variations discernible to the modern analyst were *potentially* created intentionally rather than incidentally, and that they may have held significance in terms of original meaning. Recent ethnographic work on Australian aboriginal rock art has illustrated the potential symbolic importance of what might at first glance appear to be rather minor details, such as broken versus unbroken circle motifs (Martin 2003). The possible interpretations of these variations are wide ranging. However, by exploring the ways these variations are differentially distributed across the landscape, we may gain insights into which of these potential interpretations are more or less relevant.

As noted earlier, the deliberate use of natural features in the stone surfaces within the compositions is now widely acknowledged (e.g. Bradley et al 2002). Fissures are actively used as radial lines within multi-ringed motifs, motifs 'disappear' into cracks in the stone, and natural solution hollows are employed in a fashion that is identical to the use of artificial cups. Ethnographic studies have demonstrated the ideological significance of natural features as entranceways into the stone and into other worlds (see Chapter 3). The practice links back to the idea of the creation of rock art being an ongoing and repeated activity, with the natural features becoming, if you like, the 'earliest' phase (see Bradley 1998). It seems appropriate then that, with some guiding principles, the practice of using natural elements should be incorporated wholeheartedly into a motif analysis rather than ignored. Obviously, recording the sheer presence of a fissure, so ubiquitous on stone surfaces in general, would not be particularly useful (although see recent work by Jones 2004, 2005a as discussed in Chapter 3). Instead, the attributes relating to natural features have been defined so as to attempt to identify definite cases of the intentional use of, or allowance for, these forms. In all cases a subjective judgement had to be made as to whether the features were of considerable antiquity (i.e. potentially contemporary with the carvings) as opposed to modern, or of questionable antiquity (such as hairline fissures).

This approach was viewed as a kind of open dialogue in order to 'get to know' the material and its idiosyncrasies. The attribute list was deliberately allowed to develop in a relatively free manner, responding sensitively to the material itself, allowing new attributes to be added as they arose (see above and Dunnell 1971 for critiques of such an approach). Initially, it was expected that a threshold of variation would be reached, after which few additional motifs would be identified. As we will see, this threshold took its time to appear! As a result, the information gathered allows a very detailed picture of motif variation and association to be established. However, the information is also extraordinarily difficult to analyse on a manual basis, due to its complexity, and its sheer mass. Although it is quite possible that this approach has been *too detailed* in its pursuit of variation to produce meaningful results, a second stage of analysis is proposed here whereby a seriation program is used to sort the panels into groupings of similar motif associations (see below). Though this approach could only be tested here in a preliminary fashion, it suggests that computer programs may well provide a means of identifying more detailed patterns in Atlantic rock art motif variation and association than has been possible using manual methods.

By borrowing the techniques used in the binary seriation of architectural structures (Graves et al 2002), it is possible to begin to identify different groupings where panels feature similar ranges of attributes. Specialised seriation software (e.g. Winbasp, freely available at www.uni-koeln.de) can be used to sort the panels into groups that share the same attributes. In some cases this might be conducted on a series of different levels – using attributes relevant to all panels, and using attributes relevant only to a sub-sample of panels to investigate specific questions. As discussed above, unlike the use of this technique in architectural seriations (ibid), currently it cannot be assumed that these groupings of rock art panels can be used to infer particular conditions (social interaction, chronological variations etc).

By way of example, Winbasp tables are shown in Figure 6.33 for the Louth / Monaghan and Dingle panels. The results could not be explored in full for each of the study areas in the context of this chapter. However, this data can potentially be integrated with the GIS and used in a wide variety of ways. For instance, it can be used to investigate the distribution of panel types featuring particular combinations of attributes. For example, Figure 6.34 displays the distribution of panels across the Inishowen Peninsula that feature only simple cup marks. These occur in a widely scattered range of predominantly lowland locations across the peninsula, broadly recalling the types of landscape locations for 'simple' panels types identified by Bradley (1997; see Chapter 1). Yet they also occur in clusters on the Isle of Doagh alongside neighbouring panels that exhibit a much wider range of motif types. Taking a closer look at the Carrowreagh cluster in Figure 6.34, a marked concentration of cup only panels occurs along the northern face of the distinctive rocky gully to the south of the distribution. This suggests that at a variety of scales, it was appropriate to produce cup only panels in particular parts of the landscape.

We can also investigate the distribution of individual motif types themselves that may occur alone, or in combination with other motifs. For example, Figure 6.35 illustrates the distinctive case of the Isle of Doagh parallel groove motifs. With few exceptions (Johnston 1991: 88-89) these motifs are unique to the rock art in the Isle of Doagh area within the Irish corpus. Rare examples are also known from southern Scotland, such as one of the panels at Ormaig in the Kilmartin area of Argyll (Figure 6.36). This is compelling given what we know about the extensive long distance connections between southwest Scotland and Ireland during the Neolithic (e.g. Waddell 1991/2). Johnston (1989) sees these designs as comparable with motifs in some megalithic art, notably at Loughcrew, and they also bear more resemblance to the linear and rectangular styles identified by Eogan (1986) at Knowth. As the detail of the Isle of Doagh in Figure 6.35 demonstrates, the motifs are also unique to the Magheranaul townland cluster, and are not featured in the Carrowreagh area. This reflects the distinctive nature of the rock art in these two neighbouring clusters. The Carrowreagh cluster features a typical range of classic rock art motifs that would not be particularly unusual in any of the three study areas. These are dominated by cup motifs, cup and ring motifs, and simple compositions, with a low incidence of grooves or enclosure elements. In contrast, the Magheranaul group features several densely carved panels and a high incidence of unusual groove and enclosure elements.

This contrast between neighbouring locales is reminiscent of the distinctive styles described by Purcell (2001) with regard to the individual valley systems on the Iveragh Peninsula, Co. Kerry. Although it is tempting to interpret such patterns as reflecting the use of particular locations by different social groups over extended durations, this is problematic, since different social conditions are known to have produced similar spatial patterns in stylistic variation (Wiessner 1990, 108, see also Plog 1990, Davis 1990). In the ethnographic case presented by Taçon (1999), a particular gorge features two distinctive clusters of motifs used by two different aboriginal communities. However, there is also a range of other possible interpretations that need to be taken into account. For example, the distinction could just as easily relate to chronological differences between the Carrowreagh and Magheranaul corpora, or to the different roles played by the two clusters, and in turn the different activities and / or audiences they attracted.

Using the data produced in this approach, it is also possible to make general observations as to distinctions between the study areas (see Appendix A for the attribute datasets). In some cases, particular design elements or structural principles appear to be unique to particular regions. In addition to the distinctive occurrence of parallel groove motifs in Inishowen, the absence of motifs that appear to be truncated by the panel edge is also apparent. Though in some cases (e.g. Carrickallen, see Chapter 5) this may be the result of quarrying activity, whether ancient or modern, in most instances this seems to be a deliberate compositional choice – but clearly not one favoured in Inishowen. The Louth / Monaghan area features a prevalence of motif truncation, in addition to the extensive use of natural cups, cups positioned in ring gaps, and enclosed dimples. Unique to the Dingle Peninsula is the use of relief pecking to lower the area within the inner ring of a cup and multi-ring motif. Admittedly, the significance of these distinctions in relation to other parts of Ireland and Britain is yet to be explored, and the discovery of new panels may well challenge the observations made on the basis of current data. However, these types of contrasts indicate that if we employ sufficiently sensitive motif classifications that take into account the grammatical relationships between design elements, then regional and local variations can be readily identified.

Using this classification approach it is also possible to investigate the distribution of cup and ring motifs with regard to the number of rings present. This approach was used by Bradley (1991) to investigate increasing complexity in response to monument complexes. A GIS renders this type of investigation particularly accessible, as shown in Figures 6.37 and 6.38, which display the variations seen in the Louth / Monaghan group. Here, the maximum number of rings in the dispersed panels is restricted to 1-3, with the exception of the distinctive panel at Miskish More in the northwest, which features a seven-ringed motif. Meanwhile, the Drumirril cluster features a higher number of 4-7 ringed motifs, again reinforcing the distinctive nature of this group. Taking a closer look at the Drumirril cluster, it is interesting that in three instances the individual hilltops feature a 4-7 ringed motif to the west, and a series of panels with smaller numbers of rings to the east. Even in the central nexus, where the panels occur within just a few metres of one another, this spatial arrangement is maintained with the prominent seven-ringed panel lying to the northwest of the group, which, due to the nature of the local topography, is most readily approached from the southeast.

Again, as noted in Chapter 3, the repeated occurrence of these types of subtle spatial patterns at a variety of different landscape scales reinforces their significance. The fact that the shifts repeatedly occur in an easterly to westerly fashion is compelling, potentially indicting the importance of movement from one panel to the next, as Bradley (ibid) has noted in some British study areas in relation to monument complexes. However, it is ironic that the patterns described for the British study areas seem to occur in reverse in the Louth / Monaghan area, with regard to the monument complex in the east. This may indicate that the rock art panels in fact operated independently of the monuments. Alternatively, it might also reflect the regional nature of the ways rock art is structured across different landscapes.

Approach 3: 'Stylistic' distinctions in technique

The third approach explored here rather more straightforward in that it is comprised of only two categories. During the course of the motif analysis, the recording of panels in the field, and the review of literature on 'style' in Atlantic rock art, it became apparent that two ways of producing the motifs that could be distinguished on the basis of composition and carving technique had been independently observed in a series of studies. Some of the authors (Waddington et al in press) had linked the distinctions to chronological change. As we shall see, these stylistic distinctions are similar to those established by O'Sullivan (1986) with regard to megalithic art. Though the significance of these connections was only realised late in the present study, and it has subsequently not been possible to assess the distinction on a statistical basis across the study areas, these observations offer considerable potential for future work.

As noted in Chapter 2, Waddington et al (in press) and Connolly (1991) have described similar contrasts between two types or styles of rock art panels. These contrasts are based primarily on distinctions in technique, but also in composition, and therefore reflect observations that are possibly closest to the art historical treatment of the term 'style'. In other words, it is not so much the motif content or form, but the way in which the motifs are arranged and the method in which they are depicted, that is at stake. At Hunterheugh Crags, Northumberland, the first style was described as responsive to the natural topography of the stone, while the second was less so, and more “crude” and deeply carved in form (ibid). With the exception of depth of carving, these observations correspond to Connolly’s (1991: 37-8) description of two divergent styles in the south west of Ireland. Here the first was characterized by well-defined, deeply carved, and carefully composed motifs, whilst the second was characterised by broad, shallow, flat grooves that are less carefully defined and composed. It is important to stress here that though these descriptions and the following discussion inevitably make use of adjectives that imply an aesthetic judgment, or different degrees of skill or ability on behalf of the carvers, it must be remembered that this is a culturally constituted perception, and it should not be assumed that the carvings were viewed this way in prehistory. The following discussion initially makes use of the terms ‘crude’ and ‘sensitive’ following the descriptions by Waddington et al (in press). However, as we shall see, a less loaded pair of terms can be borrowed from studies of megalithic art.

Though interpretations of the Irish corpus in this manner must remain tentative, work by Waddington et al (in press) suggests that these types of stylistic distinctions may lend important insights into the internal chronology of outcrop rock art, as we come to look at this question in increasing detail. It is difficult to assess the potential applicability of this scheme beyond the Hunterheughs Crag site without further extensive classificatory work. However, a selection of examples based on field observations during the present study (see below), as well as several panels from Kilmartin, where recording methods have produced particularly high quality results (e.g. RCAHMS 1999), indicates that this distinction may indeed apply more broadly. The Kilmartin corpus represents some of the most complex and sophisticated outcrop rock art in the Atlantic group, and some of the few readily observable cases of superimposition (see Chapter 2). In the best-known example at Achnabreck (panel number 113[1]), those recording the stone were able to identify a ‘suggested’ early phase of carvings that features a range of motifs that closely resemble designs from megalithic art (see Figures 6.39 and 6.40), including a triskele, double-horned spirals, parallel grooves, cup-less single and multiple concentric rings, and a set of enclosed conjoined cups that is strongly reminiscent of those on kerbstones 52 at Newgrange (RCAHMS 1999: 44-51; O’Kelly 1982: 158-9). Some of the latter phase motifs on this panel appear to be less carefully formed; they are more roughly pecked, the spaces between the multiple concentric rings vary within a single cup and ring motif, the rings are frequently more irregular with slight corners and kinks, and the rings sit rather uncomfortably with adjacent motifs that in some instances seem to have impinged on the ability of the carver to produce complete, circular rings.

Similar observations can be made for the panel at Cairnbaan (Figure 6.41) where again, the rings of the more ‘heavy-handed’ motif are cramped by, and deeper than, the more perfectly circular rings of an earlier series of motifs (panel number 132[2]; RCAHMS 1999: 55, 59). At Ballygowan (panel number 123; RCAHMS 1999: 54) is another cup and ring motif with angular and roughly pecked rings, and a poorly formed central cup, which contrasts with some of the other motifs on the panel (Figure 6.42). In this case the motif has not been restricted by adjacent designs. However, a roughly formed, and deeply pecked groove links the motif to two earlier cup and ring carvings in a somewhat awkward manner, truncating the outer ring of one of its neighbors, and creating a second radial groove for another neighbor, which already features its own downslope-oriented radial. At Ormaig, a cup and ring motif lying at the edge of the composition exhibits an entirely different form and technique from its companions (Figure 6.43); it is roughly pecked with generally wide rings that vary greatly in width around their circumference, as do the gaps between the rings, and the pecking is comparatively shallow (panel number 179[1]; RCAHMS 1999: 68).

Unfortunately, in Ireland there are few examples where chronological implications can be determined on the basis of style, largely owing to the lack of superimposition. Johnston noted a possible example at Cortial (1989: 633), and a further example may be present in Drumirril (Figure 6.16), though both require further close examination using artificial lighting. In most instances individual panels are characterized by one style or the other, rather than featuring both. One possible candidate that potentially offers chronological clues is the Ballyhoneen wedge tomb in the Loch an Dúin Valley, on the Dingle Peninsula. As discussed in Chapter 2, this monument features four carved stones that bear carvings on a range of different surfaces; the upper surface of a capstone, the inner surfaces of orthostats, and a narrow side face of a second capstone (Figure 2.19). The range of surfaces seems to suggest that the motifs were not necessarily positioned in the monument primarily for display purposes; particularly in the case of the latter, which is difficult to view. As noted previously all but the latter fit comfortably with the range of motifs on outcrops in the wider Dingle area, and could easily represent re-used rock art on what were once otherwise unmodified erratic boulders. The position of the motifs along the narrow side face of the second capstone, is difficult to explain in terms of the (probable) original orientation of the boulder. Unlike the other panels, this one features only a line of cups. These are unusually roughly pecked, poorly formed, and small in size, contrasting with the line of cups at Ballintlea, which are deeper, perfectly circular in shape, and semi circular in cross-section (Figure 2.15). This interpretation remains speculative, but in Chapter 2 the possibility that this panel was specifically carved for the wedge tomb was suggested, whilst the remaining stones are more likely to represent reused rock art panels.

Beyond this example, a small number of individual panels carved in the ‘crude’ style can be identified, though these generally lack chronological clues. These are considerably outnumbered by ‘sensitive’ panels, the category into which most of the panels in the three study areas fall. If the shift is indeed chronological, this may indicate a long-lived ‘sensitive’ style in several regions of Ireland, followed by a much shorter ‘crude’ style. These two types frequently occur side by side within panel clusters. This may reflect the repeated nature of visits to specific places for carving and other activities over several generations. For example, at Magheranaul on the Isle of Doagh, Inishowen

Peninsula, a series of ground-level outcrop panels occur in a tight cluster, within a few metres of one another. Here, one of the panels stands out from the others in terms of technique and form (Figures 6.44 – 6.45). Its motifs are defined by very superficial and rough pecking. The rings are thin, irregular and poorly defined to the extent that in places it is difficult to determine just how many rings are present, and whether the central area of pecking can be deemed to be a cup or a tiny ring. In this way, it appears to be the production of the *essential form* of the motif that was important, rather than attention to the formal qualities of the design. Rough pecking seems to have been deemed sufficient to 'sketch out' the shape of the motif, and this was not followed up with further painstaking work to ensure that the elements were deeply pecked and symmetrical. This contrasts with a carefully formed disc cup that forms the central element of one of the cup and ring motifs, and the more deeply pecked radial associated with it. Though the problems with differential weathering have been discussed in detail in Chapter 2, it is interesting that despite their superficial nature, these motifs are crisper and less softened than those on an immediately neighboring panel. The latter features wide, smoothly finished and highly weathered motifs, some barely visible (Figure 6.46). The rings here are even, regular and carefully spaced. Though the edges are a little more roughly finished than those on other panels, this seems likely to be due to the hardness of the stone (see Purcell 1994). These two examples epitomise the contrast between these two styles.

At Drumgonnelly, Co. Louth, there are two panels positioned along a low ridge (Figures 6.47 – 6.48). Here too, a distinction can be made between them on the basis of style, technique and composition. The uppermost panel features carefully formed motifs that interact with the many natural solution depressions across the stone surface. The rings are smooth, carefully formed as perfect circles or slight ovals, and evenly spaced. The neighboring panel features an interesting array of designs, some of which were discussed in Chapter 2 with regard to chronology, with one area of pecking apparently more recent in date based on its remarkably fresh colouration, and jagged pecked surface that suggests the use of a metal implement. In fact, based on the present discussion, a further two possible phases become apparent. Viewing the panel from downslope, as shown in Figure 6.48, the left side of the stone features a series of three carefully formed cup and ring motifs, each with radial grooves running in a consistent direction downslope (see Chapter 2 for the significance of this detail). To their right, and separated by a narrow fissure, lies a much less regular arrangement of designs. At its centre is an asymmetric cup and ring motif featuring an uneven ring, a barely discernible radial groove running cross-slope, and a second radial running upslope. Thus, these radials fail to respond to the slope of the stone surface (again, see Chapter 2). The associated grooves are awkwardly arranged and make use of oddly placed, poorly formed cups. The motifs also fail to respond to the natural depressions in the stone, despite their presence. The peck marks are clearly visible in this arrangement, contrasting with its neighbors, though this may well be largely the result of differential turf cover, as indicated by differential lichen growth.

The comparison of two individual motifs from Drumirril, as shown in Figures 6.49 and 6.50, emphasises the formal differences between these two types. In Figure 6.49 the motif is comprised of roughly pecked rings around a barely discernible central cup and radial, all of varying widths. The spacing and alignment of the rings around the radial is irregular, lending the appearance of an incipient spiral. The motif is disrupted in a haphazard manner by the fissures to its right, and the pecking is superficial and uneven. In contrast, the cup and ring motif in Figure 6.50 consists of symmetrical, evenly spaced rings. The pecking is deep, and has consistently produced smooth semicircular profiles. Although the design is traversed by a narrow fissure (which may well postdate the carving), it sits comfortably next to the major fissure above it, and the natural solution hollow abutting it, rather than being constricted by their presence. This lends the appearance of a carefully thought out series of natural and carved elements.

On the basis of the study areas investigated here, it is currently far from clear what these distinctions may represent. Field observations indicate that the two styles occur side by side, sometimes on individual panels, in other cases across panels positioned alongside one another. In theory it is possible that these contrasts reflect, for instance, chronological transformations in the practice, variations in the social context of the carving events, or differences in individual carvers' styles. Examples of each of the two styles can be identified in each of the three study areas. These are widely scattered rather than associated with particular regions, locales, clusters or nexuses. In this way the distinction does not appear to relate to the expression of regional or local identity, where we would expect the designs to cluster only in particular regions or places. It is notable, however, that the 'crude' style motifs identified to date are all from sites that also feature 'sensitive' style carvings. In other words, 'crude' style motifs rarely occur in isolation, unlike 'sensitive' style designs. Thus spatial analyses using GIS may well prove useful in future work. If this tentative pattern can be demonstrated across a larger sample, this may indicate that a chronological or context-specific explanation for the variation is more likely. As discussed in Chapter 2, Waddington et al (in press) were able to discern a chronological distinction between the two, with the 'cruder' style following the more 'sensitive' style. Frequently, it seems likely that the 'sensitive' designs took considerably longer to produce than the 'crude' style motifs, indicating the potential role of context-specific variations in technique. However, in suggesting here that the division is widely applicable it should also be remembered that a range of actual distinctions (chronology, individual style, social context) are possibly being amalgamated in these two categories – thus caution must be exercised in interpreting the results.

In broad terms, these two categories can be related to the two distinctive styles identified by O'Sullivan (1986; 1988; 1996) in megalithic art, based on the Brú na Bóinne panels; depictive versus plastic. This improved on an earlier scheme proposed by Shee Twohig, which distinguished between 'Loughcrew' and 'Fourknocks' styles (1981; see also Shee Twohig 1996: 68). Depictive style motifs are characterised by two-dimensional forms where the motifs are placed in a somewhat haphazard fashion, and the depiction of particular design forms takes precedence over the degree of finish and sensitivity to the form of the rock 'canvas'. These were generally found to predate the plastic style art (though by what duration remains unclear) as their locations indicated that they were carved before the panels were put into position within the tombs. O'Sullivan (1986: 75) noted that the style appeared to have 'pertained at the time when the tombs were being built', at least in the case of the Boyne Valley tombs. In contrast, the later plastic style art, which was carved *in situ* on accessible surfaces some time after tomb construction, took into account the form of the stone surface, producing a sculptural quality that approached the three-dimensional. These panels were also more carefully finished with even, regular forms and balanced symmetrical arrangements. The motifs overlie, and sometimes obscure or outsize, the earlier depictive style designs. However, although a sequential development can be identified, particularly at Newgrange, O'Sullivan (1986: 79) also stressed that the two styles are far from definitive or mutually exclusive, with some designs remaining difficult to categorise. Given the sheer volume of carved stones in the Boyne area, O'Sullivan (ibid) proposed that this particularly intensive creative endeavour might itself have afforded the opportunity for the transformation or evolution of the depictive style into the plastic form.

Eogan (1997, 1998) also identified chronological factors in the art at Knowth. This work found that a sequence of carving styles from incised motifs, to angular pecked motifs, to loose pecking, and ribbon art (roughly equivalent to the plastic style) and close area pecking could be determined (ibid). The fact that these similar types of stylistic shifts have been identified as having a chronological basis lends weight to the idea that the same situation occurs in outcrop rock art. Again, the mirror-effect between the two traditions reinforces their close links and broad contemporaneity, as argued in Chapter 2. Intriguingly though, the opposite shift to that identified in megalithic art (O'Sullivan ibid) is apparent in outcrop rock art, with the 'cruder' forms *postdating* the more 'sensitive' forms. Furthermore, while the 'cruder' style of rock art occurs only where the 'sensitive' style is also present, in the majority of cases it is the plastic style passage tomb art that is found in tombs where we also see depictive style panels. It is also interesting that whilst in outcrop rock art (at least in the study areas investigated here) the number of panels exhibiting the 'sensitive' (plastic) style far outnumbers the 'crude' (depictive) style, in the passage tomb art of the Boyne Valley the opposite is the case.

Whether precisely the same type of broad stylistic shift that we see in passage tomb art might have occurred across the rock art tradition as a whole is far from clear, let alone whether the shifts in passage tomb art can be linked to the shifts in rock art styles to form a chronological sequence. If this were the case, the fact that passage tomb motifs are present in the earlier phase at Achnabreck in the 'sensitive' or plastic style would appear to support contemporaneity with the plastic style. However, extrapolating such broad chronological models from a single panel is highly problematic. Alternatively, the distinction may not be chronological at all, but representative of two contemporaneous ways of producing rock art. In the Brú na Bóinne context the depictive style motifs were frequently, but not always, hidden, whilst the plastic style art was on prominent display, possibly indicating a different role, association, or contextual origin for the two styles. Likewise, whilst the depictive style was present in both focal and satellite tombs, the plastic style was predominantly limited to the former (O'Sullivan 1986: 78-9). It seems possible that in both megalithic art and rock art, the depictive style may represent 'votive motif deposition' practices, whilst in the plastic style the emphasis is on display and the creation of the kinds of 'visually arresting' aesthetic described above.

In the majority of cases the classification of outcrop rock art panels into either of these two categories is straightforward. Unfortunately however there are also numerous instances where this is a little difficult, and potentially quite subjective. 'Sensitive' or plastic style rock art exhibits a fairly wide variety of forms with regard to depth of pecking, degree of finish, and interaction with the form of the stone, and so it currently remains a little unclear as to how successfully a binary classification can be applied to the entire rock art corpus, and whether it obscures a wider range of styles. However, as noted above, O'Sullivan (1986: 79) described similar ambiguities in relation to passage tomb art. Within the plastic style he noted the increasingly plastic nature of later passage tomb carvings, which became progressively more concerned with the form of the stone, eventually leading to the treatment of geometric designs as incidental, and then superfluous, with a shift towards pick-dressing as the depiction of geometric designs began to dissolve (ibid: 75; see also O'Kelly 1982). Thus, there are also subtle nuances and shifts within the two megalithic art styles. The very preliminary investigation presented here suggests that a more detailed analysis of the applicability and utility of these distinctions for outcrop rock art would be a valuable direction for future work. The fact that three rock art researchers have been able to apply these distinctions across several different study areas, from Britain to Ireland, points to exciting possibilities for upcoming stylistic analyses. The basic characteristics of the two styles are summarised in Table 10. Again it is difficult to describe these distinctions without resorting to aesthetically loaded terms, and it is important to emphasise that these should not be read as implying a judgement as to the 'artistic quality' of the two styles, or their effectiveness in communicating their particular messages to audiences in the past. The potential social significance of these observations is explored further in the final Chapter.

Intimate scale observations

GIS technology provides an important means of exploring spatial patterning in the stylistic variations described above. However, as pointed out by those who remain sceptical as to the degree to which GIS technology can offer contributions to the study of landscape perception (e.g. Tilley 2004: 218; Thomas 2004), there are some observations that are best, or perhaps can only be, made whilst interacting with archaeological monuments in the field. These deal with types and scales of observation that are simply too fine or subtle to be identified or investigated using a standard GIS.

Although general principles of access, pathways of movement, and visibility can be explored using digital data, the data at hand is usually too coarse to deal with more specific attributes of bodily movement in response to minor fluctuations in the topography or the specific slope angle of a carved surface. Possible exceptions include cases where specific sites have been fully surveyed to a high resolution (e.g. Chapman 2000), allowing archaeological data to be used to argue that specific pathways were encouraged by certain features and topographical characteristics. However, the use of experiential observations to explore these aspects has its own problems. As Brück (1998) has pointed out, by relying on field observation we are introducing a significant degree of subjectivity into our analysis. We are introducing our own body-specific and culture-specific biases. So is such an approach worthwhile as a means of investigating rock art?

Work by Otte and Remacle (2002) suggests that *in situ* art placement places specific demands on the viewer in a manner that is perhaps even more particular than the ways monuments guide one's movement across a site. This is because to view the carved face, the viewer is frequently restricted in terms of their bodily placement, and even their bodily attitude (standing, sitting / crouching etc.). Admittedly, bodily attitude is considerably more restricted in the cramped cave environment analysed by Otte and Remacle (ibid). The character of Palaeolithic art renders it a much more obvious context in which to investigate impact on bodily movement. In the case of rock art on natural stone surfaces, we can potentially use this type of approach to identify whether particular types of bodily attitudes or positions, and therefore experiences and perceptions, are encouraged by the panels, although the extent to which such restrictions necessarily represented or enforced static or dominant social conditions of the groups that made or used them is debatable (see Brück 2001). Though this approach could not be explored in full within the context of this chapter, this section presents a range of examples from the Louth / Monaghan study area as a means of exploring the *potential* of this type of analysis.

A range of factors can be taken into account, including the type of rock surface employed and the position of the carvings on the boulder or outcrop. These aspects are influenced by the nature of the outcropping rock and erratic boulders in each of the study areas, as well as the subtle differences in topographic location that were discussed in Chapter 3. As noted previously, the rock art in Counties Louth and Monaghan is generally positioned on small local prominences within their wider setting of rolling lowlands. Due to the geology of the region, these predominantly consist of exposed sections of outcropping sandstone, even though at times these can easily be mistaken for boulders. During the excavation presented in Chapter 5, several panels originally thought to be boulders were found to be rounded sections of outcrop standing proud above the surrounding turf. For this reason it is sometimes doubtful whether qualitative classifications as to panel type (e.g. Bradley 1996: 92; Stewart 1961) reflect geological types as opposed to impressions based on modern vegetation cover. However, a range of panel types can be broadly distinguished. In the Louth / Monaghan area, these include localised sections of outcrop dispersed across larger hilltops and ridgelines, which can be contrasted with situations where a large outcrop itself forms the prominence. Is this a meaningful distinction, or does it speak more of our own culturally constituted perceptions of these landforms? Did those producing the carvings treat them differently?

In the Louth / Monaghan area the outcrops frequently take on a mound-like appearance, or form distinctive landmarks due to their unusual outcrop formation. This is particularly notable at several panel clusters within Drumirril (see Figure 6.51 and 3.1), at Drumsinnot (Figure 6.1), and Cortial (Figure 1.17). At these sites the carvings tend to cluster on one side of these features. Frequently, the outcrops are lent a more topographically distinctive appearance by certain approaches to the site from positions in the surrounding landscape, whilst they are hardly discernable from others. This observation is based on an open landscape, unrestricted by vegetation. As noted above, it is likely that at the time the motifs were produced, the viewer faced more restrictive vegetation patterns in the immediate landscape, patterns that are virtually impossible to reconstruct with any precision today. However, the results of the geophysical survey presented in Chapter 4 also indicate that rock art may cluster in areas where the shallow bedrock geology would have encouraged localised clearances within a surrounding mosaic of wetlands, grassy clearings and forested zones. In several cases the most densely decorated surfaces coincide with the more topographically distinctive approaches to these landforms, even though stone surfaces are available on other sides of the features. In these cases the motifs are also more likely to lie on sharply sloped through to vertical surfaces, and are more likely to appear on surfaces with a range of different orientations.

In contrast, in the former group, where the carvings occur on dispersed sections of outcrop along ridges and hills, the motifs are more likely to occur on consistently horizontal surfaces. This suggests that the structural properties of these landforms were perhaps appreciated, or at least may have guided people’s response to them, and as a result the practice of carving and the positioning of viewers. The landmark outcrops seem to have been treated as distinct places defined by closely clustered panels on landforms that bear visual resemblances to built cairns or mounds. This is due to the highly localised and pronounced convex form of these natural rocky formations. This is particularly notable in Drumirril (Figure 6.51) and Drumsinnot (Figure 6.1). At the Drumirril nexus the outcropping stone is comprised of angular segments that rise diagonally out of the ground. From a distance, this lends them the appearance of having been artificially constructed out of separate segments of sandstone piled on top of one another, and people have frequently asked me whether the formation is artificial rather than natural. In this way the outcrop is visually similar to a built megalith.

In addition, with the exception of the dominant surface featuring a seven-ringed motif, the majority of the carved forms occur on the outer surfaces, and at a low level, with several of the smaller carved surfaces located at ground level. Similarly, at Drumsinnot the carvings are concentrated on the vertical sides of the outcrop. This could be seen as echoing the placement of some of the most visually dominant passage tomb ornament on the vertical faces of the outer kerbstones. The apparently intentional selection of natural features that resemble built monuments as carving locales in the Louth / Monaghan area is particularly interesting given the presence of passage tomb art in the region. It seems likely that the communities engaged in the practice of rock art were familiar with the passage tombs of their region. This may explain why these natural features made such effective locales for carving practices. By visually referencing the related tradition of passage tomb art, the carvers would have tapped in to and expressed a whole range of ideological and social connotations.

With their higher proportion of sloping and vertical decorated surfaces, the motifs on these distinctive outcrops, hilltops and ridges could have been viewed by larger numbers of people simultaneously. In several cases the vertical surfaces are visible only from specific parts of the surrounding terrain, though again these are often capable of accommodating large groups. At the Drumirril nexus several of the decorated faces are clearly visible from the relatively flat hilltop at the edge of which the outcrop is positioned. Elsewhere in Drumirril (Figure 6.51) and at Drumsinnot the motifs are visible from the flat natural terraces from which the distinctive outcrop clusters rises. In contrast, the dispersed horizontal panels frequently occur along the tops of ridges and hills, and their position restricts the viewers that are able to see the motifs themselves to a much smaller number of people gathered immediately next to the stones. These observations are compelling, but inescapably subjective. Could they really reflect differing social contexts and audiences? Could they have encouraged activities to occur in specific areas around these landforms? Certainly the landmark outcrops *appear* more distinctive, and more easily identifiable, *today*, and might feasibly have been known, recognised, and even named by larger groups of people. They also encourage the viewer to stand in front of vertical carved surfaces. At the Drumirril nexus they even require the viewer to sit or crouch in front of some panels (e.g. see Figure 3.10), or position themselves between the jagged outcropping stones in a “participatory work of movement” (Tilley 2004: 160) in order to view each surface. What is not clear is whether it is relevant to project these observations back into prehistory. For instance, it may not have been necessary to actually see the motifs during the hypothetical activities that occurred at these sites – it might have been enough to be at the place itself. As demonstrated in this chapter, and in Chapters 4 and 5, the potential to test these ideas further lies in further motif analysis and excavation, as these may also throw light onto the possibility that different groups conducted different activities at these locations.

However the number of steeply sloped and vertical panels in the Louth / Monaghan region is not based on geology alone, as uncarved examples of these surfaces were also observed in the Inishowen and Kerry study areas. This seems to suggest an emphasis on the importance of visibility and display in some of the Louth / Monaghan rock art. The importance of this group within the present study perhaps inevitably led to the idea that these outcrops and distinctive hilltop locations served as landmarks in the surrounding landscape whose 'natural architecture' may have influenced the ways people approached and viewed the panels. This is much less obvious on the Inishowen and Dingle Peninsulas. Nevertheless in many cases the positions from which the panels were viewed, and sometimes created, can frequently be identified. Across the three study areas the majority of the dispersed panels suggest that the actual motifs were visible only to relatively small groups of people positioned close to the panels at one time. It is only in the larger clusters, and in later monument contexts (e.g. standing stones), that the panels were transformed in such a way as to become more visible from the surrounding landscape and to larger groups. However, there is also considerable variation in the degree of display and sizes of potential audiences between individual panels. This brief discussion demonstrates that these types of intimate scale observations would be worthwhile developing and exploring in a more systematic manner in future work, particularly in combination with investigations employing geophysical survey and excavation.

Discussion

Rock art, as a communicative phenomenon, can be understood as acting as a vehicle for style (in the broad sense of the word). As a communicative act almost by definition, it seems likely that rock art played a relatively active communicative role, implying that stylistic variation may also have been active rather than passive. Furthermore, with its mediating role between individuals and social groups, it is likely that rock art expresses both group and individual identity at different levels. However, there is also an undeniable formal unity evident at a fundamental level across the petroglyphs of Britain and Ireland. In rock art traditions there are few stylistic limitations relating to utilitarian aspects of the panels in the way that, for instance, the required form of an axe or fishhook provides some limits for the opportunities for formal variation, even in purely symbolic examples. There is an interesting tension here though between stylistic rules and the freedom within which the individual panel operates within them.

The carving technology available and the extent to which stone surfaces can be physically altered do provide some basic limitations. There also seems to be a limit to the type of design elements that could be employed in rock art (lines, cups, curvilinear grooves), with other forms that appear on other types of material culture in prehistory apparently deemed inappropriate for use in this context (for example well developed spirals, fine incised lines, or chevrons seen in cists, megalithic art and on pottery). So there are some restrictions imposed on the potential range of stylistic variability. There is also a high degree of similarity across the entire corpus at a fundamental level – there apparently was 'a way of making rock art' in operation during the Neolithic. Accepting these limitations, however (and here the tension arises), the three approaches presented above demonstrate that a wide range of variation is evident in the ways the basic design elements are put together on individual panels. Apart from cases where panels feature single cups, or a single cup and ring, it is almost impossible to identify two identical compositions. This suggests that within the restrictions of the practice, a high degree of individual agency and contextual specificity was permitted. The range of compositions suggests that the carvers were not attempting to reiterate a preconceived symbolic template of an emblemic or iconic style (see Wiessner 1983).

Although it has not been possible to fully explore and interpret the range of motif or stylistic variation evident in the rock art corpus in the context of this chapter, these three approaches hint at the great potential offered by these types of analyses. None of the three classification methods is complete or without challenges and problems, and the brevity with which the results could be discussed here is frustrating; there is much to be resolved. There are numerous problems, such as how best to identify particular groupings of panels within the Winbasp tables produced in the second approach, how to resolve the tension between motif content and structural behaviour, and the viability of a system that relies on such a huge number of attributes. Even so, the few examples presented here suggest that future work will be capable of deepening our understanding of the ways in which the panels reflected and reinforced people’s relationship to their regional and local landscapes. They also demonstrate the degree of detail we can potentially take into account in terms of spatial patterning, and reveal the flexibility with which a GIS, used along side a relational database and the Winbasp program, can be employed to investigate complex patterns, and combinations of patterns. The relationship between the three approaches employed here also remains problematic, and it seems likely that each approach reflects slightly different factors and combinations thereof (chronological changes, regional, local and individual styles, differences in the roles of different sites). The significant spatial patterns in the distribution of motif classes, and their mirroring of the panels’ response to the wider landscape, demonstrates that rigorous landscape analyses can produce meaningful results rather than naive musings based on subjective readings of particular panel groups. The potential for GIS to offer a valuable vehicle for exploring these qualitative variations in material culture across the landscape is considerable. These analyses demonstrate that GIS technology is limited by the imagination and care with which it is applied more than an inherent inability to address issues beyond the functional, and the environmentally determined. The identification of the potential applicability of O’Sullivan’s (1986) depictive versus plastic styles to the rock art tradition also offers considerable potential for refining the chronological and / or contextual relationships between particular panels.

The comparative approach to the three study areas has also highlighted some tantalising patterns that are yet to be substantiated more widely. For example, the observation by Purcell (2001) that some of the largest motifs on the Iveragh Peninsula seem to occur in relative distributional isolation seems also to be observable in Monaghan and Inishowen. In Monaghan, the Miskish More stone features an unusually large composite motif of seven rings, which lies in isolation, almost 4.5 km from the nearest panel, at the north-westernmost extent of the current known rock art distribution for the Louth / Monaghan group. The only other seven-ringed motif in the region lies at the heart of the Drumirril cluster, in the central nexus identified in Chapter 3. In the Inishowen Peninsula study area, the Malin stone, featuring the greatest number of rings (ten) identified to date in these three areas is also located 5km from the nearest panel exhibiting more than simple cups. Again, this panel lies at the northernmost limits of the rock art distribution for the Inishowen Peninsula, with the exception of the possible cup marked mobiliary stones at Ardmalin (Colhoun 1995). Though the occurrence of these examples, in addition to the three cases noted by Purcell (1994), can hardly be described as a definite distributional 'pattern', it is these types of variations that may help us to formulate more useful research questions for future investigation, particularly in terms of landscape and context. They also allow us to move away from classifications of panels based on binary categories towards more nuanced continuums of panel types.

Based on the motif analyses, the regional clusters on the Isle of Doagh and in Drumirril can be distinguished from the dispersed panels in their surrounding regions in a number of ways. The motif range increases in complexity towards Drumirril, and the area features a high number of multi-ringed motifs. Unique motifs occur in Magheranaul on the Isle of Doagh, where we also see a dense concentration of some of the most complex panels in the county. Thus, it has not been possible to identify precisely the same patterns of motif and compositional variation across the three regions. Rather, each displays its own unique structure in terms of the complex relationships between motif variation and landscape. This should not come as a surprise given the importance of distinctive regional and local practices demonstrated by recent landscape studies of Neolithic monuments and material culture (see Cooney 2000b). Though the distinctions between regional clusters and dispersed panels have been demonstrated on some levels, it is also apparent that there were similarities between them. For instance, though Drumirril features a high occurrence of panels with varied motif ranges and motifs with high numbers of rings, this area also features single-ringed motifs and panels with single dominant or limited motifs. It seems possible that some of these similarities reflect chronological shifts as people visited the area over generations to carve and perhaps re-carve the stone surfaces. Thus in these areas it is difficult to identify the kinds of binary distinctions between panels proposed by Bradley (see 1997: 128-31), such as 'simple' versus 'complex', since there are always exceptions to these rules. As a result, it is difficult to infer that entirely different audiences viewed these different panels.

When I commenced this study the sheer range of variation evident in the corpus presented a seemingly insurmountable mountain. What does the seemingly unclassifiable nature of the phenomenon itself tell us? Each panel appears as a unique, idiosyncratic arrangement of symbols, some common, some rare, others without parallel. The motifs are arranged in a unique response to their context; the physical stone surface, the wider landscape, and regional practices. They appear as events, or accumulations of events which are themselves unique acts, responding to the nuances of their context. There appears to be no template, no specific series of predefined motif types, other than very broad or simple ones, and ones that are so widely scattered in their distribution that it is possible they may have arisen independently of one another (e.g. rosette motifs). In this way, the production of a rock art panel seems to be an act that actively seeks uniqueness.

Such musings are frequent in stylistic analyses of diverse assemblages. With regard to the Late Magdalenian art of the French Midi-Pyrénées, Dobres (1995 cited in Conkey 1997: 360) has described an “overall fluidity and flexibility in how such artefacts are made, repaired, and / or reused”. In spite of some distinctive patterns within this process, Dobres interpreted this characteristic as reflective of relatively open and opportunistic social relations of production, rather than closed and rigidly structured ones (ibid). The at once homogenous and unified, yet undeniably varied and idiosyncratic nature of Atlantic rock art also recalls Gell’s (1998: 219-20) description of the way Marquesan style reflects certain social attitudes and cultural realities:

“There was an elective affinity between a *modus operandi* in the artefactual domain, which generated motifs from other motifs by interpolating miniscule variations, and a *modus operandi* in the social realm which created ‘differences’ arbitrarily against a background of fusional sameness. The limitless fertility of the Marquesan style in generating variant forms, each subtly distinct, coupled with its striking formal homogeneity simultaneously suggest an overwhelming need to establish difference and a recognition of the merely *relative* character of all differences”.

This has interesting implications for the manner in which rock art was viewed by its creators and audience. Indeed, this may indicate that the act of creation, and the involvement in the communication process, took precedence over the creation of a predefined symbolic composition. This also implies a degree of dynamism in terms of the grammatical and compositional trajectory along which a rock art panel might have potentially travelled. Individual moments in time and individual agency may have played a key role in the development of the statements that were being made. If this is so, what might it tell us about individual identity in the Neolithic?

CHAPTER SEVEN

Anchorstones, cornerstones, touchstones

Looking back - nested and transformative qualities of landscape

The complementary strands of contextual evidence that have been woven together here have sought to investigate the nature of the social contexts within which rock art was created and used. Let us summarise some of the key findings before moving on to interpret them in more depth. A precise date for this carving practice remains elusive, and yet this ambiguity seems likely to linger on. The current dating evidence points to the carving of quintessential rock art motifs onto living rock surfaces as a tradition that began as early as the Middle Neolithic (possibly even earlier), and continued at least into the Later Neolithic, and possibly into the Early Bronze Age. Along the way, a series of distinct yet interrelated traditions were identified within particular contexts; the deposition of 'votive cup stones' of a portable size, the reuse of quarried rock art panels, and the application of carved designs onto Bronze Age cist slabs, all against the background of an even longer-lived custom of simple cup marking evident in a wide range of contexts. Alongside these carving practices, passage tomb art developed within the specific context of monument building. As emphasised throughout the research presented here, these traditions are replete with ambiguities, overlaps and connections, and it is this resonance that would have contributed to their efficacy.

By addressing the landscape context of rock art panels an enriched and nuanced sense of the ways that Neolithic communities responded to their regional and local landscapes in surprisingly complex and sensitive ways can be gained. The places that people found to be especially appropriate as carving locales are likely to have been those that acted to enhance and inform the experience of both the carving events and the journeys to the rock art panels. Within each region different kinds of carving sites have been identified through the different contextual studies presented here. Regional clusters and different types of dispersed panels (see below) can be recognised. The former seem, at least in the study areas investigated here, to have been places that generations of people returned to, and where the carved designs accumulated gradually. The landscape context of these clusters seems to go some way towards explaining just why these particular locales became special points of focus. Each is set apart from the surrounding dispersed panels by virtue of their location at the periphery of the regional rock art distribution, their relatively hidden nature, and the presence of major topographical features that may have acted to demarcate a threshold between the clusters and the surrounding panels. These physical and experiential thresholds are likely to have emphasised the significance of visits to the rock art clusters, and played an important role in the creation and maintenance of personal and cultural memories. It seems possible that significant concentrations of art in places like Kealduff, on the Iveragh Peninsula (Purcell 1994), and Kilmartin Valley in Mid-Argyll (RCAHMS 1999), may mirror the patterns evident in the three study areas addressed here.

In contrast to these ‘places apart’, the dispersed panels, scattered individually or in smaller groupings across much wider areas, seem likely to have fulfilled a somewhat different series of roles as points of ritual within the local lived landscape. The settlement evidence to date, notably from the Louth / Monaghan area, indicates that people were conducting their daily lives in close proximity to the dispersed sites. The geophysical survey and excavation results presented here also suggest that similar evidence is likely to continue arising in and around the rock art distribution, including the Drumirril cluster itself. This echoes the point made by Van Dommelen (1999: 281), that everyday landscapes and ritual activities form a seemless totality, and that the continuous creation and alteration of the landscape via routine activities can gradually result in particular locales slowly becoming foci for ritual practices, rather than being assigned and predetermined as ‘sacred places’. This gradual development of the practice is reflected in the patterns of variation in style and motifs across the regional and local landscape. Across the Mhuirthemne Plain, nuances in the complexity of individual motifs, combinations of motifs, and compositional arrangements seem to reflect the varying roles of panels throughout the area. At both the regional level and within the Drumirril cluster, a distinctive shift is apparent whereby the motifs and compositions increase in their complexity from east to west.

We see some patterns mirrored across the three areas. Such commonalities point to a shared basis for certain aspects of the practice, and may reflect the use of pathways and associated narratives to heighten the symbolic importance and experience of traversing the landscape to reach the regional clusters. As demonstrated in Chapter 6, this experience may also have been informed by changes in the motif content and variation in panels as one approached the landscape thresholds to, and nexuses within, the clusters (see Bradley 1997: 1991). The potential importance of journeying to the regional clusters from parts of the surrounding landscape need not rule out the very real possibility that some communities were living and working in close proximity to both the regional clusters and the dispersed panels. This is illustrated by the Neolithic settlements uncovered within a few hundred metres of the carved outcrops at Tankardsrock, County Louth, and the potentially “everyday” nature of some of the findings at Drumirril, not to mention the possible structure associated with the Early Neolithic pit feature in Trench 2. After all, focal points for repeated activities, and so-called ‘ritual landscapes’ were not born instantaneously, but gradually accumulated over generations as people came to view and respond to particular locales in different ways, and attach regional significance to them, as part of their daily and seasonal practices. This comes as no surprise given, for example, the settlement evidence uncovered within the monument complexes like Knowth (Eogan 1984).

As the work discussed here has demonstrated, a wide range of activities occurred alongside rock surfaces that were already, or were to become, carved panels in the Drumirril cluster.

Despite the small scale of the excavations to date, the work at Drumirril has already revealed a range of activities where the everyday and ritual aspects of daily activity are interwoven; quarrying, burning events, and activities resembling routine domestic activity and work – the deposition of pottery, worked or burnt flint flakes and tools, the excavation and back-filling of pits, and possibly the building of structures. This work demonstrates that we can use traditional methods of archaeological enquiry, such as geophysical survey and excavation, to investigate the use of these places. Because these are relatively low visibility landscapes, it helps to take an unusually sensitive approach, employing high-resolution geophysical survey to target these areas of activity. What remains to be explored in future work is whether similar or contrasting activities might be associated with the range of dispersed panel types.

The sense of variation in the roles played by different panels, and panel groupings, represents an important step towards a richer, more nuanced, understanding of people's engagement with rock art in the past. To divide panels simply into the categories of 'clustered' and 'dispersed' would be overly reductive. As indicated throughout this study, it seems likely that within both the clusters and dispersed panels, there are still more variations to be teased out. The panel nexuses identified within each regional cluster, notably elaborate panels situated in isolated contexts, and densely inscribed panels exhibiting multiple phases of carving, probably represent only the most obvious of these variations. Thus, rather than reducing the practice of rock art to a single homogenous phenomenon, or pursuing diametrically opposed categories, the range of landscape investigations presented here emphasises diversity and multiplicity in terms of the roles particular panels and groups of panels played in the past.

By investigating and comparing three areas dispersed across the island of Ireland, the project has emphasised the role of regional, as well as local, diversity in structuring the practice of rock art. This diversity is highlighted by the complex and interwoven range of features and characteristics that seem to have informed the positioning of the carvings across the landscape in different areas. These include particular geological formations and distinctive outcrops that might have been imbued with certain ideological associations, restricted areas of fertile soil such as the Isle of Doagh, and particular parts of the topography where the intersection of a range of landscape characteristics and features, from views to clearings and water bodies, lent the locale a distinctive quality. This reflects the importance of regional and local understandings of landscape and place, and the divergent (pre)historical trajectories and social relationships that meant that particular locales came to be particularly appropriate places for rock art to be created by different communities. That 'regional ways of doing' played this role is in keeping with our current interpretations of, in particular, the Middle Neolithic; a time when increasing regionality has been traced across a range of practices, monuments and material culture traditions (Cooney 2000: 16).

The nested scales of analysis addressed here have highlighted the way that particular patterns are echoed at different scales, from regional, to local to intimate landscapes. Thus we see nexuses and regional clusters structured and positioned in such a way as to mirror the wider patterns and associations seen across the surrounding region. This is particularly striking in Drumirril, where the undulating topography both echoes in miniature form, and forms the threshold to, the drumlin terrain to the west. Although the motif analyses presented here are very much preliminary, these have demonstrated that particular patterns of motif or compositional variation occur repeatedly across certain regions, within regional clusters and on individual hilltops. This suggests that people found places that reflected or reinforced certain understandings of the wider world around them to be particularly effective locales for the repeated practice of rock art over several generations. As Roymans (1995: 3) has noted, “sacred places are focal points from which local communities order and interpret the surrounding landscape”.

The ways different communities interpreted and structured their landscapes reveals some common, and some different, connotative associations across different regions. These characteristics indicate that an interwoven range of social, ideological, and economic qualities of landscape may have informed the decisions and choices used by the carvers to position their petroglyphs. In this way, both the “shape, form, contours and colour of the land” (Cooney 2000: 220), and the daily practices of working the land and its materials, would have informed the ways in which traditions, such as carving living rock surfaces, developed and were transformed in different regions. Thus, we see locales such as the Isle of Doagh forming a focus for carving practices, a place whose unique shifting relationship to, and views back towards, the mainland may have lent it certain symbolic connotations, and a relevance to particular understandings of the world. As an island, Doagh would have represented a distinctive parcel of land; at once a place apart, yet connected, through a continually shifting relationship between land and sea. Though Smith and Blundell (1998) have cautioned researchers against assuming that concepts such as ‘boundedness’ are interpreted consistently cross-culturally, it seems likely that in this special case the unusual liminal character of the Isle would not have been lost on the Neolithic communities that used it (see Cooney 2004: 150). At the same time, we also learn that Doagh is one of the only areas of productive acid brown earth soils on the Inishowen Peninsula. These material qualities may well have been closely interwoven in the minds of the communities using, perhaps living on, or visiting the Isle.

The Isle of Doagh represents a diminutive, modest landscape location in terms of visual and physical topography. In this way it contrasts with the ideas proposed by Taçon (1999; see Chapter 1) as to the types of landscapes that form the focus of ritual marking traditions. Low visibility appears to have played an even more prominent role in the case of the Drumirril and Loch an Dúin clusters. With only one exception (the unlocated panel at Tullagee, County Louth), neither cluster is visible from the surrounding dispersed panels on the basis of the viewshed analyses presented here. While this comes as no surprise for the Dingle study area, where the dramatic mountainous spine of the peninsula separates the cluster from the dispersed panels, in Drumirril, even the dispersed panels located nearby lack visual contact. These observations need to be ground-proofed in future work, but the repeated pattern indicates that these clusters seem to be situated in visually secreted parts of the landscape. Of course, this is only in relation to the surrounding dispersed panels, and remains to be tested for other Neolithic site types in future work.

The low-visibility character of this marking practice is in keeping with its intimate and modest nature. This highlights the culturally constituted nature of people's response to landscape in specific social contexts (Smith and Blundell 1998). As discussed below, this aspect may offer clues as to the types of social identities and relationships the practice of rock art was able to reinforce, negotiate and reflect. As a 'monument' type, these sites are far from commanding in an authoritative sense, with comparatively little emphasis on prominent visual display, save for a few special cases. If the message conveyed was to be persuasive, it seems likely that only small, possibly close-knit groups would have been the target of this persuasion, particularly in the case of the dispersed and / or horizontal carved surfaces.

The positioning of rock art has been demonstrated to be highly sensitive to subtle features of local topography. This implies that people creating and visiting the sites made detailed 'readings' of the landscape when selecting locations for the creation of new rock art panels, and possessed an intimate knowledge of these places when relocating an existing panel. Given the widespread evidence for Neolithic and early Bronze Age occupation activity and timber structures across the Louth / Monaghan region, it seems likely that this kind of intimate knowledge arose out of everyday experiences of local and regional landscapes on the part of communities living with these areas, at least in this particular study area. We can imagine that through an individual's lifetime many visits were made to local panels and regional clusters at particular times of the year, or perhaps in association with particular events or circumstances.

It is not enough to simply identify the characteristics of significant places in the landscape – we must move beyond this to discuss how and why such places became significant, and how and why they formed such effective locales for carving practices in terms of their wider social context (Van Dommelen 1999: 280-1). Each visit people made to rock art panels would have reinforced a personal and genealogical connection to particular pathways across the landscape, to particular locales, and even individual stones, enabling these paths and places to be 'memorised' through repetition of experience in a very physical and tangible way (Rowlands 1993). Care is required here however, as these types of observations also relate back to our experiences as landscape archaeologists, as discussed in Chapter 1. The archaeologist too learns to locate carved stones by following remembered paths, and by retaining memories of physical encounters with the textures, colours and symbols of the stone surfaces.

The types of places and features that drew the practice of rock art close also resonate across other types of architectural, depositional and material traditions of the Neolithic. The importance of the Isle of Doagh within the Inishowen Peninsula corpus echoes the growing realisation that islands, due to their inherently liminal and bounded nature, may have played important roles in the building of regional identities in the past, as they continue to do today (Cooney forthcoming; see also Cooney 2004). The consistent association between panels and small hilltops and ridgelines across the Mhuirthemne Plain that bear striking resemblances to built monuments (see Scarre 2002b) may indicate an ideological association in this region between carving practices and the building of architectural mounds, such as the passage tombs and Linkardstown graves of the Neolithic. What is intriguing about the carved hilltops at Drumirril is that they were eventually defined even more resoundingly via enclosing ditches and banks. The construction of the enclosure modified the ‘natural monument’ of the carved rocky hilltop even further, and enhanced its visual resemblance to built monuments. O’Sullivan (pers.comm.) has explored the fact that passage tombs frequently exhibit enclosing features of various types that act to define a ‘ritual space’ around the monument. Despite the recovery of Middle Neolithic pottery from the base of the repeatedly recut ditch around one of the Drumirril hilltops, the origin of these constructions is not yet clear. It remains possible that the features are prehistoric in origin, though radiocarbon dates from the upper fill produced Early Christian determinations (see Chapter 5). The identification of a buried soil beneath the bank suggests that future work may yield datable evidence, at least in the form of a *terminus post quem* for the construction event(s).

It is notable that of the three areas investigated here, this is the only region that also features art from what would have been broadly contemporaneous megalithic monuments at Newtownbalregan, Tateetra, Killin, Carrickrobin and (based on the discussion in Chapter 2) Ballybarrack. Thus, the connotative effect of the morphological associations between the contexts of the two carving traditions would have been particularly resounding in this region. It remains a possibility that, in a very broad sense, rock art sites may have formed locales where the types of activities and events that occurred were in some ideological sense related to, and therefore referenced, those associated with passage tombs. For example, one of the roles played by passage tombs and other megalithic monuments may have been to aid people in the process of remembering and forgetting their ancestors and deceased kin (Cooney 2000: 119-126). The links between quintessential rock art and the carvings associated with Neolithic and Bronze Age funerary monuments hints at a potential role for rock art as ‘sites of memory’ (Nora 1989). The quarrying and reuse of rock art in the construction of later funerary monuments, particularly in northern and southwestern Britain, further reinforces this connection. The present evidence fails to identify any consistent spatial links between funerary monuments and rock art sites in the study areas addressed here. However, it remains possible that rock art traditions, as a ‘technology of remembrance’ (Jones 2003), played some role in ancestral rituals, perhaps even the negotiation of death and loss, since many of the funerary practices of the Neolithic may have left little in the way of obvious physical traces (Cooney and Grogan 1994: 70; Cooney 2000: 89-90). Having said that, the possibility that there was a broad link between rock art and funerary practices need not negate the idea that the creation of carvings also played a role in a wider range of aspects of Neolithic life.

Memory and meaning

"If people could say it, they would not make it" (Tilley 1999: 272).

The notions of permanence, and memory are particularly relevant for rock art in Ireland and Britain. As petroglyphs, these motifs are surprisingly durable, even given the degree of weathering evident on many of their exposed surfaces. Differential weathering, rare cases of superimposition and combinations of motifs which appear to be produced by different carvers all suggest that the creation of rock art was a repeated activity involving several visits, and possibly several carvers, over a considerable duration of time. Evidence for multiphase compositions and the relationship between artificial motifs and natural features in the stone suggests that the concept of the passage of time, and relationships to times past may have played a critical role in the ways rock art sites were understood and used by their makers and viewers. Rock art would have provided a window onto the ways Neolithic communities made use of landscape as "a source of / for memory or sentiment" (Conkey 1997: 360). It seems likely that memories, events, narratives and genealogies could have been traced, visually, verbally, and probably through the physical engagement with the changing textures and forms of the carved surfaces.

Several of the landscape features with which rock art is associated, and the landscape features that appear to have structured the regional distributions of rock art can be described as thresholds and liminal places. This is particularly notable in the regional clusters of the Isle of Doagh, Drumirril and the Loch an Dúin Valley. Such places can be conceived of as "sites of imaginative transformation, doors to different worlds" (Smith 2000: 15). These types of interpretations are far from new, whether discussing rock art, hoard deposition in wetlands (Bradley 1990; Cooney and Grogan 1994: 211-2), or the hilltop siting of some megalithic tombs (see Eogan 1986; Bergh 2002). For example Waddington (1998) has described the carved rock surfaces themselves as liminal places, through which people could communicate with spiritual worlds. The behaviour of motifs across the stone surfaces, where grooves direct water towards the edge of the panel and into the surrounding soil, and motifs emerge from or disappear into fissures and depressions, emphasises this liminal quality. It seems likely that these qualities both mirrored and aided the types of practices conducted at rock art sites, including the evocation of personal and cultural memories. What the results of the present study have shown is that people also structured their practices across whole regions in response to these types of transformative landscape qualities. As outlying clusters, the regional points of focus perhaps drew on the narrative and instructive aspects of traversing the landscape. Such aspects are effective ways of reinforcing memories, both through the repeated experience of place and through repeated acts of carving, and would have served to emphasise the importance of individual, genealogical and more ancient community histories (see Rowlands 1993).

What is intriguing and somewhat unique about rock art is that carved stones are simultaneously both object and place. In this way rock art panels are well placed to provide a particularly effective form of *aide memoire*. Both places and objects can elicit “lost traces” of past events or owners via “direct re-engagement with past experience in ways that are prevented in language” (Rowlands 1993: 144). Refering to Kopytoff’s (1986) discussion of the biography of things, Rowlands (ibid) also notes that “objects of a durable kind assert their own memories, their own forms of commentary and therefore come to possess their own personal trajectories”. This is true of rock art panels, both those visited, and perhaps carved, repeatedly over generations, and those that were erected, or quarried, fragmented, transported, or buried. In these cases, the physical markings of time are “literally inscribed” on the stone surfaces (Rowlands 1993: 149).

The repeated visits to rock art locales, and the formalised nature of rock art production suggests that the tradition may well have played a role in the creation, and assertion, of cultural history and myth, as defined by Gosden and Lock (1998). Based on the field observations during the present research the ground level character of many panels would have meant that soil deposits and vegetation were constantly encroaching on the carved surfaces. As a result it seems likely that the panels themselves were repeatedly cleared and cleaned of turf and given the widespread nature of pockets of woodland in the Neolithic, leaf litter, both to view existing carvings, and to expose stretches of uncarved stone for further embellishment. The significance of these types of maintenance rituals in the creation of history, and the continuance of communities’ connections to their own past (ibid: 4) has been discussed with regard to the prehistoric chalk carvings and linear ditches of southern England (ibid: 6):

“A regular cycle of cleaning and refurbishment would have strengthened peoples’ ties to a known past, reinforced the potency of that past in the present or changed the nature of attachment to that past”.

In rock art too, we can tentatively identify the distinction between history and myth proposed by Gosden and Lock (ibid: 4). For instance, it seems likely that the panels and outcrop formations that were marked and remarked in particular areas over generations reflect the maintenance of a history of practice where knowledge of the genealogy of at least the more recent participants is retained. In contrast, the elaboration and embellishment of natural features in the stone may reflect the creation and maintenance of myth, whereby ancient features are reworked and given new values (ibid: 4; see also Bradley 1998). Similarly, the reuse of rock art panels in later monuments and burials, where, as we have seen, the original significance of compositions and their internal grammar are transformed, even inverted, represents the use of ancient features in new ways, maintaining connections to even the very distant past.

What is interesting about the case of Atlantic rock art is the rarity of superimposition, whereby earlier motifs are overlaid by later designs. In contrast, this is a distinctive feature of plastic style passage tomb art, where pick dressing and visually dominant designs elide or entirely obscure earlier phases of depictive style carving (O’Sullivan 1986). Particularly in cases where new motifs have been added to earlier rock art compositions, this suggests that carving events were conscious acts in an ongoing, additive rather than transformative process. In itself this highlights the relevance and maintenance of history and memory as fundamental part of the practice.

In his discussion of modern memorial building, Rowlands (1993) has made a useful distinction between the ‘primary rites’ of the funerary process, and the ‘secondary rites’ of remembrance traditions. Though emphasising their blurred nature, Cooney (2000: 119-26) has also distinguished between funerary traditions that followed the death of a family member, and broader ancestor rituals, both of which are associated with Neolithic tombs. Rowlands has described the “separation of the time-bound, polluting aspects of primary rites from the regenerative aspects of the secondary rites on which the reintegration of permanent order depends”, and the forgetting process through which discontinuity is denied Rowlands 1993: 145). In other words, both remembering and ‘laying memories to rest’ play important roles in the ways individuals and communities cope with death and loss. The latter enables people to move on with their lives by reinforcing the enduring strength of families and communities in the face of traumatic events.

This may offer a useful way of thinking about the similarities and contrasts between rock art and passage tomb art raised above. The latter is situated in a context that is directly connected to (though by no means solely driven by) funerary practices – the ‘time bound and polluting rites’ of ancestor rituals and funerary practices. Meanwhile, the current evidence for rock art and sites of a funerary nature does not indicate a consistent spatial association. In the Louth Monaghan area in particular the two site types are virtually mutually exclusive in their distributions. If the proposed link between rock art and memory is correct, then it seems possible that the practice played a role in the regenerative, reintegrative and forgetting processes that Rowlands (ibid) describes, as a means of emphasising the continuity of community life. If so, the kinds of distinctions between the parts of the landscape where we see rock art and passage tomb art occurring can be interpreted as an essential part of the efficacy of these sites. In other words, they needed to occupy separate parts of the landscape for their role to be effective. This idea further heightens the significance of the regional clusters as ‘places apart’ in distributional, topographic, and visual terms. The construction of wedge tombs within the clusters at Loch an Dúin and on the Isle of Doagh during the Later Neolithic to Early Bronze Age therefore indicate a major shift either in the approach that these communities took to their memorialising practices or the attitude to carving traditions. Not only were the primary rites brought into the cluster, indeed into the nexuses within these clusters, but existing rock art panels themselves were also used to construct the monuments.

With reference to what he calls inscribed practices of memorialisation that take place over long durations, Rowlands notes that “in the act of repetition or replication, the original occasion of its usage is in some way evoked so that the unfolding progress of the tradition promises a future of further imitation [or reproduction], of renewed simulacra” (ibid 146). This description is particularly pertinent for the tradition of rock art, which, as we have seen, involved repetition and direct and indirect references to past carving events. This ‘slow repetition’ has been described as a way of counter-balancing dramatic social changes (Fowler 2003: 60), whereby “the small effects of individuals’ actions are often the most effective reminders of their existence for those who survive them” (2003: 57 citing Battaglia 1990: 197-8). As places people returned to generation after generation the regional clusters would have acted as foci of community and personal (genealogical) significance. The cumulative nature of the motifs whereby natural features and then carved designs are embellished, compositions grow and change, branching off from one another and establishing new connections may have served as a metaphor for social relationships within the community. In this way, Rowlands’ (1993:142) point is helpful in exploring why particular practices and particular places worked so effectively in the resolution of the tensions between remembering and forgetting. By repeatedly creating carvings in certain locales, and by adding to existing compositions, the practice of rock art reflects the idea that life and family lineage are ‘works in progress’, and that families and communities continue to live on after the loss of their loved ones.

Rock art, deposition and materiality

The repeated practice of rock art creation may be interpreted as more akin to sequential acts of deposition than to monument construction. Rather than individual items or assemblages, individual motifs and ‘assemblages’ of motifs are laid down onto the ground surface. Pollard has emphasised the importance of the performative nature of deposition (Pollard 2001: 316). The bodily experience of place (especially a repeated physical and material experience) reinforces the significance of certain events to both individual and community. This would have been particularly resounding if travelling to the regional rock art clusters involved fairly powerful physical experiences of traversing mountains, rivers or tidal estuaries. Physical contact with the panels themselves would also have contributed to the sensory experience (Gosden 2001). Purcell (1994) has described the dust and noise encountered during her experiments with carving petroglyphs. As Fowler (2003: 56) notes, “fields of memory are mapped out through experience of the material”, and in the case of rock art these sensory fields can be identified at a range of scales. In this way, both the material world of landscape, and the materiality of the stone surfaces would have served to reinforce the significance of carving events, and informed the memories of those events.

The nature of the motifs and the subtle results of the pecking technique is such that a direct physical closeness between the viewer and the stone is often necessitated or elicited, particularly in the absence of the grazing light which renders the motifs more readily visible. This recalls Lewis and Rose’s (1988: 47) description of Victoria River aborigines *addressing* rock art in a kind of “face to face” interaction with the stone. In the case of the petroglyphs of Ireland and Britain this interaction, at least in the present, is often a tactile experience where the viewer must often rely on touch as much as vision in order to make out the form of the designs (a situation which is not necessarily favourable in terms of conservation recommendations). The degree to which this would have been the case during prehistory is, of course, problematic. The motifs would only have gradually become less visible as the patina built up on the stone surface, and the motifs became more weathered.

Watson (2003: 65-9) has noted the importance of physical contact in the building of relationships between people and landscape, emphasizing the important role of, and concept of 'the skin' and tactile experience for the people of the Balgo area in central Australia. Here, there are numerous conceptual or ideological connections (not to mention motif parallels) between practices such as body painting, scarification, sand drawings and 'reading' animal tracks and other marks on the surface (skin) of the land. Bodily contact with the land via the bare skin is an important part of this process, and human skin and the surface of the terrain are seen as parallels. In the case of petroglyphs, the pecking or 'bruising' of designs into the surface of living rock might be compared to effectively 'tattooing the skin of the earth'. Whilst the dangers of simply overlaying such ethnographic insights onto prehistoric practices are well known (see Layton 2001), what these examples do illustrate is the nature of the physical realities of people's interaction with rock art. In this way, rock art brings a totally new perspective to how we think about Neolithic monumentality, and how people experienced and interacted with these monuments in the past. If these monuments are to do with expressing and reinforcing memory and the meanings embedded in the landscape then rock art seems to achieve this at a much more personal and intimate level than other monument types.

Relational identity and ideologies of concealment and display

The present research has questioned the validity of models that assign complex and simple panel types to parts of the landscape that were accessed by different audiences. By opening rock arts sites to more varied audiences that might well have consisted of the kinds of social groups living nearby, a new light is cast on the ways that the practice of rock art may have served to express and create social and individual identity. The question of whether rock art was separate from, or integrated into daily life is an important one to ask. It brings to bear on whether we ought to proceed along the lines argued by shamanistic approaches, whereby rock art plays a religious role (Lewis-Williams and Dowson 1988; Dronfield 1995, 1996) controlled by a select elite, or whether we look to studies such as that by Küchler (1987) on Malangan art in New Ireland, or Watson (2003) on sand drawings in Australia, where, depending on the context, all kinds of people within a given community engage with various art practices. Since the ethnographic record provides examples of both restricted and open practices, there is no reason to assume that all stone carving was necessarily limited to an elite social group. What the discussion below offers is the possibility that both restricted *and* open forms of artistic practice can be identified during the Neolithic.

Although recent work by Purcell (2001: 88) has identified difficulty of access as an important factor in the location of numerous Iveragh Peninsula rock art sites, in most cases the stones can be approached from any direction within the immediate landscape. This does not negate the fact that the viewers may well have followed socially imposed, traditional or remembered routes to reach the panels. However, unlike the approach and entry into passage tombs, stone circles and other megalithic monuments, there are generally fewer demands imposed on the visitor in terms of the direction of approach and bodily movement. The motifs are often only visible once the viewer is almost literally on top of the boulder or outcrop. It is only then that the 'visually arresting' and 'enchanting' aesthetic qualities of the carvings can take hold of the viewer (Bradley 1997; Gell 1992). The generally inconspicuous landscape position of what are often small ground-level stone surfaces suggests that in the majority of cases the panels were not intended to dominate the visual landscape. As a result, these 'monuments' are usually only visible to small groups of people at once. The hilltop locations of the panels at Drumirril accentuate this situation, with some panels located on rocky summits where the viewing space is relatively limited. The modest and sensitive nature of rock art provides an entirely different approach to marking and socializing the landscape to the better-known megalithic monuments. The actual creation of rock art is not an act dependant on communal effort or brute force. Single individuals might have created single motifs, and sometimes even entire panels. The positioning of rock art has been demonstrated to be highly sensitive to subtle features of the local topography. This also implies that people creating and visiting the sites made detailed 'readings' of the landscape when selecting locations for the creation of new rock art panels, and possessed intimate knowledge of these places when locating an existing site.

In addition to the regional clusters featuring large concentrations of carved panels, we also see rock art dispersed widely across the regional landscape. This general pattern contrasts with the distribution of passage tomb art, which, with some exceptions, tends to occur in large complexes of passage tombs. This contrast is particularly notable in the Louth / Monaghan area, where we see the candidates for megalithic art panels clustered predominantly around the Kilcurry and Castletown River confluence. The presence of a range of single or paired panels scattered across the wider region may indicate that the production and use of rock art was required on a more regular basis by wider ranges of social groups than passage tomb art.

The last Chapter highlighted the tension between an underlying unity in the formal qualities of the Atlantic rock art corpus, and the apparent freedom with which carvers could create and add to designs and compositions. If we accept the idea that style "talks loudly" (Wobst 1999: 121) about individuals as well as groups, it seems likely that this quality reflects the importance of establishing and negotiating difference both between various social groups, and between individuals, whilst recognising "the merely *relative* character of all difference" (Gell 1998: 219-20). The motifs and compositions seen in Atlantic rock art are cumulative in nature, whereby basic design elements are combined and recombined in innovative and idiosyncratic ways, elaborating on existing features, establishing new connections and responding to the 'canvas' of the living outcrop or boulder. This quality may well serve as a metaphor for the narratives and messages the carvings communicated, emphasising the ambiguity and interconnectedness of people, places and history. The centrality of history and memory suggests that visits to and creation of rock art was associated with particular kinds of spoken narratives and oral histories. The subtext for the motifs of Atlantic rock art is also a concern for 'embeddedness' between the material world and human imagination, and ambiguity between natural features and cultural embellishment. As Smith notes, "like symbolic motifs and concrete materials, language is all about integration and interdependence, about being embedded in the world about us" (2000:

16). The endless novelty apparent in the compositions, as revealed by the second approach to motif classification presented in the last chapter, brings to mind Brück's discussion of relational identity and the 'dividual' self whereby people's identity is based on networks of interpersonal relationships rather than their inherent traits as bounded and independent individuals (2001, 2004; see also Fowler 2004). Referring to the considerable variability that can be observed in depositional practices at even a single class of Neolithic monument, Brück has observed that "it is hard to imagine that each of so many [idiosyncratic] depositional events was orchestrated by some dominant power; are we not hearing 'a cacophony of voices'?' (2001: 660 citing Bender 1993: 275).

As Brück (ibid) notes, "it is in this ambiguity that we see the diverse and often contradictory strategies of a society that cannot in every instance be conceived of as a unified and homogenous entity". This ambiguity and tension is arguably heightened in the practice of rock art, even more so than, for instance, the production of stone axes or architectural monuments during the Neolithic due to the relative lack of restrictions on their compositional morphology.

There is a marked stylistic contrast between rock art and the more formalised tradition of passage tomb art in the plastic style (O'Sullivan 1986). Rock art compositions tend to be idiosyncratic, irregular and informal. This contrasts with plastic style passage tomb art where the designs flood their stone canvases in a regular, even manner, often exhibiting a concern for symmetry and balance. Even in the proposed 'plastic style' rock art the degree of harmony simply does not match that seen in many plastic style megalithic panels, particularly when the combined effect of panel groupings is taken into account. In passage tombs stylistic groupings of panels that exhibit similar motifs, compositions and aesthetic effects can frequently be identified (see Eogan 1986 and O'Kelly 1982). While Chapter 6 pointed out that plastic style rock art shares many features of plastic style passage tomb art, there are seldom unified oeuvres identifiable in rock art, where the same types of motifs, compositions and technical qualities are seen across several panels located in close proximity to the extent that we see this in passage tomb art. They also maintain a higher level of idiosyncrasy to the compositions compared to plastic style passage tomb art. For example, in Magheranaul on the Isle of Doagh there are several parallel groove motifs occurring within a small area, but these are depicted using a wide variety of different scales, forms and techniques. The art on the small ground level panels in the Drumirril nexus comes closest, since these exhibit similar motif types depicted using similar carving techniques and at a comparable scale (Figure 7.1). In contrast, the other panels in Drumirril are distinctive and individual in terms of their compositions and motifs. Again, this is suggestive of a special role for the group of panels in the nexus.

A similar contrast is apparent between plastic and depictive forms of megalithic art. The multi-authored nature of depictive passage tomb panels bears more similarity to the rock art corpus as a whole in terms of its idiosyncratic nature. At Newgrange, Knowth and Fourknocks, the dominant plastic style designs on prominent display are characterised by their stylistic unity as panel groups, their symmetry, repetition, and the planned nature of the compositions (Shee

Twohig 1981; O'Kelly 1982; Eogan 1986). Their message is unified and clear in stylistic terms. The unified nature of plastic style passage tomb art might be said to lend it a sense of authoritative credibility, since it implies a structured and predefined approach to carving. In contrast the depictive designs, for instance on the hidden faces of the kerbstones at Newgrange, are varied and chaotic, competing with one another for space (e.g. Figure 2.12). Thus, both rock art and hidden depictive art in passage tomb contexts contrast with the stylistically unified oeuvres of individuals that many of the corpora of plastic style passage tomb panels demonstrate. It remains unclear whether these might have actually been masterminded by particular individuals and / or carried out by numerous hands. As O'Sullivan (1986: 74) has noted, "if the majority of compositions were not produced by one artist they evolved under the influence of a dominant unifying force or personality" (1981 Vol.1: 175). These contrasts are echoed in terms of access and movement, in the latter, one's approach to and view of the panels is informed more rigidly by the architectural context, and access may have been restricted to a specialist elite (though see Brück's 2001 critique of this). In comparison, rock art sites encourage a greater degree of freedom in terms of both one's physical approach to the panels, and one's choices in developing new divergent compositions alongside existing designs.

There is a danger of oversimplifying this line of argument. However, it seems possible that the practice of rock art, and the practice of the 'votive deposition' of depictive motifs on panels that were to become hidden within monuments, or overwritten by plastic style passage tomb art, may reflect some of the varied identities and social relationships that underwent constant negotiation within Neolithic communities, and indeed that were probably involved in building the tombs themselves. It is tempting to view the local dispersed rock art panels, and the regional clusters, as places where these forms of negotiation were more open and informal, and accessible to wider social groups. This is not to deny the potential power of rock art in the formation of social difference and inequality between groups and individuals. However, the manner in which this was achieved seems to reflect quite a different set of circumstances to those we see in the more formalised and controlled passage tomb context. These contrasts emphasise the key role that art forms (in the broadest anthropological sense) play in maintaining, challenging and renegotiating different forms of social identity. As Pollard notes, "depositing things in [or *on*] the ground … served on occasions as a very deliberate strategy in the negotiation of values. Such statements might relate to the identity of places, the definition of different kinds of personhood or being, or the working of relations and obligations" (2001: 316).

O'Sullivan (1986: 75-6) has stressed the intentionality with which the plastic style passage tomb art seems to be on display, emphasising the importance of these carvings as visual statements. This contrasts with the hidden depictive art, which seems to operate independently of visibility. The placement of depictive art in hidden locations (e.g. see Eogan 1984: 80-9, 172-77) seems to have been an essential part of its value. Gosden has pointed to the significance of acts of concealment and display with regard to the management of knowledge and social power (Gosden 2004: 41-4). Also of relevance here is Rowlands' (1993) discussion of 'incorporating practices', whereby objects are intentionally destroyed or buried. We might extend this idea to include the 'votive deposition' of hidden art in passage tombs (and later EBA burials). Once out of circulation, "such objects become a memory in their absence, and therefore the essence of what has to be remembered…They cannot function as an *aide memoire* and are thus not made with a view towards the past, but towards the future…they do not embody memories of past events but have themselves become embodied memories; objectified and condensed as a thing" (Rowlands 1993: 146-7; see also Brück 2004: 319-21). In this way they might be better described as '*enterrer* (to bury / say goodbye to) *memoire'*, whereby memories are laid to rest, and as Melanesian ethnography has shown, "object sacrifice will invariably 'stand for' some aspect of the person" (Strathern 1988: 161 cited in Rowlands 1993: 147).

Viewing rock art as the 'art of the masses' through which the individual might be liberated from authoritarian control would be to grossly exaggerate the differences between it and the passage tomb art tradition, and to romanticise the past as characterised by an idealised egalitarian society. Rather, we can envisage rock art as having played a role that was accessible and very much caught up in the everyday lives of Neolithic communities. Unlike passage tomb construction, the creation of rock art did not require a vast or organised pool of people. Currently we have little reason to suppose that those living in nearby settlements, and frequenting temporary locales of occupation in the surrounding area, that is men and women, older and younger members of the community, were restricted from rock art sites in the ways that have been proposed for passage tombs. In this way, we can picture rock art as having played a part in negotiating relationships and social tensions amongst the wider community. Thus art seems to have operated across multiple social spheres or networks during the Neolithic, when we see a range of distinct, yet interrelated traditions, as defined in Chapter 2, arising and transforming through time. Though there are problems with approaches that treat ancient art practices as equivalent to modern conceptions of art, as noted in Chapter 1, in fact even art in modern western societies is not so different from the situation just described. There are domains within which art is restricted to an elite audience of knowledgeable and powerful individuals. Alongside these artforms there are other art practices that operate within their own systems of knowledge and authority. Though many are particular to the modern western condition (consider for instance 'graffiti bombing', or the 'art attacks' performed by the 'Guerrilla Girls' (www.guerrillagirls.com)), there is a degree to which we can learn to envisage a more inclusive and varied picture of art practices and their spheres of influence in the past, even from contemporary western art.

As Brück has described, "people would have experienced several parallel versions of social reality constructed through different kinds of knowledge and informed by different concerns and interests. A person is therefore likely to have held power in certain contexts but not in others…although other types of knowledge are informed by and overlap with the dominant discourse, they are not coterminous with it simply because different subgroups within society can have quite different conditions of existence…although specific structures of authority doubtless existed, they did not extend themselves through every aspect of people's lives but were undercut and substituted by other forms of power in other situations” (2001: 663 citing Thomas 1996: 178-81 and Bender 1998: 89, 150). This would have occurred particularly when different aspects of people’s relative identity were highlighted in different contexts of action. Although the spatially distinct nature of passage tomb art and rock art suggests they may have played quite different roles in regional identity, this does not necessarily rule out an overlap between the social groups involved in creating and viewing the two traditions. The types of formal overlaps between the two practices discussed in Chapter 2 reinforce this potential ambiguity, where there are some motif types that are diagnostic of one tradition that occasionally occur in the other. However there would also have been limits to which the degree of overlap was appropriate; there would have been a framework of restrictions people operated within, and which delimited appropriate action. It is interesting that some of the rock art motifs that bear the strongest resemblance to the passage tomb designs in the Boyne Valley occur not in the surrounding regions, but in southern Scotland and Northern England (e.g. RCAHMS 1999). Whilst the connotations held by these motifs may have restricted the degree to which they could be employed in local rock art practices in acceptable ways, those further afield clearly found using them to be an effective means of communicating particular messages.

Closing note

On the basis of this discussion, rock art can be approached as a way of accessing the complexities of varying social relationships, and understanding “the different forms, bases and configurations of power as these were contextually actualised within Neolithic monumental contexts” (Brück 2001: 656). If these ideas are correct, then the investigation of rock art seems to represent one means of redressing the balance for a period where so much of the discourse on identity has been focused around megalithic tombs. These monuments are thought to have been orchestrated by elite social groups as an expression of the ‘dominant discourse’ in Neolithic society. In contrast, rock art panels appear to have been more open and accessible to wider social groups, both at the local level of the dispersed panels, and at the regional level, whereby local communities may have gathered or returned repeatedly to regional panel clusters. Thus, as this research has demonstrated, rock art seems capable of telling us about the ‘nested landscapes’ that were experienced by socially varied people co-inhabiting the land (see Bender 1998, Bender et al 1997 – Knapp and Ashmore 1999: 17-18). In combination with the growing body of settlement data for the Neolithic (see Cooney 2003), rock art may provide a window onto the everyday ritual practices of much wider communities and social identities than those that have traditionally been addressed. If so, this brings a renewed importance to our investigations of rock art sites and the settlements and field systems in the wider landscapes around them, using traditional methods such as excavation and geophysical survey, but in the sensitive ways demonstrated here. Furthermore, by exploring the formal variations in motif and compositional styles in relation to landscape we can begin to investigate how and why people found different carving practices to be an appropriate means of addressing the issues of identity and memory. In this way, the richly varied practices of carving in which people engaged, and slowly developed and transformed, during the course of the Neolithic and Bronze Age have much to offer research on both the material culture and landscapes of these periods.

Appendix A: Inventory of rock art panels

Panel Name	Easting	Northing	Class	Attributes	Inventory Number	Survey Number	RMP Number	Other Number / Reference	Status
Dingle									
Aghacarrible	51250	99650	1C	1,2,3,4,5,6,9,13,15,16,17,18,20,21, 22,25,26,28,29,30,33,34,35,36,37, 42,43,50,51,56,58,60,61,62,64,66, 67,68,69,70,71,72,73,74,75,87,88, 89,90,91,92,97,99	-	166	054-021	Findlay 1973; Findlay 1973; Cuppage 1986; Long 2002	In situ
Annagap	59350	103350	N/A	1	-	167	-	Cuppage 1986; Long 2002	Not located
Ardbeg	59050	112950	6A	1	-	168	035-01801	Cuppage 1986; Long 2002	Not located
Ardmore	52275	100055	1C	1,2,16,17,18,25,28,30,33,34,41,49, 54,56,57,58,60,61,68,70,71,75,87, 88,89,90,91	-	50	054-016	Cuppage 1986; Long 2002	In situ
Ardrinane	59650	101950	N/A	1	-	169	-	Findlay 1973; Cuppage 1986; Long 2002	Location unknown
Ballinasig 1	46350	102055	6A	2,20,21,28,35,41	-	170(1)	043-226	Cuppage 1986; Long 2002	Not located
Ballinasig 2	46350	102055	5A	1,2,5,9,25,26,28,33,41,42,88,99	-	170(2)	-	Cuppage 1986; Long 2002	Not located

Ballinknockane	69150	110450	N/A	2,29,33,35	-	171	-	Cuppage 1986; Long 2002	Location unknown
Ballintlea	35350	99750	5A	1,94,99,100	-	172	052-033	Cuppage 1986; Long 2002	In situ
Balinvownig	58050	101050	6A	2,33	-	173	-	Findlay 1973; Cuppage 1986	Location unknown
Ballyglasheen 1	60650	105450	1C	1,2,17,18,22,25,26,28,30,33,58,59, 60,61,63,67,68,72,73,89,91,94,99	-	174(1)	045-003	Findlay 1973; Cuppage 1986; Long 2002	In situ
Ballyglasheen 2	60650	105450	1A	1,17,91	-	174(2)	-	Cuppage 1986; Long 2002	In situ
Ballyglasheen 3	60650	105450	6A	1	-	174(3)	-	Cuppage 1986; Long 2002	Not located
Ballyglasheen 4	60650	105450	6B	1,18,58,88,99	-	-	-	Identified by author	In situ
Ballynasare Bridge 1	54750	101250	1C	1,2,7,8,17,23,28,29,30,31,33,34,44 ,58,59,60,64,66,67,68,70,71,72,73, 76,91,94	-	175(1)	-	Findlay 1973 (Banoge South); Cuppage 1986; Long 2002	Location unknown
Ballynasare Bridge 2	54750	101250	1B	1,2,7,28,31,32,33,34,67,68,71,72,7 3	-	175(2)	-	Findlay 1973 (Banoge South); Cuppage 1986; Long 2002	Location unknown
Ballyrishteen	49025	102550	6A	1	-	56	043-202	Cuppage 1986; Long 2002	In situ
Brackloon 1	60050	102250		N/A - unknown	-	176	-	Findlay 1973; Cuppage 1986; Long 2002	Location unknown

Brackloon 2	60150	101750	1A	1,2,5,7,14,16,17,18,28,29,30,33,41 ,57,63,64,67,68,70,71,72,73,87,88, 89,91,99	-	177	045-082	Findlay 1973; Cuppage 1986; Long 2002	In situ
Coumduff 1	58150	104350	5B	1,2,28,33,63,68,73,99	-	178	044-023	Cuppage 1986; Long 2002	Not located
Coumduff 2	58150	104350	6A	1,17,25	-	179	044-020	Cuppage 1986; Long 2002	Not located
Coumduff 3	58150	104350	N/A	1,2,33	-	180	-	Cuppage 1986; Long 2002	Location unknown
Dromavally	59750	104450	N/A	2,16,33	-	181	-	Findlay 1973; Cuppage 1986; Long 2002	Destroyed
Fahan	34850	97550	N/A	1	-	182	-	Findlay 1973; Cuppage 1986; Long 2002	Location unknown
Foheraghmore	50850	100150	N/A	1,2,28,33,34,35,67,70,94,99	-	183	-	Findlay 1973; Cuppage 1986; Long 2002	Location unknown
Glanmore	33050	101550	6A	1,26,92	-	24(9)	042-13209	Cuppage 1986; Long 2002 (Ballintemple)	In situ
Glanteenasig	61650	108150	1A	1,4,15,17,18,22,25,88,94,99	-	184	036-047	Cuppage 1986; Long 2002	Location unknown
Gowlaneard	53050	102950	6A	2,29,33,64,68,73,89,90	-	29b	044-02902	Cuppage 1986; Long 2002	In situ
Gowlane East 1	53350	102450	1B	1,2,28,33,34,35,99	-	185c	-	Findlay 1973; Cuppage 1986; Long 2002	Location unknown

Gowlane East 2	53350	102450	4B	1,2,17,28,33,34,36,99	-	185d	-	Findlay 1973; Cuppage 1986; Long 2002	Location unknown
Gowlane East 3	53350	102450	4B	1,2,28,33,35,99	-	185e	-	Findlay 1973; Cuppage 1986; Long 2002	Location unknown
Kildurrihy East	35250	100350	3A	1,16,18,19,24,60,92,100	-	967	052-037	Findlay 1973; Cuppage 1986; Long 2002	In situ
Killelton	71750	110750	1A	1,3,17,18,20,25,58,68,90,91,92,94,99	-	186	037-022	Findlay 1973; Cuppage 1986; Long 2002	Not located
Kinard East 1	49650	99350	1C	1,2,5,7,8,9,12,22,23,25,26,28,29,30,31,33,34,35,44,48,51,57,58,63,64,67,68,69,70,71,72,73,76,87,88,89,90,92,94,97,99,102	-	187(1)	053-054	Cuppage 1986; Long 2002	In situ
Kinard East 2	49650	99350	6B	1,2,25,28,33	-	187(2)	-	Cuppage 1986; Long 2002	In situ
Ballyhoneen 1	52749	108146	6A	2,28,33,41,48	-	25a	035-07301	Lough Adoon 9 (Long 2002); Site 79 (Ócoileáin 2003)	In situ
Ballyhoneen 2	52749	108146	6B	1,12,29,33,43,47	-	25a	035-07301	Lough Adoon 9 (Long 2002); Site 79 (Ócoileáin 2003)	In situ
Ballyhoneen 3	52749	108146	5A	1,3,15,94,99	-	25a	035-07301	Lough Adoon 9 (Long 2002); Site 79 (Ócoileáin 2003)	In situ
Ballyhoneen 4	52749	108146	6A	1	-	-	035-07301	Lough Adoon 9 (Long 2002); Site 79 (Ócoileáin 2003)	In situ
Ballyhoneen 5	52753	108179	6A	1	-	25b	035-07302	Site 10 (Ócoileáin 2003); Lough Adoon 8 (Long 2002)	In situ

Kilmore 1	52392	108615	2B	2,6,29,31,32,33,35,37,48,63,68,69, 71,75	-	25x	035-07324	Site 48 (Ócoileáin 2003); Lough Adoon 3 (Long 2002)	In situ
Kilmore 2	52326	108904	6B	2,28,33,63,68,73,91	-	-	-	Lough Adoon 2 (Long 2002); Site 51 (Ócoileáin 2003)	In situ
Kilmore 3	52354	108945	6A	2,28,33	-	-	-	Lough Adoon 1 (Long 2002)	Not located
Kilmore 4	52528	108689	4B	1,2,28,34	-	-	-	Lough Adoon 7 (Long 2002); Site 52 (Ócoileáin 2003)	Not located
Kilmore 5	52487	108628	6A	1,91,96	-	-	-	Identified by author	In situ
Kilmore 6	52446	108549	3B	1,2,22,25,28,35,63,68,69,72,73	-	-	-	Lough Adoon 4 (Long 2002); Site 49 (Ócoileáin 2003)	In situ
Kilmore 7	52515	108599	2B	1,2,17,28,33,34,88	-	-	-	Lough Adoon 5 (Long 2002); Site 54 (Ócoileáin 2003)	In situ
Kilmore 8	52535	108622	1B	1,2,8,28,33,50,57,58,63,67,68,70,7 2,73,89,90,91,92,96	-	-	-	Lough Adoon 6 (Long 2002); Site 53 (Ócoileáin 2003)	In situ
Loch an Duin	52752	107205	5B	1,2,28,31,35,36,57,58,59,63,65,66, 67,68,70,71,72,73,75,89,91,92	-	188	035-076	Findlay 1973; 'Lough Adoon 10 (Long 2002); Site 55 (Ócoileáin 2003)	In situ
Ballyhoneen 6	53209	107367	3B	1,2,28,33,96	-	-	-	Lough Adoon 11 (Long 2002); Site 84 (Ócoileáin 2003)	Not located
Lougher 1	63750	104850	4B	1,2,11,29,31,33,35,41,42,65,68,73	-	189(1)	-	Findlay 1973; Cuppage 1986; Long 2002	Museum

Lougher 2	63750	104850	1B	1,2,16,25,28,29,33,63,68,71,73,88,94,99	-	189(2)	045-032	Findlay 1973; Cuppage 1987; Long 2002	In situ
Lougher 3	64450	104250	5A	1	-	190	045-041	Cuppage 1988; Long 2002	Not located
Maumnahaltora	67950	106750	5A	1,99	-	35 TOMB 3	045-01305	Cuppage 1986; Long 2002	In situ no access
Milltown	42950	101150	1C	1,2,9,17,25,26,28,33,51,52,54,55,57,58,60,61,63,67,68,70,71,73,76,94,99	-	191	043-214	Findlay 1973; Cuppage 1986; Long 2002	In situ
Ventry	38390	98020	1C	1,2,7,8,16,18,22,25,28,29,30,31,32,33,34,41,47,58,63,67,68,71,73,74,75,88,89,91,92,94,97,99	-	-	052-303	Dunne 1998	In situ

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Anna McCanns	297475	306795	6B	2,13,25,26,29,32,33,42,64,68,88	-	1214	006-118	Van Hoek n.d.; Johnston 1989; Buckley and Sweetman 1991; Nolan 1999	In situ
Ballinloughan 1	296605	306705	6B	2,5,9,14,17,20,22,25,26,28,29,30,33,34,42,63,66,67,68,72,73,75,94,96	222	222	006-119	Van Hoek n.d.; Johnston 1989; Van Hoek 1985; Buckley 1986; Buckley and Sweetman 1991; Clarke 1982; Nolan 1999	Destroyed
Ballinloughan 2	296605	306705	4B	1,2,4,14,18,28,31,33,35,41,44,49,63,64,65,67,68,73,92	222	222	006-119	Van Hoek n.d.; Johnston 1989; Van Hoek 1985; Buckley 1986; Buckley and Sweetman 1991; Clarke 1982; Nolan 1999	Museum
Ballinloughan 3	296605	306705	6B	2,25,26,28,33,41,52,58,70,92,97	222	222	006-119	Van Hoek n.d.; Johnston 1989; Van Hoek 1985; Buckley 1986; Buckley and Sweetman 1991; Clarke 1982; Nolan 1999	Destroyed
Ballinloughan 4	296605	306705	6A	2,5,25,26,28,34,41	222	222	006-119	Van Hoek n.d.; Johnston 1989; Van Hoek 1985; Buckley 1986; Buckley and Sweetman 1991; Clarke 1982; Nolan 1999	In situ
Ballinloughan 5	296605	306705	6A	2,33,93	222	222	006-119	Van Hoek n.d.; Johnston 1989; Van Hoek 1985; Buckley 1986; Buckley and Sweetman 1991; Clarke 1982; Nolan 1999	Destroyed
Ballybarrack	303395	305245	1C	25,26,28,30,33,36,47,50,56,58,61,63,64,66,67,69,70,72,75,76,92,93,95,96	223	223	007-203	Kelly 1977; Van Hoek n.d.; Buckley 1986; Johnston 1989; Buckley and Sweetman 1991; Nolan 1999	Museum
Carrickallen	299485	306225	4B	2,9,12,14,22,24,25,26,29,35,60,87,92,93	-	1177	-	Van Hoek n.d.; Johnston 1989; Buckley and Sweetman 1991; Clarke 1982; Nolan 1999	In situ
Carrickrobin	297835	307345	1C	1,2,4,5,6,10,12,13,14,16,17,18,19,20,25,26,27,28,29,30,31,32,33,34,35,36,41,42,43,44,57,58,61,63,64,65,67,68,69,70,72,73,74,75,87,90,91,92,93,96,99	224	224	006-03302	Van Hoek n.d.; Tempest 1931; Buckley 1982; Johnston 1989; Buckley 1986; Buckley and Sweetman 1991; Nolan 1999	Museum

Comraghs 1	294108	305320	6B	1,2,30,34,93	69	-	-	Van Hoek n.d.; Clarke 1982; Johnston 1989; Nolan 1999	Not located
Comraghs 2	294108	305320	6B	2,34,35,87,93	69	-	-	Clarke 1982; Johnston 1989; Nolan 1999	Not located
Cortial 1	299655	306905	5B	1,2,5,15,25,26,28,29,34,35,42,60,63,64,68,70,71,73,75,89,90,92	225	225	006-121	Buckley 1986; Johnston 1989; Buckley and Sweetman 1991; Van Hoek n.d.; Clarke 1982; Johnston 1989; Nolan 1999	In situ
Cortial 2	299655	306905	6B	2,25,29,33	225	225	006-121	Buckley 1986; Johnston 1989; Buckley and Sweetman 1991; Clarke 1982; Johnston 1989; Nolan 1999	In situ
Crumlin 1	304772	304205	2B	1,2,25,26,29,33,35,41,42,43,47,68,87,92,93,96	-	-	-	Lynch 2002	Museum
Crumlin 2	304772	304205	2A	95	-	-	-	Lynch 2002	
Drumcah	294605	306435	1C	1,2,5,15,16,25,26,28,29,30,32,33,34,35,44,64,66,67,68,69,71,72,73,75,87,91,99,	226	226	006-122	Buckley 1986; Johnston 1989; Buckley and Sweetman 1991; Van Hoek n.d.; Clarke 1982; Johnston 1989; Nolan 1999	In situ
Drumcah 2			N/A	2,33	-	-	-	Clarke 1982; Buckley and Sweetman 1991	
Drumgonnelly 1	295755	305985	1C	1,2,12,25,26,28,29,1,33,34,35,41,57,61,69,70,75	227	227	006-123	Van Hoek n.d.; Clarke 1982; Buckley 1986; Johnston 1989; Buckley and Sweetman 1991	In situ
Drumgonnelly 2	295755	305985	5C	1,2,7,9,22,25,28,29,33,56,57,58,61,63,64,67,68,70,71,72,73,76,87,89,91,95,96,99	227	227	006-123	Nolan 1999	In situ
Drumirril 1	293483	304662	6B	2,9,25,26,28,35,63,68,73,88	69	-	032-19	Nolan 1999	In situ

Drumirril 2	293483	304662	6A	2,18,29,36,64,68,73,90,93	69	-	032-19	Identified by author	In situ
Drumirril 3	293513	304651	6B	2,6,18,25,26,28,29,33,35,41,48	69	-	032-19	Campbell and Millar n.d. (B); Johnston 1989 (B); 18 (Van Hoek n.d.); Nolan 1999	In situ
Drumirril 4	293535	304649	3B	1,2,4,12,14,15,18,21,25,26,29,33,41,44,89	69	-	032-19	Campbell and Millar n.d. (B); Johnston 1989 (B); 1 (Van Hoek n.d.); Van Hoek 1997; Nolan 1999	In situ
Drumirril 5	293535	304651	6A	2,20,25,28,34,63,86,75	69	-	032-19	Campbell and Millar n.d. (B); Johnston 1989 (B); 2 (Van Hoek n.d.); Nolan 1999	In situ
Drumirril 6	293538	304650	6B	2,25,26,31,33,34,41	69	-	032-19	Campbell and Millar n.d. (B); Johnston 1989 (B);; 3 (Van Hoek n.d.); Van Hoek 1997; Nolan 1999	In situ
Drumirril 7	293547	304664	1C	1,2,6,8,9,12,14,20,25,26,28,33,34, 41,56,57,58,60,61,63,66,67,68,69, 72,73,74,75,89,91,92,95,97	69	-	032-19	Campbell and Millar n.d. (B); Johnston 1989 (B); 5 (Van Hoek n.d.); Van Hoek 1997	In situ
Drumirril 8	293548	304663	1C	2,5,6,9,12,13,14,15,17,25,26,28,29 ,33,34,41,42,43,56,57,61,70,87,91, 96,99	69	-	032-19	Campbell and Millar n.d. (B); Johnston 1989 (B); 4 (Van Hoek n.d.)	In situ
Drumirril 9	293791	304669	4B	2,5,6,9,25,26,29,30,33,39,41,56,61 ,64,68,70,75,90,92,93,94	69	-	032-19	Campbell and Millar n.d. (C); Johnston 1989 (C); 6 (Van Hoek 1997); Nolan 1999	In situ
Drumirril 10	293793	304668	6A	2,18,29,32,35,46	69	-	032-19	Campbell and Millar n.d. (C); Johnston 1989 (C); Van Hoek 1997; Nolan 1999	In situ
Drumirril 11	293793	304668	6B	7,25,26,56,58,60,61,92	69	-	032-19	Campbell and Millar n.d. (C); Johnston 1989 (C); 7 (Van Hoek 1997); Nolan 1999	In situ
Drumirril 12	293793	304668	6A	2,25,26,29,33,88	69	-	032-19	7 (Van Hoek n.d.); Van Hoek 1997	In situ

Drumirril 13	293794	304670	1C	1,2,5,6,9,12,17,20,25,26,29,31,33, 34,35,44,58,63,64,65,67,68,70,75, 92,93	69	-	032-19	Campbell and Millar n.d. (C); Johnston 1989 (C); 8 (Van Hoek n.d.); Van Hoek 1997; Nolan 1999	In situ
Drumirril 14	293794	304671	6B	1,2,6,29,33,41	69	-	032-19	Identified by author	In situ
Drumirril 15	293794	304669	6B	N/A - very recent discovery	69	-	032-19	Identified by author	In situ
Drumirril 16	293793	304667	6A	2,29,30,37,64,68,75,87,92,93	69	-	032-19	Campbell and Millar n.d. (C); Johnston 1989 (C); 9 (Van Hoek n.d.)	In situ
Drumirril 17	293794	304667	4B	2,12,29,33,36,64,68,87,88,93	69	-	032-19	Campbell and Millar n.d. (C); Johnston 1989 (C); 10 (Van Hoek n.d.); Van Hoek 1997	In situ
Drumirril 18	293794	304668	4B	1,2,18,29,30,36,41,43,64,68,75,93	69	-	032-19	Campbell and Millar n.d. (C); Johnston 1989 (C); 11 (Van Hoek n.d.)	In situ
Drumirril 19	293794	304667	6A	2,21,35,93	69	-	032-19	Campbell and Millar n.d. (C); Johnston 1989 (C)	In situ
Drumirril 20	293809	304523	6A	2,29,35,87,93	69	-	032-19	22 (Van Hoek n.d.); Campbell and Millar n.d. (D); Johnston (D); Nolan 1999	In situ
Drumirril 21	293809	304521	6B	1,2,25,26,30,33	69	-	032-19	21 (Van Hoek n.d.); Campbell and Millar n.d. (D); Johnston (D)	In situ
Drumirril 22	293812	304522	1B	1,2,16,18,28,30,33,42,58,61,63,67, 68,70,72,73,87,88,89,90,93,94,99	69	-	032-19	20 (Van Hoek n.d.); Campbell and Millar n.d. (D); Johnston (D); Nolan 1999	In situ
Drumirril 23	293814	304523	4B	2,25,26,29,30,32,33,35,64,66,68,6 9,72,73,87,92,93	69	-	032-19	19 (Van Hoek n.d.)Campbell and Millar n.d. (D); Johnston (D);	In situ

Drumirril 24	293783	304828	4B	2,16,25,26,29,30,31,33,34,38,93	69	-	032-19	12 (Van Hoek n.d.); Campbell and Millar n.d. (A); Johnston 1989 (A); Van Hoek 1997; Nolan 1999	In situ
Drumirril 25	293799	304876	1B	1,2,25,26,29,30,33,34,35,42,43,88	69	-	032-19	13 (Van Hoek n.d.); Campbell and Millar n.d. (H); Johnston 1989 (H); Van Hoek 1997	In situ
Drumirril 26	293854	304848	5B	2,6,13,25,26,28,29,30,33,34,35,48, 58,63,64,67,68,72,73,89,90,91	69	-	032-19	15 (Van Hoek n.d.); Campbell and Millar n.d. (B); Johnston (B); Nolan 1999	In situ
Drumirril 27	293855	304850	2C	1,2,17,20,25,26,30,31,32,33,35,47, 48,51,57,58,60,61,63,65,68,75,87, 89,90	69	-	032-19	14 (Van Hoek n.d.); Campbell and Millar n.d. (B); Johnston (B); Nolan 1999	In situ
Drumirril 28	293870	304874	6A	2,5,13,25,26,28,34,41,92	69	-	032-19	25 (Van Hoek n.d.); Campbell and Millar n.d. (B); Johnston (B); Nolan 1999	In situ
Drumirril 29	293934	304858	5B	1,2,25,26,29,30,31,33,34,41,42,48, 63,67,68,73,87	69	-	032-19	Nolan 1999	In situ
Drumirril 30	294005	304822	6A	25,26,31,34,41,47,63,69,88	69	-	032-19	24 (Van Hoek n.d.); Campbell and Millar n.d. (G); Johnston 1989 (G)	In situ
Drumirril 31	293897	304806	6A	9,25,26,34,42,46,47	69	-	032-19	23 (Van Hoek n.d.); Campbell and Millar n.d. (F); Johnston (F); Van Hoek 1997	In situ
Drumirril 32	293483	304881	4B	1,2,18,22,25,29,36	69	-	032-19	16 (Van Hoek n.d.); Campbell and Millar n.d. (K); Johnston (K); Van Hoek 1997; Nolan 1999	In situ
Drumsinnot 1	296045	307985	2C	1,2,6,7,8,12,14,18,25,26,29,30,33, 34,35,41,42,43,44,45,60,63,68,69, 70,72,74,75,90	228	228	006-124	Buckley 1986; Johnston 1989; Buckley and Sweetman 1991; Van Hoek n.d.; Clarke 1982; Nolan 1999	In situ
Drumsinnot 2	296045	307985	6A	2,5,25,26,30,34,46,68,87	228	228	006-124	Buckley 1986; Johnston 1989; Buckley and Sweetman 1991; Van Hoek n.d.; Clarke 1982; Nolan 1999	In situ

Drumsinnot 3	296045	307985	5A	2,3,4,10,15,25,26,58,91,99	-	-	006-124	Buckley 1986; Clarke 1982; Johnston 1989; Buckley and Sweetman 1991	In situ
Edenakill	297885	312365	6A	2,25,26,30,35	199	199	-	Gerard Millar pers.comm.; Nolan 1999	In situ
Killin Hill	301035	310105	N/A	N/A - megalithic art panel	229	229	006-01502	Buckley 1986; Buckley and Sweetman 1991; Evans 1939	In situ
Miskish More	291335	309445	4B	1,2,19,25,28,39,63,66,69,72,74,75, 92	70	-	029-13	Raftery 1953; Brindley 1986; Van Hoek n.d.; Johnston 1989; Nolan 1999	Museum
Tankardsrock 1	301255	307825	6A	2,9,18,29,33,64,68,73	230	230	007-102	Buckley 1986; Clarke 1982; Van Hoek n.d.; Johnston 1989; Buckley and Sweetman 1991; Nolan 1999	Buried
Tankardsrock 2	301255	307825	6A	2,28,35,63,66,68,72,73,75,88,93	230	230	007-102	Buckley 1986; Clarke 1982; Van Hoek n.d.; Johnston 1989; Buckley and Sweetman 1991; Nolan 1999	Buried
Tankardsrock 3	301255	307825	6B	1,2,13,18,25,26,33,58,89,93	230	230	007-102	Buckley 1986; Clarke 1982; Van Hoek n.d.; Johnston 1989; Buckley and Sweetman 1991; Nolan 1999	Buried
Tinure Stone	305061	283407	N/A	N/A - outside main Louth study area	-	-	-	Van Hoek n.d.; Tempest 1937-40	In situ
Tullagee 1	295295	305515	6B	2,5,9,18,28,35,46,63,66,67,68,69,71,72,73,74,75,87,88,93	231	231	006-126	Tempest 1933; Buckley 1986; Van Hoek n.d.; Johnston 1989; Buckley and Sweetman 1991; Nolan 1999	In situ
Tullagee 2	295305	305355	6A	2,53	232	232	006-125	Van Hoek n.d.; Buckley 1986; Johnston 1989; Buckley and Sweetman 1991; Nolan 1999	Not located
Newtownbalregan 1	302156	308928	1C	1,2,10,11,14,18,20,22,25,27,28,33, 41,42,47,57,62,70,89,92,93,94,95, 96	-	-	-	O'Connor 2005b	Museum

Newtownbalregan 2	302156	308928	6B	1,58	-	-	-	O'Connor 2005b	Museum
Carnmore 1	304912	310860	1A	N/A - very recent discovery	-	-	-	O'Connor 2005a	Museum
Carnmore 2	304912	310860	N/A	N/A - cist art panel	-	-	-	O'Connor 2005a	Museum
Tateetra	302587	309824	N/A	N/A - megalithic art panel	-	-	-	O'Connor 2005b	Museum
Drumirril 33	293907	305030	N/A	N/A - unknown	69	69	032-19	26 (Van Hoek n.d.); Campbell and Millar n.d.(J); Johnston 1989 (J)	Not located
Drumirril 34	293288	305014	N/A	N/A - no access	69	69	032-19	Campbell and Millar n.d. (L); Johnston 1989; 17 (Van Hoek n.d.); Van Hoek 1997	No access
Drumirril 35	293288	305014	6A	2,9,25,26,28,34	69	69	032-19	Campbell and Millar n.d. (L); Johnston 1989	No access
Drumirril 36	293925	304563	1C	1,2,7,18,20,24,25,28,29,31,34,35,41,68,88,93,99	69	69	032-19	Identified by author	In situ
Drumirril 37	293934	304617	1C	1,2,3,4,7,9,18,24,25,26,28,30,33,34,57,58,61,63,64,66,68,70,72,75,76,92,94	69	69	032-19	Identified by author	In situ
Cortial 3	299655	306905	N/A	N/A - unknown	225	225	006-121	Johnston 1989	Not located

Inishowen									
Drumcarbit 1	248650	450350	4B	2,30,33,40,46,66,68,72,73,75	-	-	-	Crumlish 1991	In situ
Altashane 1	243050	446750	5C	1,2,18,22,23,24,25,35,59,61,99	-	335	-	Lacy 1983 (general ref. to area / monument); DON 45 (Van Hoek 1988); Johnston 1989	In situ
Clehagh 1	238750	446550	3A	1,100	-	652	-	Lacy 1983 (general ref. to area / monument); DON 53 (Van Hoek 1988, 1993)	In situ
Clehagh 2	238750	446550	2A	1,29,33,42,47,99,100	-	652	-	Lacy 1983 (general ref. to area / monument); DON 53 (Van Hoek 1988, 1993)	In situ
Clehagh 3	238750	446550	4B	1,2,20,33,63,68,73,96	-	652	-	Lacy 1983 (general ref. to area / monument); DON 53 (Van Hoek 1988, 1993)	In situ
Clehagh 4	238750	446550	5A	1,23,99,100	-	652	-	Lacy 1983 (general ref. to area / monument); 'DON 53 (Van Hoek 1988, 1993)	In situ
Clehagh 5	238750	446550	3A	1,17	-	652	-	Lacy 1983 (general ref. to area / monument); DON 53 (Van Hoek 1988, 1993)	In situ
Clehagh 6	238750	446550	2A	1	-	652	-	Lacy 1983 (general ref. to area / monument); DON 53 (Van Hoek 1988, 1993)	In situ
Clehagh 7	238750	446550	6A	1	-	652	-	Lacy 1983 (general ref. to area / monument); DON 53 (Van Hoek 1988, 1993)	In situ

Clehagh 8	238750	446550	3A	1	-	652	-	Lacy 1983 (general ref. to area / monument); DON 53 (Van Hoek 1988, 1993)	In situ
Clehagh 9	238750	446550	N/A	N/A - multiperiod / Early Christian	-	652	-	Lacy 1983 (general ref. to area / monument); DON 53 (Van Hoek 1988, 1993)	In situ
Clehagh 10	238750	446550	6A	N/A - multiperiod / Early Christian	-	652	-	Lacy 1983 (general ref. to area / monument); DON 53 (Van Hoek 1988, 1993)	In situ
Clehagh 11	238750	446550	N/A	N/A - multiperiod / Early Christian	-	652	-	Lacy 1983 (general ref. to area / monument); DON 53 (Van Hoek 1988, 1993)	In situ
Clehagh 12	238750	446550	N/A	N/A - multiperiod / Early Christian	-	652	-	Lacy 1983 (general ref. to area / monument); DON 53 (Van Hoek 1988, 1993)	In situ
Clehagh 13	238750	446550	6A	N/A - multiperiod / Early Christian	-	652	-	Lacy 1983 (general ref. to area / monument); DON 53 (Van Hoek 1988, 1993)	In situ
Clehagh 14	238750	446550	6A	N/A - multiperiod / Early Christian	-	652	-	Lacy 1983 (general ref. to area / monument); DON 53 (Van Hoek 1988, 1993)	In situ
Cloontagh 1	239950	444250	5B	1,2,28,29,33,34,64,68,73,88,100	-	653	-	Lacy 1983); DON 54 (Van Hoek 1988); Johnston 1989	No access obtained
Meendoran 1	239850	443550	1B	1,2,18,29,33,34,58,90,91	-	-	-	DON 55 (Van Hoek 1988); Johnston 1989 (Meendoran B)	In situ
Meendoran 2	239450	442175	5B	1,2,29,33	-	659	-	Lacy 1983 (general ref. to area / monument); DON 56 (Van Hoek 1988); Johnston 1989	In situ
Meendoran 3	239650	442250	5B	1,2,28,33,63,68,73,88	-	-	-	Lacy 1983 (general ref. to area / monument); DON 57 (Van Hoek 1988); Johnston 1989	In situ

Meendoran 4	239650	442250	5B	2,18,22,28,33,99	-	-	-	DON 58 (Van Hoek 1988); Johnston 1989	In situ
Glebe	231550	437050	5A	1,23,99	-	419	-	Lacy 1983 (general ref. to area / monument); DON 61 (Van Hoek 1988); 18/1 Colhoun 1995	In situ
Ardmore	247250	426450	1C	1,2,5,9,11,18,25,28,29,33,34,35,36 ,42,44,45,49,50,52,55,57,58,61,63, 67,68,70,71,73,74,75,91,92,96,99	-	340	-	Lacy 1983 (general ref. to area / monument); DON 67 (Van Hoek 1988); 39/2 Colhoun; Johnston 1989	In situ
Knockergrana	255255	447150	N/A	1	-	654	-	Lacy 1983; DON 48 (Van Hoek 1988); 12/39 Colhoun	Not visited
Ballyliffin	239000	447650	N/A	N/A - unknown	-	648	-	Lacy 1983; 10/1 Colhoun 1995	Not visited
Carrowmullin	234850	428150	N/A	1,33,73	-	650	-	Lacy 1983 (general ref. to area / monument); Johnston 1989; Van Hoek 1988	Not visited
Lisfannan	233850	427550	N/A	N/A - unknown	-	655	-	Lacy 1983	Not visited
Tullyarvan	235250	434150	N/A	N/A - unknown	-	661	-	Lacy 1983 (general ref. to area / monument);	Not visited
Ballyannan 1	232150	438050	N/A	1,2,33,96	-	662	-	Lacy 1983; DON 60 (Van Hoek 1988); 18/3 Colhoun 1995; Johnston 1989	Not visited
Straid 1	236450	446750	6A	1	-	1610	-	Lacy 1983 (general ref. to area / monument); DON 49 (Van Hoek) 1988; 10/27 Colhoun	Not visited
Carndoagh	243750	447450	3A	1,99	-	367	-	Lacy 1983 (general ref. to area / monument); DON 47 (Van Hoek 1988); 11/44 Colhoun	Not visited

Meendoran 5	239450	442175	3A	1,2,5,28,30,33,34,63,68,73,91	-	659	-	Lacy 1983 (general ref. to area / monument); Johnston 1989	In situ
Carrowreagh 1	241486	449856	6A	2,28,34	-	-	-	DON 3A (Van Hoek 1988)	In situ
Carrowreagh 2	241483	449847	5B	1,2,18,28,33	-	-	-	DON 3B (Van Hoek 1988)	In situ
Carrowreagh 3	241595	450079	4C	1,2,3,9,17,18,28,34,37,42,55,60,63 ,68,73,99	-	-	-	DON 10B (Van Hoek 1988)	Buried
Carrowreagh 4	241595	450079	6B	1,2,9,28,34,76	-	-	-	DON 10F (Van Hoek 1988)	Not located
Carrowreagh 5	241477	449859	6A	2,28,33	-	-	-	DON 3 (Van Hoek 1987)	In situ
Carrowreagh 6	241585	450045	5A	1,2,28,33,99,100	-	-	-	DON 4 / Craigawannia B (Van Hoek 1987); Carrowreagh B (Johnston 1989)	In situ
Carrowreagh 7	241606	450190	6A	2,31,32,35,65,68,73	-	-	-	DON 5 (Van Hoek 1987)	Not located
Carrowreagh 8	241701	450199	5B	1,2,22,28,33,63,68,73	-	-	-	DON 6 (Van Hoek 1987); Carrowreagh C (Johnston 1989)	In situ
Carrowreagh 9	241703	450205	5A	1,2,16,19,30,33,99	-	-	-	DON 8 (Van Hoek 1987)	In situ
Carrowreagh 10	241718	450262	5B	1,2,18,28,29,33,58,64,68,70,73,90	-	-	-	DON 9 (Van Hoek 1987)	In situ

Carrowreagh 11	241595	450079	4B	1,2,29,30,36,37,44,64,68,71,73	-	651	-	Lacy 1983; DON 10(Van Hoek 1987); Johnston 1989 (Carrowreagh A)	In situ
Ballymagehan 1	243750	449650	N/A	N/A - unknown	-	-	-	Johnston 1989	Not visited
Ballymagehan 2	243750	449650	N/A	N/A - unknown	-	-	-	Johnston 1989	Not visited
Fegart Upper	243750	449650	N/A	N/A - unknown	-	-	-	Johnston 1989	Not visited
Carrickabraghy 1	240550	451350	6A	1	-	-	-	DON 1 (Van Hoek 1987)	Not visited
Carrickabraghy 2	240550	451350	N/A	N/A - unknown	-	-	-	DON 2 (Van Hoek 1987)	Not visited
Magheranaul 58	242745	449896	2A	1	-	656-658	-	Lacy 1983 and Johnston 1989 (general ref. to area / monument); Identified by author	In situ
Carrowreagh 13	241685	450185	N/A	1	-	-	-	DON 7 (Van Hoek 1987)	Not visited
Carrowreagh 14	241474	449854	6A	1	-	-	-	DON 3C (Van Hoek 1988)	Not visited
Carrowreagh 15	241466	449865	6A	1	-	-	-	DON 3D (Van Hoek 1988)	In situ
Carrowreagh 16	241479	449874	6A	1	-	-	-	DON 3E (Van Hoek 1988)	Not visited

Carrowreagh 17	241498	449816	N/A	1	-	-	-	DON 3F (Van Hoek 1988)	Not visited
Carrowreagh 18	241511	449841	6A	1	-	-	-	DON 3G (Van Hoek 1988)	Not visited
Carrowreagh 19	241517	449840	N/A	1	-	-	-	DON 3H (Van Hoek 1988)	Not visited
Carrowreagh 20	241518	449846	N/A	1	-	-	-	DON 3I (Van Hoek 1988)	Not visited
Carrowreagh 21	241528	449843	N/A	1	-	-	-	DON 3J (Van Hoek 1988)	Not visited
Carrowreagh 22	241528	449841	N/A	1	-	-	-	DON 3K (Van Hoek 1988)	Not visited
Carrowreagh 23	241556	449843	N/A	1	-	-	-	DON 3L (Van Hoek 1988)	Not visited
Carrowreagh 24	241547	449848	6A	1	-	-	-	DON 3M (Van Hoek 1988)	Not visited
Carrowreagh 25	241368	449858	6A	1	-	-	-	DON 3N (Van Hoek 1988)	Not visited
Carrowreagh 26	241705	450197	6A	16	-	-	-	DON 8A (Van Hoek 1988)	Not visited
Carrowreagh 27	241579	450108	N/A	1,18	-	-	-	DON 10A (Van Hoek 1988)	Not visited

Magheranaul 59	242738	449891	5C	1,2,5,14,16,28,33,34,48,54	-	656-658	-	Lacy 1983 and Johnston 1989 (general ref. to area / monument); Identified by author	In situ
Carrowreagh 29	241595	450079	N/A	1	-	-	-	DON 10C (Van Hoek 1988)	Not visited
Carrowreagh 30	241595	450079	6A	1	-	-	-	DON 10D (Van Hoek 1988)	Not visited
Carrowreagh 31	241595	450079	N/A	1	-	-	-	DON 10E (Van Hoek 1988)	Not visited
Magheranaul 60	242812	449894	6A	1	-	656-658	-	Lacy 1983 and Johnston 1989 (general ref. to area / monument); Identified by author	In situ
Carrowreagh 33	241595	450079	6A	1	-	-	-	DON 10G (Van Hoek 1988)	Not visited
Carrowreagh 34	241595	450079	N/A	1	-	-	-	DON 10H (Van Hoek 1988)	Not visited
Magheranaul 1	243284	449718	5B	1,2,3,18,28,30,33,91,99	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 11A (Van Hoek); Magheranaul 1A (Van Hoek 1987); Johnston 1989	Overgrown
Magheranaul 2	243285	449718	3A	1,2,28,33,99	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 11B (Van Hoek); Magheranaul 1B (Van Hoek 1987); Johnston 1989	Overgrown
Magheranaul 3	243283	449720	4B	1,2,4,14,18,29,33,64,73,88	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 11C (Van Hoek); Magheranaul 1C (Van Hoek 1987); Johnston 1989	Overgrown
Magheranaul 4	243284	449720	N/A	1	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 11D (Van Hoek); Magheranaul 1D (Van Hoek 1987); Johnston 1989	Overgrown

Magheranaul 5	243285	449722	6A	2,17,28,30,36,41,42	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 11E (Van Hoek); Magheranaul 1E (Van Hoek 1987); Johnston 1989	Overgrown
Magheranaul 6	243283	449723	4B	1,2,18,28,36,63,68,73	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 11F (Van Hoek); Magheranaul 1F (Van Hoek 1987); Johnston 1989	Overgrown
Magheranaul 7	243281	449724	N/A	1,17	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 11G (Van Hoek); Magheranaul 1G (Van Hoek 1987); Johnston 1989	Overgrown
Magheranaul 8	243279	449724	6A	1	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 11H (Van Hoek); Magheranaul 1H (Van Hoek 1987); Johnston 1989	Overgrown
Magheranaul 9	243287	449717	6A	1	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 11I (Van Hoek); Magheranaul 1I (Van Hoek 1987); Johnston 1989	Overgrown
Magheranaul 10	243286	449684	6A	2,29,30,34,68,75,87	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 12 (Van Hoek); Magheranaul 2 (Van Hoek 1987); Johnston 1989	Overgrown
Magheranaul 11	243324	449702	1C	1,2,3,4,5,7,9,10,11,14,15,16,17,18, 19,23,27,28,29,30,31,32,33,34,35, 36,37,44,52,53,54,55,57,58,59,60, 61,63,64,65,67,68,70,71,72,73,75, 76,77,83,84,87,88,89,90,92,99	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 13 (Van Hoek); Magheranaul 3 (Van Hoek 1987); Johnston 1989	Overgrown
Magheranaul 12	243319	449694	3B	1,2,7,16,53,60,68,71	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 14 (Van Hoek); Magheranaul 4 (Van Hoek 1987); Johnston 1989	Overgrown
Magheranaul 13	243304	449702	N/A	1	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 15 (Van Hoek); Magheranaul 5 (Van Hoek 1987); Johnston 1989	Overgrown
Magheranaul 14	243298	449735	6A	1	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 16 (Van Hoek); Magheranaul 6 (Van Hoek 1987); Johnston 1989	Overgrown

Magheranaul 15	243225	449728	5C	1,2,17,29,30,33,34,58,60,64,68,72,73,78,82,85	-	656(d)	-	Lacy 1983; DON 17 East (Van Hoek 1987); Magheranaul 7 (Van Hoek); Johnston 1989	In situ
Magheranaul 16	243216	449719	6A	1	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 18 (Van Hoek 1987); Magheranaul 8 (Van Hoek); Johnston 1989	Not located
Magheranaul 17	243227	449718	1A	2,28,33,53,54,60,61,68,70,73,77,78,79,80,81,82,84,85	-	656(b)	-	Lacy 1983; DON 19 (Van Hoek); Magheranaul 9 (Van Hoek 1987); Johnston 1989	In situ
Magheranaul 18	243216	449703	5B	1,2,16,22,28,30,33,53,55,58,63,68,70,71,72,73,92	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 20(Van Hoek); Magheranaul 10(Van Hoek 1987); Johnston 1989	Overgrown
Magheranaul 19	243264	449593	5A	1,3	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 21 (Van Hoek); Magheranaul 11 (Van Hoek 1987); Johnston 1989	Not visited
Magheranaul 20	243281	449581	1C	1	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 22 (Van Hoek); Magheranaul 12 (Van Hoek 1987); Johnston 1989	Not visited
Magheranaul 21	243225	449728	5C	1,2,16,28,29,30,33,36,53,57,64,68,73,77,78,79,82,84,85,86,88,90,94,98	-	656(c)	-	Lacy 1983; DON 17 West (Van Hoek 1987); Magheranaul 7 (Van Hoek); Johnston 1989	In situ
Magheranaul 22	243199	449654	6B	1,16,68	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 23A (Van Hoek); Magheranaul 13A (Van Hoek 1987); Johnston 1989	Destroyed
Magheranaul 23	243190	449664	5C	1,2,10,14,18,28,34,52,64,68,70,78,79,82,84,86,89,95	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 23B (Van Hoek 1987); Magheranaul 13B (Van Hoek); Johnston 1989	Destroyed
Magheranaul 24	243185	449667	5A	1,2,29,33,99	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 23C (Van Hoek 1987); Magheranaul 13C (Van Hoek); Johnston 1989	Destroyed
Magheranaul 25	243180	449671	N/A	N/A - unknown	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 23D (Van Hoek 1987); Magheranaul 13D (Van Hoek); Johnston 1989	

Magheranaul 26	243172	449674	6A	2,28,33	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 23E (Van Hoek 1987); Magheranaul 13E (Van Hoek); Johnston 1989	
Magheranaul 27	243200	449644	6B	1,16,29,33,41	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 24A (Van Hoek 1987); Magheranaul 14A (Van Hoek); Johnston 1989	Destroyed
Magheranaul 28	243194	449646	N/A	1	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 24B (Van Hoek 1987); Magheranaul 14B (Van Hoek); Johnston 1989	Destroyed
Magheranaul 29	243188	449649	3B	1,2,28,33,99	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 24C (Van Hoek 1987); Magheranaul 14C (Van Hoek); Johnston 1989	Destroyed
Magheranaul 30	243185	449650	5A	1,2,29,33,64,68,73,91	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 24D (Van Hoek 1987); Magheranaul 14D (Van Hoek); Johnston 1989	Destroyed
Magheranaul 31	243158	449639	6A	1	-	656-658	-	Lacy 1983 (general ref. to area / monument); 'DON 25 (Van Hoek 1987); Magheranaul 15 (Van Hoek); Johnston 1989	Destroyed
Magheranaul 32	242969	449729	2C	1,2,25,28,30,33,34,52,53,54,57,64, 68,70,73,78,79,82,84,85,86,97,99	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 26 (Van Hoek 1987); Magheranaul 16 (Van Hoek); Johnston 1989	Not located
Magheranaul 33	242985	449830	5C	1,2,17,18,25,26,28,29,33,57,58,59, 61,70,87,92,99	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 27 (Van Hoek 1987); Magheranaul 17 (Van Hoek); Johnston 1989	In situ
Magheranaul 34	242920	449978	5B	1,2,5,11,16,17,18,28,35,68,70	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 28 (Van Hoek 1987); Magheranaul 18 (Van Hoek); Johnston 1989	In situ
Magheranaul 35	242896	449958	3A	1,2,28,30,34,35,42,64	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 29 (Van Hoek 1987); Magheranaul 19 (Van Hoek); Johnston 1989	In situ
Magheranaul 36	242877	449937	3C	1,2,28,29,30,31,33,34,35,49,59,63, 64,67,68,69,70,72,73,76,89,99	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 30 (Van Hoek 1987); Magheranaul 20 (Van Hoek); Johnston 1989	In situ

Magheranaul 37	242864	449940	5B	1,2,8,28,33,58,67,68,70,71	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 31 (Van Hoek 1987); Magheranaul 21 (Van Hoek); Johnston 1989	In situ
Magheranaul 38	242792	450038	6A	2,28,36	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 32 (Van Hoek 1987); Magheranaul 22 (Van Hoek); Johnston 1989	In situ
Magheranaul 39	242797	450054	4A	1	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 33 (Van Hoek 1987); Magheranaul 23 (Van Hoek); Johnston 1989	Not visited
Magheranaul 40	242812	450059	6A	1	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 34 (Van Hoek 1987); Magheranaul 24 (Van Hoek); Johnston 1989	Not visited
Magheranaul 41	242810	450029	2B	1,2,28,33,77,79,81,85	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 35 (Van Hoek 1988); Magheranaul 25 (Van Hoek); Johnston 1989	In situ
Magheranaul 42	242764	449872	2C	1,2,28,29,30,33,34,60,68,70,76	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 36 (Van Hoek 1987); Magheranaul 26 (Van Hoek); Johnston 1989	In situ
Magheranaul 43	242752	449891	6A	2,29,34	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 37 (Van Hoek 1987); Magheranaul 27 (Van Hoek); Johnston 1989	Not located
Magheranaul 44	242753	449903	N/A	1	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 38 (Van Hoek 1988); Magheranaul 28 (Van Hoek); Johnston 1989	Not visited
Magheranaul 45	242713	449902	2C	1,2,7,28,30,33,34,67,68,71,76,88,9 0	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 39 (Van Hoek 1987); Magheranaul 29 (Van Hoek); Johnston 1989	In situ
Magheranaul 46	242731	449890	1C	1,2,3,5,6,9,10,18,28,29,30,33,34,3 5,41,42,44,47,57,58,61,63,64,65,6 6,67,68,71,72,73,75,87,89,90,99	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 40 (Van Hoek 1987); Magheranaul 30 (Van Hoek); Johnston 1989	Not located
Magheranaul 48	243250	449450	N/A		-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 42 (Van Hoek 1987); Magheranaul 32 (Van Hoek); Johnston 1989	In situ

Magheranaul 49	243299	449734	6A	1	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 16A (Van Hoek 1987); Magheranaul 6A (Van Hoek); Johnston 1989	Not visited
Magheranaul 50	243264	449595	N/A	1,3	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 21A (Van Hoek 1988); Magheranaul 11A (Van Hoek); Johnston 1989	Not visited
Magheranaul 51	243262	449521	4A	1,2,5,28,30,33,37,87,99	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 22A (Van Hoek 1988); Magheranaul 12A (Van Hoek); Johnston 1989	In situ
Magheranaul 52	243251	449520	6A	1,16	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 22B (Van Hoek 1988); Magheranaul 12B (Van Hoek); Johnston 1989	Not visited
Magheranaul 53	243236	449521	N/A	1	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 22C (Van Hoek 1988); Magheranaul 12C (Van Hoek); Johnston 1989	Not visited
Magheranaul 54	243200	449630	1C	1,2,10,18,20,22,25,28,30,32,33,34, 46,49,52,58,60,61,64,67,68,70,72, 73,75,76,77,81,82,84,85,87	-	656-658	-	Lacy 1983 (general ref. to area / monument); DON 25A (Van Hoek 1988); Magheranaul 15A (Van Hoek); Johnston 1989	Destroyed
Norrira	245850	451450	N/A	1	-	464	-	Lacy 1983 (general ref. to area / monument); DON 43 (Van Hoek 1988)	Not visited
Rashenny 1	242250	447650	6A	1	-	472	-	Lacy 1983 (general ref. to area / monument); DON 44 (Van Hoek 1988); 11/49 [D] Colhoun	Not visited
Glenmakee 1	243850	447250	N/A	1	-	1472	-	Lacy 1983 (general ref. to area / monument); DON 46 (Van Hoek 1988); 11/40 Colhoun	Not visited
Straid 2	236550	445650	N/A	1	-	667	-	Lacy 1983; DON 50 (Van Hoek 1988); 10/14 Colhoun	Not visited
Straid 3	236550	445650	N/A	1	-	667	-	Lacy 1983; DON 51 (Van Hoek 1988); 10/14 Colhoun	Not visited

Roosky	237850	445850	N/A	1	-	905	-	Lacy 1983 (general ref. to area / monument); DON 52 (Van Hoek 1988); 10/23 Colhoun	Not visited
Gortleck	232450	438750	N/A	1	-	1569	-	Lacy 1983 (general ref. to area / monument); DON 59 (Van Hoek 1988)	Not visited
Ballyannan 2	232550	438500	N/A	N/A - unknown	-	47??	-	Lacy 1983 (general ref. to area / monument); 19/3 Colhoun	Not visited
Ballyargus	254150	434950	6A	1	-	343	-	Lacy 1983 (general ref. to area / monument); DON 62 (Van Hoek 1988); 31/10 Colhoun	Not visited
Tullyarvan	235250	434150	N/A	1	-	661	-	Lacy 1983; DON 63 (Van Hoek 1988)	Not visited
Ballynahone	236850	428550	6A	1	-	355	-	Lacy 1983 (general ref. to area / monument); DON 64 (Van Hoek 1988)	Not visited
Lisfannan	233850	427550	6A	1	-	655	-	Lacy 1983 (general ref. to area / monument); 'DON 65 (Van Hoek 1988)	Not visited
Carrowmullin	234850	428150	N/A	N/A - unknown	-	650	-	Lacy 1983 (general ref. to area / monument); DON 66 (Van Hoek 1988)	Not visited
Ardmalin	239170	458300	N/A	N/A - unknown	-	-	-	1/4 (Colhoun 1995: 1)	Not visited
Drumcarbit 2	247400	451050	N/A	N/A - unknown	-	-	-	4/15 (Colhoun 1995: 11-12)	Not visited
Drumcarbit 3	247400	451050	N/A	N/A - unknown	-	-	-	4/15 (Colhoun 1995: 11-12)	Not visited

Carrowreagh	242100	449750	N/A	N/A - unknown	-	-	-	4/16 (Colhoun 1995: 12)	Not visited
Magheranaul 55	243450	449850	N/A	N/A - unknown	-	111	-	Lacy 1983 (general ref. to area / monument); 4/24 (Colhoun 1995: 13-14); Johnston 1989	Not visited
Magheranaul 56	243450	449850	N/A	N/A - unknown	-	111	-	Lacy 1983 (general ref. to area / monument); 4/24 (Colhoun 1995: 13-14); Johnston 1989	Not visited
Magheranaul 57	243450	449850	N/A	N/A - unknown	-	111	-	Lacy 1983 (general ref. to area / monument); 4/24 (Colhoun 1995: 13-14); Johnston 1989	Not visited
Clehagh 15	238450	446550	N/A	N/A - unknown	-	778	-	Lacy 1983 (general ref. to area / monument); 10/2 (Colhoun 1995: 22)	Not visited
Tullynabratilly	240730	446975	N/A	N/A - unknown	-	-	-	10/8 (Colhoun 1995: 24)	Not visited
Meendoran 5	239250	443750	N/A	N/A - unknown	-	near 458	-	10/12 (Colhoun 1995: 25)	Not visited
Clonmany	237350	445250	N/A	N/A - unknown	-	near 151	-	10/26 (Colhoun 1995: 27)	Not visited
Carrowmore	251650	445650	N/A	N/A - unknown	-	1527	-	Lacy 1983 (general ref. to area / monument); 11/2 (Colhoun 1995: 29-30)	Not visited
Glenmakee 2	243750	447250	N/A	N/A - unknown	-	423	-	Lacy 1983 (general ref. to area / monument); 11/40 (Colhoun 1995: 38);	Not visited
Straths	243050	447650	N/A	N/A - unknown	-	near 487	-	11/48 Colhoun	Not visited

Rashenny 2	242250	447650	N/A	N/A - unknown	-	472	-	Lacy 1983 (general ref. to area / monument); 11/49 [C] Colhoun	Not visited
Rashenny 3	242250	447650	N/A	N/A - unknown	-	472	-	Lacy 1983 (general ref. to area / monument); 11/49 [D] Colhoun	Not visited
Rashenny 4	242075	447575	N/A	N/A - unknown	-	-	-	11/50 Colhoun	Not visited
Ballyannan 3	232550	438500	N/A	N/A - unknown	-	47??	-	Lacy 1983 (general ref. to area / monument); 19/3 Colhoun	Not visited
Sharagore 1	230750	439450	N/A	N/A - unknown	-	115	-	Lacy 1983 (general ref. to area / monument); Colhoun 18/4	Not visited
Sharagore 2	230750	439450	N/A	N/A - unknown	-	115	-	Lacy 1983 (general ref. to area / monument); Colhoun 18/4	Not visited

Sharagore 3	230850	439150	N/A	N/A - unknown	-	181	-	Lacy 1983 (general ref. to area / monument); Colhoun 18/6	Not visited
Sharagore 4	230850	439150	N/A	N/A - unknown	-	181	-	Lacy 1983 (general ref. to area / monument); Colhoun 18/6	Not visited
Sharagore 5	230850	439150	N/A	N/A - unknown	-	181	-	Lacy 1983 (general ref. to area / monument); Colhoun 18/6	Not visited
Luddan	235350	430450	N/A	N/A - unknown	-	in 1593	-	Lacy 1983 (general ref. to area / monument); Colhoun 29/20	Not visited
Ballynakilly 1	230850	423450	N/A	N/A - unknown	-	1410	-	Lacy 1983 (general ref. to area / monument); Colhoun 37/2	Not visited
Ballynakilly 2	231045	423775	N/A	N/A - unknown	-	-	-	Colhoun 37/3	Not visited
Altashane 2	243050	446750	3A	1,18,99	-	near 335	-	Identified by author	In situ
Magheranaul 61	243230	449718	5A	78,79,82,85	-	-	-	Identified by author	In situ
Bocan Stone Circle	254450	447550	N/A	N/A - unknown	-	327	-	Lacy 1983 (general ref. to area / monument); Boyle Somerville 1929	Not visited
Cloontagh 2	239640	445400	N/A	N/A - unknown	-	-	-	Boyle Somerville 1929	Not visited
Carrowreagh	241595	450079	5B	1,2,4,18,28,33,58	-	-	-	Identified by author	In situ

Appendix B: GIS metadata & tables

1 GIS Metadata

GENERAL METADATA

Software:	ArcGIS 8.1
Hardware:	Dell Inspiron 8100 Intel® Pentium® Mobile
Purpose of Dataset:	Landscape modeling and visibility study of prehistoric rock art in Ireland
Description:	Includes Irish County boundaries, published and newly discovered archaeological sites, and several landscape datasets: DTM, soil mapping, bedrock and outcrop mapping, wetlands, palaeoenvironmental samples and six inch mapping. Derived datasets include contour mapping, hillshade mapping, and viewshed mapping based on the DTM and wetland mapping based on the GSI historic map archive
Language:	English
Spatial & Temporal Coverage:	Study areas: Inishowen Peninsula Co. Donegal, the Louth / Monaghan area, Dingle Peninsula Co. Kerry. Neolithic-Early Bronze Age
Dataset Collected By:	Blaze O' Connor
Date:	2001-2006
Projection System:	Transverse Mercator System
Coordinate System:	Irish National Grid

DATA TYPE SPECIFIC METADATA

Name:	**Digital Elevation Model & Derived Datasets**
Source of Data:	Ordnance Survey Ireland (OSi)
Method of Original Data Capture:	Government survey
Purpose of Original Dataset:	Government survey
Date of Capture and/or purchase:	Purchase 2002-2003, capture unknown
File Type(s):	Text file (space delimited)
Scale & Resolution:	Supplied as 10m resolution, processed to 50m resolution to facilitate processing speeds
Additional Processing:	Converted to point shapefile, then TIN (triangulated irregular network) and raster. Forms the basis of the Hillshade models, contour rasters and viewsheds.
Data Ownership/rights:	OSi. Purchased by UCD School of Archaeology

Name:	**Six Inch Mapping**
Source of Data:	OSi
Method of Original Data Capture:	Government field survey
Purpose of Original Dataset:	Government survey
Date of Capture and/or purchase:	Purchase 2003, Capture: various editions 1830s onwards
File Type(s):	Scanned to TIFF image
Scale & Resolution:	50m resolution
Additional Processing:	Rectification of original survey features occasional minor discrepancies. Rectified using control points from Aerial Photographs / Discovery Series Maps to 1m RMS error
Data Ownership/rights:	OSi. Purchased by UCD School of Archaeology

Name:	**Viewsheds**
Source of Data:	DTM based on OSi spot height data
Method of Original Data Capture:	Government survey
Purpose of Original Dataset:	Government survey
Date of Capture and/or purchase:	Purchase 2002-2003, Capture unknown
File Type(s):	Raster
Scale & Resolution:	50m resolution. Note: ArcGIS 8.1 does not allow viewer height to be specified.
Additional Processing:	See DTM. Coded on binary / cumulative basis (see Chapter 3)

Name:	**Wetlands**
Source of Data:	Osi 1:50,000 vector mapping and GSI historic map archive
Method of Original Data Capture:	Osi: not known. GSI: heads-up digitised from scanned & rectified images (for details see Chapter 3)
Purpose of Original Dataset:	Osi: Government mapping. GSI: bedrock mapping.
Date of Capture and/or purchase:	Osi: not known. GSI: 1870s
File Type(s):	Osi: CAD layer. GSI: Polygon shapefile
Scale & Resolution:	Osi: 1:50,000. GSI: digitised to approx. 50m accuracy
Data Ownership/rights:	Osi / GSI. OSi data purchased by UCD School of Archaeology

Name:	**Outcrop Exposures**
Source of Data:	GSI historic map archive
Method of Original Data Capture:	GSI survey (1870s) & heads-up digitised by GSI from scanned & rectified images
Purpose of Original Dataset:	Bedrock mapping
Date of Capture and/or purchase:	Original capture 1870s. Digitised 2001-2
File Type(s):	Polygon shapefile
Scale & Resolution:	Digitised to approx. 10m accuracy of historic mapping. Original surveyed data accurate to approx. 100m
Data Ownership/rights:	GSI

Name:	**Physiographic Divisions & Associated Soils**
Source of Data:	Teagasc
Method of Original Data Capture:	Soil survey (see Gardiner & Radford 1980)
Purpose of Original Dataset:	Government mapping
Date of Capture and/or purchase:	See Gardiner & Radford 1980
File Type(s):	Polygon shapefile.
Scale & Resolution:	See Gardiner & Radford 1980
Data Ownership/rights:	Teagasc

Name:	**County Boundaries**
Source of Data:	UCD Database
Method of Original Data Capture:	Not known
File Type(s):	Polygon shapefile
Data Ownership/rights:	UCD
Database Fields/Coding:	County name

Name:	**Rock Art Panels**
Source of Data:	Published sources and site survey
Method of Original Data Capture:	Various and not always published
File Type(s):	Point shapefile
Data Quality:	Published coordinates vary from 1km to 10m accuracy. Site survey to approx. 10m accuracy. Published coordinates bumped up to six digit Eastings and Northings with a single ‘5’ followed by required number of ‘0’s

Name:	**Archaeological Sites and Monuments**
Source of Data:	Published Survey & Inventory Volumes, & Excavations Bulletin
Method of Original Data Capture:	Various and not always published
File Type(s):	Point Shapefiles
Data Quality:	See note on coordinate accuracy below. Published coordinates bumped up to six digit Eastings and Northings with a single ‘5’ followed by required number of ‘0’s
Database Fields/Coding:	Townland, site type

Name:	**Drumirril & Loch an Dúin Fieldsystems**
Source of Data:	Drumirril: OSi APs and geophysical survey (see Chapter 4) Loch an Dúin: Ó Coileáin (2003)
Method of Original Data Capture:	Drumirril: heads up digitized from OSi APs and surveyed using geophysical survey (see Chapter 4). Loch an Dúin: based on archaeological survey by Ó Coileáin (2003) using bamboo probes.
File Type(s):	Polyline and Polygon Shapefiles

Name:	**Pollen Cores**
Source of Data:	Published coordinates (see Chapter 3)
Method of Original Data Capture:	Not known
File Type(s):	Point Shapefiles

2 Sites and Monuments Lists for Inishowen Peninsula, Counties Louth and Monaghan, and the Dingle Peninsula.

Note on coordinate accuracy: The published survey or inventory volumes consulted in the compilation of these monument lists provide varying coordinate precision for the location of individual monuments or central points for monument complexes. These generally range from six digit coordinates (usually a grid letter, two easting digits and two northing digits) to ten digit coordinates (five easting digits and five northing digits). In order to input the data into the GIS, twelve digit coordinates were required. To 'bump up' the coordinates a single '5' and the required number of '0's were added, as this offers the most 'accurate' estimate of the site's actual location. In several cases major errors in the published data could be corrected, and these are listed after the relevant individual tables below. This usually involved simply switching over the eastings and northings or correcting the grid letter. However, there may still be remaining errors in the published coordinates that could not be readily identified within the context of this study. Where the coordinates were not published, these sites were omitted.

Inishowen Peninsula monuments (source: Lacy 1983)

Survey No	Townland	Easting	Northing	Monument
4	Ballymore Upper	203950	434250	Court-tomb
6	Ballynarry	232450	435350	Court-tomb
10	Carrickafodan	248850	445650	Court-tomb
13	Claggan	200250	439950	Court-tomb
17	Crevary Upper	227650	427650	Court-tomb
22	Drumbrick	212050	421050	Court-tomb
23	Drumhallagh Upper	227550	431850	Court-tomb
28	Killin	244500	452500	Court-tomb
29	Knockergrana	255150	446950	Court-tomb
30	Laraghirril	253750	447050	Court-tomb
31	Letter	216550	419750	Court-tomb
32	Liafin	232550	437450	Court-tomb
33	Loughnakey	220350	425050	Court-tomb
39	Meenletterbale	261350	445950	Court-tomb
45	Tirlaydan	225650	435050	Court-tomb
47	Ballyannan	233550	438350	Portal-tomb
48	Bin	229550	432350	Portal-tomb
49	Carnaghan	232050	423750	Portal-tomb
51	Cloghroe	212850	400950	Portal-tomb
53	Eskaheen	245250	427250	Portal-tomb
55	Gortnavern	221850	430450	Portal-tomb
59	Lisnanees Upper	219450	415350	Portal-tomb
69	Muntermellan	201850	438850	Portal-tomb
73	Templemoyle	250150	449750	Portal-tomb
92	Cabry	250450	432950	Wedge-tomb
93	Carmoney	217250	431850	Wedge-tomb
94	Carmoney	217350	431750	Wedge-tomb
95	Carrowmore or Glentogher	248550	435550	Wedge-tomb
96	Carrowmore or Glentogher	248650	435550	Wedge-tomb
97	Carrowmore or Glentogher	249150	435550	Wedge-tomb
98	Carrownaganonagh	215850	425550	Wedge-tomb
99	Carrowreagh	249450	440650	Wedge-tomb
101	Creeveoughter	227450	433550	Wedge-tomb
103	Gortnalaragh	210550	421850	Wedge-tomb
104	Gransha	236250	429850	Wedge-tomb
105	Greenhill	200650	434750	Wedge-tomb
111	Magheranaul	243450	449850	Wedge-tomb
112	Meenformal	213250	429350	Wedge-tomb
113	Meenkeeragh	239350	431350	Wedge-tomb

115	Sharagore	230750	439450	Wedge-tomb
117	Ballymore Lower	205050	434750	Megalithic Tomb
118	Barnes Lower	210750	424850	Megalithic Tomb
121	Convoy Demesne	210350	402250	Megalithic Tomb
122	Cranford	218350	432450	Megalithic Tomb
126	Errity	224850	410750	Megalithic Tomb
127	Goldrum	211950	423650	Megalithic Tomb
128	Gortmacall More	217950	425650	Megalithic Tomb
129	Gortree	230550	414750	Megalithic Tomb
130	Gortree	230450	414250	Megalithic Tomb
133	Listicall Lower	233750	413750	Megalithic Tomb
134	Masiness	205450	431450	Megalithic Tomb
135	Mondooey Upper	225850	406550	Megalithic Tomb
139	Tromaty	249150	431450	Megalithic Tomb
142	Ballybuninabber	208150	421550	Megalithic Tomb
143	Carrowkeel	251650	431250	Megalithic Tomb
144	Carrowmore	247550	451250	Megalithic Tomb
145	Carrowreagh or Craignacally	242050	449850	Megalithic Tomb
146	Carthage	253850	450850	Megalithic Tomb
148	Claggan	220950	427250	Megalithic Tomb
150	Clonmass	206650	435750	Megalithic Tomb
151	Clonmany Glebe	237350	445250	Megalithic Tomb
152	Cloontagh	239750	445550	Megalithic Tomb
153	Cratlagh	216750	428850	Megalithic Tomb
159	Doocashel Glebe	205750	433650	Megalithic Tomb
161	Drung	252950	434250	Megalithic Tomb
164	Eskaheen	245250	427550	Megalithic Tomb
166	Islandroy Barr or Drumfin	215650	430450	Megalithic Tomb
168	Kinnagoe	238250	435350	Megalithic Tomb
169	Labbadish	224350	409450	Megalithic Tomb
171	Largatreany	201050	439750	Megalithic Tomb
172	Losset	207950	419850	Megalithic Tomb
174	Mageranaul	243250	449550	Megalithic Tomb
175	Muff (part of Gort Townland)	252250	449650	Megalithic Tomb
177	Oughterlin	226550	429450	Megalithic Tomb
178	Port	201950	434750	Megalithic Tomb
179	Portlough	234750	416950	Megalithic Tomb
180	Rinclevan	201550	436550	Megalithic Tomb
181	Sharagore	230850	439150	Megalithic Tomb
183	Tullyally	255350	438250	Megalithic Tomb
184	Tullynabratilly	241250	446750	Megalithic Tomb
185	Tullynabratilly	240550	446650	Megalithic Tomb
188	Clehagh	238650	446550	Field system
197	Kindroghed and Knockergrana	255650	446950	Field system
233	Althaghaderry	238250	417050	Cairn
234	Balleeghan	245250	450650	Mound
235	Balleeghan Upper	248850	451050	Mound
236	Ballintlieve	238250	441850	Mound
237	Ballyboe Mountain, Gortnaleck and Ray	200050	428550	Cairn
238	Ballybuninabber	208050	421750	Cairn
239	Ballyliffen	238050	447550	Cairn
240	Ballynakeeloge	239850	436050	Cairn

241	Ballynarry	232650	435350	Cairn
242	Baskill	251950	445550	Mound
243	Breenagh	205450	409550	Mound
244	Carrickafodan	248550	445750	Cairn
245	Carrowmore	250850	440850	Mound
246	Carthage	253750	450950	Cairn
247	Craghy	204750	409950	Mound
249	Culoort	242250	454450	Cairn
250	Drumaville	249850	447450	Mound
251	Druminderry Upper and Lower	238550	434150	Mound
252	Figary	234250	427650	Mound
253	Gortcally and Meentaghconlan	243350	431850	Cairn
255	Gortnaleck	200250	428650	Cairn
258	Lag	243850	443250	Mound
260	Lenan	232350	441950	Mound
261	Letter	233850	445450	Cairn
262	Loughagannon	219650	416850	Cairn
264	Magherabeg and Mevagh	211250	440050	Cairn
265	Monreagh or Barr of Kilmackilvenny	238250	425150	Mound
266	Straid	236550	446650	Cairn
268	Toulett	235250	419450	Cairn
269	Tullyhonour	204650	407350	Cairn
270	Umgall	245050	454550	Mound
272	Bauville Keeloges and Clonglash	237450	431950	Cairn
274	Edenacarnan	214650	415650	Mound
276	Lurganboy	224350	430550	Cairn
277	Magheraboy	221950	410150	Cairn
278	Ardaravan	235050	431850	Cist
279	Ardnamoghill	237950	413450	Cist
285	Birdstown Demesne	241750	424850	Cist
286	Bredagh Glen	259050	441650	Cist
287	Bunnamayne	239550	420450	Cist
288	Cabry	251550	431550	Cist
290	Carnaghan	232850	423650	Cist
292	Carrickballydooey	224950	410150	Cist
294	Carrickbrack	222450	400850	Cist
295	Carrontlieve	234650	425850	Cist
298	Craig	245250	423250	Cist
300	Drumhaggart	242550	424250	Cist
301	Drung	243650	451950	Cist
304	Dunree	229050	439050	Cist
305	Gortlush	234350	417550	Cist
307	Figary	233350	426950	Cist
309	Kinnagoe	237750	435250	Cist
314	Lederg	229550	439750	Cist
315	Lederg	229550	439750	Cist
323	Sladran	236450	436350	Cist
324	Tievebane	236450	424050	Cist
325	Carrowreagh	249450	440650	Stone Circle
327	Glackadrumman	254450	447550	Stone Circle
329	Tops	225550	400550	Stone Circle
332	Ray	226050	425350	Stone Circle

333	Aghadreenan	221750	438450	Standing stone
335	Altashane or Cabadooey	243050	446750	Standing stone
336	Ardagh	238450	448950	Standing stone
338	Ardaravan	235550	431850	Standing stone
340	Ardmore	247250	426450	Standing stone
341	Ardnamoghill	238150	413350	Standing stone
342	Balleeghan Upper	249350	452150	Standing stone
343	Ballyargus	254150	434950	Standing stone
344	Ballyboe and Tullybogly	225750	410550	Standing stone
346	Ballybrack	263350	439650	Standing stone
347	Ballycharry	256850	447550	Standing stone
348	Ballyhiernan	218350	443550	Standing stone
349	Ballylawn	215050	415750	Standing stone
350	Ballymagaraghy	260550	447250	Standing Stone (pair)
351	Ballymagaraghy	261250	447150	Standing stone
352	Ballymaleel	220550	414750	Standing stone
355	Ballynahone	236850	428550	Standing stone
356	Barnes Lower	210750	424550	Standing Stone (pair)
357	Barnes Lower	210850	423950	Stone Alignment
358	Barnes Lower	212250	426350	Standing stone
360	Bellanascaddan	216050	416150	Standing stone
361	Cabry	251050	432250	Standing stone
362	Cabry	250550	432350	Standing stone
363	Cabry	252350	432350	Standing stone
365	Carnfeagh	227950	428450	Standing stone
366	Carnamoyle	244250	427750	Standing stone
367	Carngoagh	243750	447450	Standing stone
370	Carrickballydooey	224950	410250	Standing stone
372	Carrowmenagh	259750	443250	Standing stone
373	Carrowmore	247550	452450	Standing stone
374	Carrowreagh or Craignacally	241350	450350	Standing stone
375	Carrowreagh or Craignacally	242250	449250	Standing stone
376	Cashel	246850	442450	Standing stone
377	Cashel	246950	442250	Standing stone
378	Cashel	246459	441850	Standing stone
379	Claragh	219650	420050	Standing stone
380	Clashygowan	231850	410450	Standing stone
381	Clashygowan	233750	409950	Standing stone
382	Cloghfin	235550	411150	Standing Stone (pair)
383	Clonbeg Glebe	205650	432350	Standing stone
384	Clonca	252350	447050	Standing stone
385	Cooladerry	225450	402250	Standing stone
386	Cooladerry	225250	402150	Standing stone
389	Cooly	259450	438250	Standing stone
391	Crislaghkeel	237650	436550	Standing stone
392	Crockaw	205350	414450	Standing stone
396	Dooish	229750	412850	Standing stone
397	Dooish and Listicall Upper	231350	412650	Standing stone
398	Doon Glebe	210750	410150	Standing stone
400	Drumcarbit	247850	451350	Standing stone
402	Drumfad Lower	222850	436750	Standing stone
403	Druminderry Upper and Lower	233550	433750	Standing stone

404	Drumineney	225250	400650	Standing stone
407	Drumoghill	226250	409550	Standing stone
408	Drung	252950	434450	Standing stone
409	Dunmore	236850	413450	Standing stone
410	Eskaheen	246450	427650	Standing stone
411	Fallaneas	217350	442550	Standing stone
412	Fegart	244250	449750	Standing stone
413	Fegart	243750	450450	Standing stone
414	Figart	224150	401450	Standing stone
415	Figart	224150	401550	Standing stone
416	Gaddyduff	237550	446550	Standing stone
417	Glasalt or Treanfasy	243650	445150	Standing stone
419	Glebe	231550	437050	Standing stone
420	Glen Lower	220650	421650	Standing stone
421	Glenalla	224550	427450	Standing stone
422	Glenalla	224450	426950	Standing stone
423	Glenmakee	243750	447250	Standing stone
424	Glenmaquin Lower	221350	406150	Standing stone
426	Gortaquigley	226650	402850	Standing stone
428	Gortnavern	216550	419550	Standing stone
429	Gransha	235750	431050	Standing stone
430	Gransha	235750	430950	Standing Stone (pair)
431	Highbank	225750	412550	Standing stone
435	Killycolman	228250	433450	Stone Alignment
437	Kinnagoe	237950	435050	Standing stone
439	Knocknafaugher	203950	434450	Stone Alignment
441	Labbadish	223850	409650	Stone Alignment
442	Lagacurry	242450	450750	Standing stone
445	Letter	235650	425950	Standing stone
446	Liafin	232750	437350	Standing stone
448	Magheraboy	221750	410150	Standing stone
449	Magheraboy	226050	403450	Standing stone
452	Magheranaul	243350	449550	Standing stone
456	Meenagory	234650	435950	Standing stone
457	Meenagory	234550	435650	Standing stone
458	Meenadoran	239250	443750	Stone Alignment
459	Meenkeeragh	239350	431350	Standing stone
460	Milford	218750	427350	Standing stone
461	Muineagh	229850	438650	Standing stone
463	Norrira	246350	451250	Standing stone
464	Norrira	245850	451450	Standing stone
465	Oakfield Demesne	227550	403150	Standing stone
466	Oakfield Demesne	227650	403450	Standing stone
467	Pluck	223450	410350	Standing stone
468	Portleen	217250	423350	Standing Stone (pair)
469	Race End	217550	417750	Standing stone
470	Rann	215450	408850	Standing stone
471	Rashenny	241850	448250	Stone Alignment
472	Rashenny	242250	447650	Standing Stone (pair)
475	Rockfield	233550	409650	Standing stone
476	Roosky	237850	445650	Standing stone
478	Rosapenna	211750	438350	Standing stone

479	Rossbracken	222850	410350	Standing stone
480	Sallybrook	227350	412150	Standing stone
481	Sesnacully	225150	402350	Standing stone
482	Sesnacully	224950	402250	Standing stone
483	Shandrim	237550	437650	Standing stone
485	Sladran	235550	437650	Standing stone
486	Speenoge	236750	420350	Standing stone
487	Straths	243050	447650	Standing stone
488	Straths	243150	448050	Standing stone
489	Stroove	267350	443050	Standing Stone (pair)
490	Tirmacroragh	256250	448550	Standing stone
491	Tirmacroragh	256250	448550	Standing stone
492	Tirmacroragh	256560	448450	Standing stone
493	Tops Demesne	225050	401150	Standing stone
494	Tops Demesne	225450	400950	Standing stone
495	Tops Demesne	225550	400750	Standing stone
499	Tullanree	248350	445250	Standing stone
503	Althaghaderry	238250	416150	Possible Standing stone
504	Ardmalin	240050	459950	Possible Standing stone
505	Ardmore	247850	426350	Possible Standing stone
506	Ardmore	248150	426250	Possible Standing stone
507	Ballinlough	238650	440850	Possible Standing stone
508	Ballyannan	232750	438050	Possible Standing stone
511	Ballyederowen	239550	423650	Possible Standing stone
512	Ballyholey	226850	407250	Possible Standing stone
513	Ballyholey Far	226850	407650	Possible Standing stone
514	Ballyhoorisky	216050	444550	Possible Standing stone
515	Ballyhork	217350	440250	Possible Standing stone
516	Ballylawn	257950	438550	Possible Standing stone
517	Ballymoney	231050	421050	Possible Standing stone
518	Ballynahone	236850	427450	Possible Standing stone
520	Bauville Keeloges, Clonglash, Meenkeeragh	239250	431850	Possible Standing stone
521	Baylet and Castlequarter	233150	422950	Possible Standing stone
522	Bellanascaddan	215850	416050	Possible Standing stone
524	Brockagh	203450	400350	Possible Standing stone
525	Bunnamayne	239450	421250	Possible Standing stone
526	Calhame	216650	409250	Possible Standing stone
538	Carricknamart	224850	407950	Possible Standing stone
539	Carrowcashel	224850	418350	Possible Standing stone
540	Carrowmore	251550	446150	Possible Standing stone
541	Carrowmore	251450	446250	Possible Standing stone
542	Carrowmore	251750	446050	Possible Standing stone
543	Cashel	249950	446150	Possible Standing stone
545	Castleblaugh	229250	412850	Possible Standing stone
546	Churchland Quarters	231950	448250	Possible Standing stone
547	Clashygowan	231950	410750	Possible Standing stone
550	Convoy Townparks	221750	401850	Possible Standing stone
551	Convoy Townparks	220950	402050	Possible Standing stone
552	Convoy Townparks	220850	401850	Possible Standing stone
553	Corkey	223150	409850	Possible Standing stone
556	Creehennan	251850	432950	Possible Standing stone
559	Derryvane	244250	423450	Possible Standing stone

560	Drean	225350	413550	Possible Standing stone
561	Drumabodan	216850	420850	Possible Standing stone
563	Drumanaught	212050	408850	Possible Standing stone
564	Drumanaught	210750	408550	Possible Standing stone
570	Drumnabratty	227750	402550	Possible Standing stone
571	Drumnahough	206350	409450	Possible Standing stone
574	Edenacarnan South	214650	415650	Possible Standing stone
575	Eskaheen	245050	427650	Possible Standing stone
577	Fegart	243650	449450	Possible Standing stone
578	Fortstewart	227550	420450	Possible Standing stone
579	Garrowcarry	213350	415650	Possible Standing stone
581	Glenmaquin Lower	222050	406650	Possible Standing stone
582	Glentidaly	223850	426450	Possible Standing stone
583	Gortin North	230650	401250	Possible Standing stone
584	Gortin North	230650	401150	Possible Standing stone
585	Gortinreagh	228850	400650	Possible Standing stone
586	Gortree	230550	413850	Possible Standing stone
587	Gortyarrigan	234650	437750	Possible Standing stone
588	Grawky	225850	410850	Possible Standing stone
590	Killyclug	214450	413750	Possible Standing stone
595	Lettermore	215450	401950	Possible Standing stone
596	Liafin	232350	437450	Possible Standing stone
600	Loughros Glebe	220950	425150	Possible Standing stone
601	Magheraboy	222250	410550	Possible Standing stone
602	Magherahaan	226150	402250	Possible Standing stone
608	Meenagory	234850	435050	Possible Standing stone
611	Mongorry	223850	405750	Possible Standing stone
615	Old Town	216750	410850	Possible Standing stone
616	Rann	216050	409550	Possible Standing stone
617	Rann	215050	408050	Possible Standing stone
619	Raymoghy	223950	411250	Possible Standing stone
623	Rossgier	233250	400250	Possible Standing stone
625	Ryelands	229250	412450	Possible Standing stone
626	Sallaghagrane	216250	411750	Possible Standing stone
627	Sallybrook	226950	411750	Possible Standing stone
628	Sesnacully	225150	402150	Possible Standing stone
631	Speenoge	236350	420050	Possible Standing stone
632	Straid	236150	444850	Possible Standing stone
633	Tober	231550	411750	Possible Standing stone
634	Tonagh	224950	411650	Possible Standing stone
635	Tonagh	224950	411450	Possible Standing stone
639	Tullybogly	226650	411350	Possible Standing stone
642	Tullydonnell Lower	222050	401950	Possible Standing stone
643	Tullyvinny	224250	401850	Possible Standing stone
644	Umrycam	236050	435050	Possible Standing stone
645	Veagh	228500	415500	Possible Standing stone
646	Veagh	226950	414250	Possible Standing stone
669	Claggan	200650	439450	Fulachta fiadh
671	Kinnalargy	211650	439750	Fulachta fiadh

Note: Monuments where erroneous published coordinates were corrected: Survey No. 28 Killin.

County Louth monuments (source: Buckley and Sweetman 1991)

Survey No	Townland	Easting	Northing	Monument
1	Bellurgan	309500	309500	Flint scatter
2	Clogher	316500	284500	Flint scatter
3	Dromiskin	306500	298500	Flint scatter
4	Dunany	315500	291500	Flint scatter
5	Ganderstown	315500	282500	Flint scatter
6	Greenore	322500	310500	Flint scatter
7	Haggardstown	316500	282500	Flint scatter
8	Johnstown	313500	292500	Flint scatter
9	Mitchelstown	315500	290500	Flint scatter
10	Newtown	315500	280500	Flint scatter
11	Newtownbalregan	301500	309500	Flint scatter
12	Port	315500	289500	Flint scatter
13	Richardstown	302500	291500	Flint scatter
15	Salterstown	311500	293500	Flint scatter
16	Templetown	318500	305500	Flint scatter
17	Whitestown	323500	306500	Flint scatter
18	Woodland	305500	287500	Flint scatter
35	Townleyhall	303745	278335	Settlement
36	Townleyhall	302275	275705	Settlement
39	Aghnaskeagh	307650	313750	Megalithic Tomb
40	Aghnaskeagh	307650	313650	Megalithic Tomb
41	Aghnaskeagh	307550	312550	Megalithic Tomb
42	Ballymakellett	309850	311250	Court-tomb
43	Commons	318250	309750	Dual court-tomb
44	Drumnasillagh	307950	313250	Court-tomb
45	Faughart Lower	305250	311950	Megalithic Tomb
46	Grange Irish	318450	308850	Megalithic Tomb
47	Grange Irish	318350	308650	Megalithic Tomb
48	Killin	300950	310150	Megalithic Tomb
49	Killin	300850	310050	Megalithic Tomb
50	Lurgankeel	302250	311750	Megalithic Tomb
51	Lurgankeel	302350	311650	Portal-tomb
52	Monascreebe	304250	313650	Portal-tomb
53	Paddock	304850	283150	Wedge-tomb
54	Proleek	308150	311050	Portal-tomb
55	Proleek	308350	311050	Wedge-tomb
56	Ravensdale Park	308050	316850	Court-tomb
57	Ravensdale Park	308350	315650	Megalithic Tomb
58	Rockmarshall	312450	308050	Court-tomb
59	Townleyhall	302350	275850	Megalithic Tomb
60	Ballagan	324355	307305	Mound
61	Barnaveddoge	300155	289185	Mound
62	Belpatrick	296045	283735	Mound
63	Belpatrick	296065	283705	Mound
64	Corrakit	313035	313835	Cairn
65	Townparks	295765	291305	Mound
66	Walshestown	311505	285585	Mound
67	Aghnaskeagh	307555	313695	Cairn
68	Belpatrick	297695	284855	Barrow

69	Belpatrick	297765	284845	Barrow
70	Belpatrick	296835	283205	Enclosed barrow group
71	Belpatrick	296605	292985	Barrow
72	Belpatrick	296485	292865	Barrow
1207	Brownstown	306975	282185	Multiple cist cairn
1173	Bryanstown	309615	274705	Mound
73	Carrickastuck	296725	310575	Barrow
74	Carrickedmond	302485	312705	Cairn
75	Carrickedmond	302755	312795	Cairn
76	Collon	298565	283525	Barrow
77	Collon	298225	283275	Barrow
78	Collon	298125	283285	Barrow
79	Collon	298225	283275	Barrow
80	Collon	298165	283275	Barrow
81	Commons	304275	300695	Barrow
82	Corrakit/Doolargy/Tallaghomeath	311285	313925	Cairn
83	Ducavan	297875	311985	Barrow
84	Fieldstown	307155	281295	Cairn
85	Fieldstown	307105	281285	Cairn
86	Grange Irish	319245	308735	Cairn
87	Killineer	315015	279895	Barrow
88	Kilpatrick	296265	285845	Barrow
89	Kilpatrick	296315	285545	Barrow
90	Knockdinnin	302715	288325	Barrow
91	Lurgankeel	302625	312105	Cairn
92	Mellifont	301375	277975	Barrow
93	Millgrange	321155	307935	Barrow
94	Milltown	311305	281515	Barrow
95	Oaktate	292805	302615	Barrow
96	Philipstown	294315	299485	Barrow
97	Rassan	294225	310455	Barrow
98	Rathlust	296375	285815	Barrow
99	Roestown	298615	288495	Barrow
100	Skeaghmore	309585	288565	Barrow
101	Smarmore	295425	285065	Barrow
102	Smarmore	295045	285095	Barrow
103	Stabannan	302525	291695	Barrow
104	Townleyhall	303745	276335	Barrow
105	Tullakeel	289105	294295	Barrow
106	Ardballan	311735	289585	Barrow
107	Balgatheran	303855	278835	Barrow
108	Ballinlough	299635	303615	Ring-ditch
109	Ballinlough	299665	303545	Ring-ditch
110	Ballinlough	299675	303485	Ring-ditch
111	Balregan	302625	309985	Cairn
112	Balregan	302535	309935	Cairn
113	Bellurgan	310215	309425	Ring-ditch
114	Bellurgan	309025	309765	Ring-ditch
115	Carrickedmond	302585	312765	Cairn
116	Carrickedmond	302625	312655	Cairn
117	Donaghmore	302415	305765	Ring-ditch
118	Dunbin Little	299935	304645	Ring-ditch

119	Haynestown	305245	302135	Ring-ditch
120	Hill of Rath	305355	277835	Enclosed barrow group (possible)
121	Loughantarve	299305	303225	Ring-ditch
1220	Lurganboy	313985	288505	Ring-ditch
1221	Lurganboy	314155	288395	Ring-ditch
122	Monksland	320125	308245	Ring-ditches
123	Mullabohy	299375	304955	Ring-ditch
124	Mullabohy	299475	304935	Ring-ditch
125	Mullabohy	299355	304805	Ring-ditch
126	Mullabohy	299435	304835	Ring-ditch
127	Mullacloe	295115	293095	Ring-ditch
128	Nicholastown	313615	287595	Ring-ditch
129	Pepperstown	295805	294175	Barrow (possible site)
130	Smarmore	295595	285105	Barrow (possible)
131	Stabannan	301445	291455	Barrow (possible)
132	Summerhill	297965	301955	Ring-ditches
133	Summerhill	297985	301815	Cairn
134	Summerhill	297965	301795	Ring-ditch
135	Summerhill	298065	301785	Ring-ditch
136	Summerhill	298065	301775	Ring-ditch
137	Aghnaskeagh	307555	313695	Burials
138	Ballinfuil	299745	311745	Burials
139	Balriggan	302945	310085	Burials
140	Baltray	314365	278485	Burials
142	Carrickedmond	302585	312765	Burials
143	Collon	299855	281425	Burials
145	Fieldstown	307155	281295	Burials
146	Gorteen	294785	308155	Burials
147	Hill of Rath	305355	277825	Burials
148	Killineer	305015	279895	Burials
149	Monasterboice	304315	282095	Burials
150	Monksland	319865	307685	Burials
151	Mullamore	294035	295535	Burials
152	Newtown	298025	303955	Burials
153	Newtownbalregan	301825	307755	Burials
154	Oaktate	292805	302615	Burials
155	Proleek	307385	311875	Burials
156	Rassan	294225	310455	Burials
157	Rossmakay	302465	301625	Burials
158	Skeaghmore	309725	288535	Burials
159	Smarmore	295055	284615	Burials
1213	Stephenstown	300585	302405	Burials
160	Stumpa	301500	311500	Burials
161	Tankardsrock	300705	308315	Burials
162	Timullen	303755	281385	Burials
163	Townleyhall	303745	276335	Burials
164	Allardstown	300625	301285	Burials
165	Anaglog	296845	286805	Burials
166	Ardballan	311735	289585	Burials
167	Carrickrobin	297850	307350	Burials
168	Mellifont	301255	278035	Burials
170	Piedmont	314450	307150	Burials

171	Proleek	308750	311615	Burials
172	Ballynahattin	305500	310500	Ceremonial enclosure (site)
173	Bellurgan	309085	309735	Cropmark complex
174	Ravensdale Park	308355	315605	Stone circle (possible)
175	Shortstone East	298215	311055	Ceremonial enclosure (possible)
176	Balregan	302395	310055	Stone alignment (possible, site)
177	Carrickedmond	302485	312855	Stone alignment (possible, site)
178	Carrickedmond	302555	312815	Stone alignment (possible, site)
179	Aghnaskeagh	307535	312445	Standing stone (site)
180	Ash Little	296715	304525	Standing stone
181	Ballymakellett	309850	311950	Standing stone
182	Balregan	302725	300025	Stone pair (site)
183	Balrobin	299515	308525	Standing stone
184	Baltray	314465	278105	Stone pair (site)
185	Barnaveddoge	300635	289495	Standing stone
186	Barnaveddoge	300705	289195	Standing stone
187	Blakestown	296005	287755	Standing stone
188	Carrickedmond	303025	313445	Standing stone
189	Castlering	296825	303985	Standing stone
190	Castlering	296445	303885	Standing stone
191	Castletown	302725	309345	Standing stone
192	Castletown	302995	308365	Standing stone
193	Dardisrath	314845	281565	Standing stone
194	Drumshallon	308415	283865	Standing stone
195	Drumshallon	308185	283645	Standing stone
196	Drumshallon	308185	283645	Standing stone
197	Drumshallon	308065	283525	Standing stone
198	Dungooly	300195	314315	Standing stone
199	Edenakill	297885	312365	Standing stones
200	Grange	298495	302195	Standing stone (site)
201	Hurlstone	294295	287515	Standing stone
202	Labenstown	313085	286665	Standing stone
203	Millockstown	298195	287735	Stone pair
204	Monavallet	307115	282775	Standing stone
205	Piperstown	307115	282775	Standing stone
206	Purcellstown	294805	287315	Standing stone
207	Rathbody	293615	297215	Standing stone
208	Rathbrist	295975	298155	Standing stone
209	Rathiddy	300705	303885	Standing stone
210	Tankardsrock	301695	307525	Standing stone (site)
211	Whiterath	303400	298450	Standing stone
212	Balregan	302395	310165	Possible standing stones
213	Balregan	302615	310015	Possible standing stones
214	Greatwood	287805	296005	Possible standing stones
215	Kearneystown	307500	284350	Possible standing stones
217	Nicholastown	291095	298995	Possible standing stones
219	Ravensdale Park	309895	315745	Possible standing stones
220	Roestown	298685	288305	Possible standing stones
221	Tankardsrock	301525	307645	Possible standing stones
1245	Carstown	311625	279455	Fulacht fiadh
233	Cornamucklagh	311695	318095	Fulacht fiadh
1222	Doolargy	310805	312245	Fulacht fiadh

234	Drumnasillagh	308085	313125	Fulacht fiadh
235	Millockstown	297325	286795	Fulachta fiadh
236	Mounthamilton	303245	305985	Fulacht fiadh
1204	Piperstown	307225	282665	Fulacht fiadh (site)
237	Rockmarshall	312805	310235	Fulacht fiadh
238	Walterstown	301245	300625	Fulacht fiadh
239	Collon	299555	283015	Fulachta fiadh (possible)
240	Corstown	308055	290225	Fulacht fiadh (possible)
241	Edenakill	298775	311785	Fulachta fiadh (possible)
242	Faughart Lower	305635	310505	Fulacht fiadh (possible)
243	Greatwood	287115	295215	Fulachta fiadh (possible)
1193	Mounthamilton	303245	305985	Earthworks
244	Rockmarshall	312395	308335	Fulacht fiadh (possible)

Note: Monuments where erroneous published coordinates were corrected: Survey No. 11 Newtownbalregan, 16 Templetown, 17 Whitestown, 112 Balregan, 156 Rassan, 164 Allardstown, 203 Millockstown, 211 Whiterath, 215 Kearneystown, and 217 Nicholastown.

County Monaghan monuments (source: Brindley 1986)

Inventory No	Townland	Easting	Northing	Monument
1	Aghnafarcan	282395	313455	Court-tomb
2	Annagleve	281225	316655	Court-tomb
1234	Annaghkilly	253655	325575	Possible Megalithic Tomb site
1235	Annaghkilly	253655	325735	Possible Megalithic Tomb site
3	Annahaia	284500	307500	Court-tomb
4	Calliagh	263575	326745	Wedge-tomb
5	Carn	261015	326005	Megalithic Tomb
6	Carnbane	261555	329255	Megalithic Tomb (site)
7	Carnbane	261295	329115	Court-tomb
1236	Carnowen	257555	329065	Possible Megalithic Tomb site
8	Carnroe	251095	320365	Megalithic Tomb
9	Cloghernagh	258495	328505	Court-tomb
10	Corgreagh	269915	308275	Megalithic Tomb
11	Corlealackagh	278715	322415	Megalithic Tomb
12	Corleanamaddy	276795	322245	Megalithic Tomb
13	Cornamucklagh South	275555	320005	Court-tomb
14	Cornasoo	261455	328165	Megalithic Tomb
15	Croaghan	279685	325585	Megalithic Tomb
16	Drumguillew Lower	277135	318155	Court-tomb
17	Dunmaurice	274085	321375	Megalithic Tomb
18	Edergole	261385	319565	Court-tomb
19	Garran	259685	325705	Portal-tomb
20	Garran	259895	325465	Court-tomb (site)
21	Greagh	264495	326935	Court-tomb
22	Killina	259795	329405	Megalithic Tomb
23	Killydrutan	266065	331485	Court-tomb
24	Killygorman	256055	326655	Court-tomb
25	Lackafin	281865	314535	Megalithic Tomb
26	Lagan	279945	315075	Megalithic Tomb
27	Lecklevera/Cashlan	259500	326500	Court-tomb (site)
28	Lemgare	279975	328315	Court-tomb
29	Lennan	274515	323255	Portal-tomb

30	Lisnadarragh	272435	307685	Wedge-tomb
31	Radeery	258475	325905	Megalithic Tomb
32	Rausker	275325	321355	Wedge-tomb
33	Skeagarvey	266175	331845	Megalithic Tomb
34	Tiredigan	260485	327995	Court-tomb
35	Annayalla	279215	324105	Possible Megalithic Tomb site
36	Carrickinare	264235	318165	Possible Megalithic Tomb site
37	Cloghvalley Lower	283185	306085	Possible Megalithic Tomb site
38	Coraghy	274595	310515	Possible Megalithic Tomb site
39	Drumgole	258925	319105	Possible Megalithic Tomb site
40	Glasdrummond	260500	326500	Possible Megalithic Tomb site
41	Latnamard	262500	325500	Possible Megalithic Tomb site
42	Lislanly	277635	321955	Possible Megalithic Tomb site
43	Maghernakill	286495	315195	Possible Megalithic Tomb site
44	Rakean	265605	323775	Possible Megalithic Tomb site
45	Tullynagrow	282615	326655	Possible Megalithic Tomb site
46	Carn	270235	335295	Cairn
47	Cormoy	257485	324785	Cairn
48	Cornacarrow	279805	312705	Cairn
49	Cornasoo	261525	328095	Cairn
1239	Fincarn	282425	314245	Cairn
50	Lattonfasky	278685	315065	Cairn
1240	Mullyash/Tavanaskea	286935	325835	Cairn
51	Reduff	276785	312425	Barrow
52	Skerrick West	248515	317455	Cairn
1241	Carnroe	251365	320105	Cairn (site of)
53	Knocknacran East	280565	300705	Barrow
54	Tiredigan	260135	328165	Cairn (possible)
55	Annahean	288500	297500	Flat cemetery
56	Cabragh	279195	317145	Cist
1242	Calliagh	263500	326500	Cist (possible)
(48)	Cornacarrow	279795	312735	Cist
57	Cornagaravoge	292045	304335	Cist
58	Inishkeen Glebe	293245	306995	Cist
(50)	Lattonfasky	278685	315065	Cists
59	Scarnageeragh or Emyvale	267685	343895	Cist (site)
60	Calliagh	263285	326635	Standing stones
61	Carnroe	251065	319065	Standing stone
62	Corfad	273235	327665	Standing stone (site)
63	Corlat	258195	328065	Standing stone
64	Drumulla	263515	319565	Standing stone
65	Killeevan Glebe	255015	325225	Standing stone
66	Killygorman	256245	326475	Standing stone
67	Rakeevan	260295	323445	Standing stone
68	Scarvy	251605	323935	Standing stone
71	Leck	265105	328865	Stone (site)
72	Drumgeeny	289015	298175	Fulachta fiadh (possible, site)

Dingle Peninsula monuments (source: Cuppage 1986)

Survey No	Townland	Easting	Northing	Monument
5	Ballyoughteragh South	032850	105450	Shell Midden
23	Ballinloghig	044850	109150	Field Systems
24	Ballintemple/Glanmore	033050	101550	Field Systems
25	Ballyhoneen/Kilmore	052350	108450	Field Systems
26	Glanlough South	064750	107250	Field Systems
27	Glanshanacuirp	049950	108950	Field Systems
28	Glanshanacuirp	048850	109450	Field Systems
29	Gowlaneard/Gowlane Beg/Gowlane East	053050	102950	Field Systems
30	Knockavrogeen East	042650	103450	Field Systems
31	Ballintemple	032350	100650	Wedge-tomb
33	Caherard	039150	101250	Wedge-tomb
34	Doonmanagh	052450	099450	Wedge-tomb
35	Maumnahaltora Tomb 1	067850	106750	Wedge-tomb
35	Maumnahaltora Tomb 2	067950	106750	Wedge-tomb
35	Maumnahaltora Tomb 3	067950	106750	Wedge-tomb
36	Minard West	052650	099750	Wedge-tomb
37	Cloonties	035450	105350	Megalithic Tomb
38	Glanlick/Vicarstown	032550	100250	Megalithic Tomb
39	Ballynahow Commons	033650	102550	Megalithic Tomb
40	Ballyquin	053150	114150	Megalithic Tomb
42	Commons	073350	108350	Megalithic Tomb
43	Coumeenoole North	033050	098750	Megalithic Tomb
44	Derrymore West	073450	007550	Megalithic Tomb
47	Illaunimmil	060450	112150	Megalithic Tomb
48	Kilballylahiff	063050	008350	Megalithic Tomb
49	Smerwick	035550	008850	Megalithic Tomb
50	Ardamore	052150	100050	Stone Alignment
51	Ballygarret	068550	110150	Stone Alignment
52	Cloonsharragh	051150	112850	Stone Alignment
53	Clogher	031450	103350	Stone Alignment
54	Curraduff	070350	108850	Stone Alignment
55	Ballineanig-castlequarter	035950	104350	Standing Stones (pair)
56	Ballyrishteen	048950	102750	Standing Stones (pair)
57	Coumduff	058150	104350	Standing Stones (pair)
58	Derrygorman	059950	104450	Standing Stones (pair)
59	Dromavally	059350	105350	Standing Stones (pair)
60	Drom East	053050	111350	Standing Stones (pair)
61	Garrane	042550	104850	Standing Stones (pair)
62	Gowlaneard	053050	102150	Standing Stones (pair)
63	Knockavrogeen East	042550	104350	Standing Stones (pair)
64	Milltown	042950	101150	Standing Stones (pair)
65	Minard West	053650	099150	Standing Stones (pair)
66	Reask	036750	104650	Standing Stones (pair)
67	Caherpierce	068250	101750	Standing Stones (pair)
68	Fahan	035150	097550	Standing Stones (pair)
69	Annagap	058950	102650	Standing stone
70	Ardamore	051950	100450	Standing stone
71	Aughacasla North	064450	112150	Standing stone
72	Ballinasig	046050	102850	Standing stone
73	Ballinasig	046050	102750	Standing stone
74	Ballineetig	047850	101050	Standing stone

75	Ballingarraun	049250	103350	Standing stone
76	Ballinloghig	042750	108150	Standing stone
77	Ballintermon	061150	102250	Standing stone
78	Ballyandreen	060550	103450	Standing stone
79	Ballyeightragh	040950	103650	Standing stone
80	Ballynacourty	058650	102250	Standing stone
81	Ballyahunt	060750	105250	Standing stone
82	Ballyerishteen	048850	103550	Standing stone
83	Ballywiheen	035850	103650	Standing stone
84	Ballywiheen	035750	103550	Standing stone
85	Beebane	046450	099050	Standing stone
86	Brackloon	060150	101750	Standing stone
87	Caherdorgan North	039750	105550	Standing stone
88	Caherdorgan South	039950	105750	Standing stone
89	Cantra	038550	100950	Standing stone
90	Cappagh	052350	113350	Standing stone
91	Carrigaha	065850	110450	Standing stone
92	Cloghane	039650	100250	Standing stone
93	Coumduff	058150	104450	Standing stone
94	Coumduff	057950	103650	Standing stone
95	Doonmanagh	052750	099150	Standing stone
96	Doonmanagh	052550	099050	Standing stone
97	Doonmanagh	052550	099150	Standing stone
98	Dromavally	059550	105350	Standing stone
99	Drom East	053250	111450	Standing stone
100	Drom East	053050	111550	Standing stone
101	Duagh	065550	109850	Standing stone
102	Emlagh	064750	102850	Standing stone
103	Farrandalouge	055050	111650	Standing stone
104	Ferritersquarter	031550	101450	Standing stone
105	Flemingstown	047850	102450	Standing stone
106	Flemingstown	063150	105150	Standing stone
107	Foheraghmore	050050	100150	Standing stone
108	Foilatrisnig	066650	108450	Standing stone
109	Glanmore	065750	105550	Standing stone
110	Glannagalt	066950	108350	Standing stone
111	Gowlaneard	052850	102250	Standing stone
112	Gowlane East	053750	103150	Standing stone
113	Graigue	031650	102750	Standing stone
114	Graigue	052450	100450	Standing stone
115	Graigue	053050	100450	Standing stone
116	Kilcooly	039350	107550	Standing stone
117	Kilfountan	042550	103350	Standing stone
118	Killeenagh	068850	102450	Standing stone
119	Killiney	060550	113050	Standing stone
120	Kilquane	041050	109250	Standing stone
121	Kilshannig	061650	118650	Standing stone
122	Kilteenbane	069950	107950	Standing stone
123	Kilvickadownig	035850	098450	Standing stone
124	Kilvickadownig	035750	098650	Standing stone
125	Kilvickadownig	035650	098450	Standing stone
126	Kinard East	050050	099450	Standing stone

127	Knockglass Beg	071350	110350	Standing stone
128	Lack	070050	102450	Standing stone
129	Lateevemanagh	038750	103750	Standing stone
130	Lisdargan	049850	103150	Standing stone
131	Milltown	042950	101150	Standing stone
132	Milltown	042650	100850	Standing stone
133	Rathduff	061450	104050	Standing stone
134	Reenconnell	042050	106550	Standing stone
135	Reenconnell	041950	106650	Standing stone
136	Ullagha	040650	104150	Standing stone
137	Ullagha	040950	104450	Standing stone
138	Ballinglanna	031950	099950	Standing stone
139	Ballinvownig	046650	100950	Standing stone
140	Ballybowler South	048250	103150	Standing stone
141	Ballybowler South	047850	102750	Standing stone
142	Ballydavid	038850	109950	Standing stone
144	Caherpierce	068250	101550	Standing stone
145	Caherscullibeen	040350	108050	Standing stone
146	Cool	069550	108250	Standing stone
147	Coumeenoole North	033050	098750	Standing stone
148	Derrygorman	059350	102550	Standing stone
149	Dromavally	059050	105050	Standing stone
150	Farrantooleen	059350	112450	Standing stone
151	Glannaheera	063750	102950	Standing stone
152	Glennahoo	054650	110650	Standing stone
153	Killelton	071550	110050	Standing stone
154	Kinard West	048550	099950	Standing stone
155	Lateevemore	039650	104450	Standing stone
156	Lisdargan	050250	103150	Standing stone
157	Marhin	035050	102850	Standing stone
158	Mountoven	068050	109350	Standing stone
159	Raheen	037250	098550	Standing stone
160	Teeravane	033450	103450	Standing stone
161	Annagap	058850	103450	Unclassified standing stone
162	Aughils	071450	102450	Unclassified standing stone
163	Ballynacourty	058750	102050	Unclassified standing stone
164	Fahan	035150	097550	Unclassified standing stone
192	Aghacarrible	051250	099750	Burial
193	Aghacarrible	051150	099750	Burial
194	Ballinagroun	066850	101450	Burial
195	Ballincolla	034050	105150	Burial
196	Ballintaggart	061050	104150	Burial
197	Burnham East	042150	099650	Burial
200	Duagh	065050	109050	Burial
202	Fahamore	061250	118450	Burial
203	Fahan	035050	097750	Burial
204	Foheraghmore	050550	100350	Burial
205	Gowlane	058350	112750	Burial
206	Killeenagh	069150	101950	Burial
209	Loughadoon	052750	107650	Burial
211	Monaree	040450	100150	Burial
213	Tobernamoodane	049350	099650	Burial

214	Acres	055950	100250	Mound
215	Ballintemple	033050	101350	Mound
216	Ballyglasheen	060450	105650	Cairn
217	Ballynahunt/Glanteenassig	060450	106650	Cairn
218	Carhoo West	043450	099350	Mound
219	Clogher	031750	103350	Mound
220	Derrygorman	059459	102450	Mound
221	Dromvalley	059050	106350	Cairn
222	Emlagh East	038150	104250	Mound
223	Glanmore	032850	101550	Cairn
224	Glennahoo	054750	110350	Mound
225	Gowlaneard	052850	102450	Mound
226	Kilballylahiff	064350	109750	Mound
227	Kilballylahiff	064450	109650	Cairn
228	Lateevemanagh	038850	103650	Mound
229	Mullaghveal	048050	106750	Cairn
233	Commons of Dingle	044250	102350	Cairn
234	Coolnagoppoge	056950	102950	Cairn
235	Kilballylahiff	063150	108650	Mound
237	Marhin	034350	101450	Cairn
238	Slieve West	066350	105650	Mound
239	Ballintaggart	046850	100150	Fulachta fiadh
240	Ballybowler South	048350	103350	Fulachta fiadh
241	Ballynacourty	058250	112850	Fulachta fiadh
242	Ballynasare Beg	054650	101450	Fulachta fiadh
243	Ballynasare Lower	054750	101250	Fulachta fiadh
244	Coumduff	058150	104350	Fulachta fiadh
245	Garfinny	047450	101450	Fulachta fiadh
246	Garfinny	047550	102500	Fulachta fiadh
247	Glanmane	066250	108650	Fulachta fiadh
248	Tobernamoodane	049450	100550	Fulachta fiadh
249	Ballyeightragh	041053	103750	Ring-barrow
250	Ballytrasna	037950	101950	Ring-barrow
251	Coumgagh	040550	104150	Ring-barrow
252	Kilcolman	038150	101950	Ring-barrow
253	Marhin	034050	101650	Ring-barrow
254	Ventry	037050	099650	Ring-barrow
255	Kilcolman	038150	102050	Ring-barrow
256	Lougher	064050	104650	Ring-barrow
257	Lougher	064350	104650	Ring-barrow
258	Lougher	064550	105050	Ring-barrow

Note: Monuments where erroneous published coordinates were corrected: Survey No. 47 Illanimmil.

Inishowen study area excavations County Derry (source: Excavations Bulletin)

Excavation Bulletin No	Townland	Easting	Northing	Monument
2001:257	Gortenny	252402	419438	Settlement
2002:376	Ballyarnet	244750	421950	Settlement
2002:377	Ballynashallog	245945	421305	Flint scatter
2002:378	Campsie	248650	419850	Occupation
2002:385	Coolkeeragh	247515	421175	Occupation
2002:387	Corrstown	286095	439145	Settlement
2002:389	Gransha	246075	419935	Occupation
2002:392	Maydown	248350	420650	Occupation
2000:0158	Ballynashallog / Ballynagard	245945	421305	Settlement
TBC	Enagh	246245	420305	Settlement
1985:16:00	Straid	259650	405850	Cists
1988:43:00	Shantallow	245250	420750	Cist
1996:058	Shantallow	244750	421550	Trackway

Inishowen study area excavations County Donegal (source: Excavations Bulletin)

Excavation Bulletin No	Townland	Easting	Northing	Monument
1977-79:0026	Tievebane	236450	424050	Cist
1985:0018	Bohullion Upper	231850	418750	Cist
1977-79:0025	Ardaravan	235050	431850	Cist
2001:267	Baylet	230950	420250	Midden

Louth / Monaghan study area excavations (source: Excavations Bulletin)

Excavation Bulletin No	Townland	Easting	Northing	Monument
2000:0696	Mell	305822	277210	Pottery
1999:625	Harristown	300019	290971	Fulacht fiadh
2000:0651	Crumlin	304772	304205	Burial
2000:0676	Farrandreg	303435	307845	Fulachta fiadh
2000:0687	Hill of Rath	305445	278155	Fulacht fiadh
1999:545	Braganstown	303421	294468	Occupation
1994:170	Dowdallshill II	305950	309250	Fulacht fiadh
1995:209	Farrandreg	303250	308250	Fulacht fiadh
1996:280	Dromiskin	305350	297950	Fulacht fiadh?
1999:591	Dromiskin	305185	298155	Fulacht fiadh
2000:0689	Hill of Rath	305336	278332	Fulacht fiadh
2000:0690	Hill of Rath	305245	278512	Fulacht fiadh
2000:0702	Newtown-Monasterboice	305640	280565	Fulacht fiadh
2000:0700	Newtown-Monasterboice	304615	280460	Fulacht fiadh
2000:0684	Haggardstown	305396	303644	Fulacht fiadh
1998:421	Carstown	311625	279455	Fulacht fiadh
1998:471	Tattyboys-Glebe	292150	295600	Fulachta fiadh
1998:471	Tattyboys-Glebe	295920	291580	Fulachta fiadh
1999:629	Newrath	303982	296472	Fulacht fiadh
2000:0643	Boolies	303437	292316	Fulacht fiadh
2000:0650	Coolfore	304610	280000	Fulacht fiadh
2000:0652	Crumlin	304475	303970	Fulacht fiadh
2000:065	Crumlin	304460	303870	Fulacht fiadh
2000:0705	Newtown-Monasterboice	304942	281373	Fulacht fiadh
2000:0697	Mell	305730	277475	Fulacht fiadh

2000:0694	Mell	306210	276585	Fulacht fiadh
1998:447	Castletown	303250	308600	Occupation
1999:637	Richardstown	291050	299894	Settlement
2000:0675	Farrandreg	303435	307845	Settlement
1999:610	Mullagharlin Haggardstown	305435	304205	Occupation
1999:600	Demesne Townparks	304355	307425	Flint scatter
2000:0639	Balgatheran	304845	279120	Occupation
2000:0649	Coolfore	304600	280270	Settlement
2000:0713	Tullyallen	304855	277605	Settlement
1993:168	Navan	306150	310550	Occupation
02E0369-1330	Donaghmore	301975	307185	Settlement
02E1331	Donaghmore	301970	307315	Occupation
02E1583	Donaghmore	302010	307125	Settlement
02E01752	Littlemill	302800	305235	Settlement
02E01833	Littlemill	302600	305570	Occupation
02E1836	Newtownbalregan	301953	308060	Settlement
03E0114	Newtownbalregan	302140	308829	Settlement
TBC	Plaster	306500	312500	Settlement
2000:0688	Hill of Rath	305355	277825	Occupation
2001:833	Balgatheran	304580	280000	Settlement
2001:836	Boolies	303437	292316	Fulacht fiadh
2001:856	Farrandreg	303455	307905	Fulacht fiadh
2001:869	Mell	305860	276550	Ringditch and enclosure
2001:871	Mell	305810	277375	Fulacht fiadh
2001:872	Fieldstown	307165	281295	Cist
2001:873	Mountbagnall	316295	306885	Occupation
2001:880	Tullyallen	304705	277005	Flint scatter
2001:882	Tullyallen	305620	276680	Occupation
2002:1291	Littlemill	302950	305500	Occupation
2002:1335-8	Marshes Upper	305800	305100	Settlement
2002:1342	Marshes Upper	305700	305050	Settlement
2002:1352	Littlemill	302800	305235	Fulacht fiadh
2002:1361	Roosky	318805	310505	Fulacht fiadh
2002:1364	Tullyallen	371505	263905	Settlement
TBC	Balregan	302850	309950	Henge
03E0873	Carnmore	304912	310860	Burials
2000:0693	Littlegrange	301750	275200	Flint scatter
2000:0715	Tullyallen	305755	276522	Ring-barrow
1980-84:0142	Newtownbalregan	301850	307750	Cist
1999:636	Richardstown	301352	291028	Fulacht fiadh
03E0888	Monanny	284266	305232	Settlement

Dingle study area excavations County Kerry (source: Excavations Bulletin)

Excavation Bulletin No	Townland	Easting	Northing	Monument
2000:0455	Mounthawk / Ballynahoulart	82455	115755	Burial?
1998:286	Cloghers	83500	113500	Settlement
1999:340	Ballyvelly	82205	114605	Settlement
2000:0454	Manor West	85735	113095	Settlement
1993:120	Coarha More, Valentia Island	37850	73650	Settlement
1992:100	Ferriters Cove, Ballyoughteragh North	33050	105250	Settlement
1986:30	Ferriters Cove, Ballyoughteragh South	32150	105550	Settlement
1993:116	Ferriters Cove, Ballyoughteragh South	33050	105250	Occupation
1994:129	Ross Island	94450	88050	Early copper mine
2000:0437	Kilmurry	91395	71755	Occupation
2000:0446	Cloghers	83705	113305	Settlement
2000:0435	Gortatlea and Flemby	91250	110150	Settlement
2000:0435	Gortatlea and Flemby	91250	110150	Ringbarrow
1973:0019	Dromkeen East	83350	130850	Fulacht Fiadh
1988:28:00	Coarhamore	37850	73650	Fulacht Fiadh
1997:242	Dromthacker	83750	115450	Fulachta fiadh
2000:0432	Flemby	91315	110085	Fulachta fiadh
2001:570	Gortatlea	91850	110250	Fulacht Fiadh
2002:782	Ballybeg	45500	102000	Fulacht Fiadh
2002:787	Dirtane	75150	128700	Fulacht Fiadh
2002:789	Dromin	91550	92450	Fulacht Fiadh
2002:792	Dromore	93650	103350	Fulacht Fiadh
1992:104	Ballyhoneen / Kilmore	52805	108524	Fulacht Fiadh
1992:104	Ballyhoneen / Kilmore	52645	108011	Fulacht Fiadh
1992:104	Ballyhoneen / Kilmore	52687	108411	Fulacht Fiadh
1992:104	Ballyhoneen / Kilmore	53076	108110	Fulacht Fiadh
1992:104	Ballyhoneen / Kilmore	52373	108082	Fulacht Fiadh
1992:104	Ballyhoneen / Kilmore	52394	108088	Fulacht Fiadh
1992:104	Ballyhoneen / Kilmore	53198	107446	Fulacht Fiadh
1992:104	Ballyhoneen / Kilmore	53074	107746	Fulacht Fiadh
1992:104	Ballyhoneen / Kilmore	52349	108159	Cist?
1992:104	Ballyhoneen / Kilmore	52705	107719	Cist

3 Raw Data Used in GIS Analyses

3.1 Data used to create graphs analysing bedrock formations in Chapter 3.

Inishowen bedrock geology data.

Geological Formation	No. of panels	Panels %	Area (m.sq)	Area of formation %
CM	1	0.60	10026307.30	1.07
CU	2	1.20	20993124.54	2.25
FG	4	2.40	103444687.76	11.09
FGcg	0	0.00	20784486.83	2.23
FS	5	2.99	86621787.05	9.28
GR	0	0.00	5435571.63	0.58
IH	1	0.60	111592333.39	11.96
LC	4	2.40	75937426.75	8.14
LFS	0	0.00	200595457.50	21.50
Md	0	0.00	12125884.26	1.30
ST	2	1.20	75547122.98	8.10
TE	148	88.62	125929123.21	13.50
Tu	0	0.00	6271283.56	0.67
UC	0	0.00	77450831.06	8.30
mxMd	0	0.00	288146.21	0.03
TOTAL	**167**	**100.00**	**933043574.05**	**100.00**

Louth / Monaghan bedrock geology data.

Geological Formation	No. of panels	Panels %	Area (m.sq)	Area of formation %
BAS	0	0.00	445008.13	0.08
Bc	0	0.00	788341.72	0.13
Bt	0	0.00	367312.54	0.06
CBT	0	0.00	86586032.35	14.66
DIN	1	1.39	64700981.68	10.96
Do	0	0.00	4763868.59	0.81
Eg	0	0.00	2190559.65	0.37
Ex	0	0.00	7659808.72	1.30
Ex1	0	0.00	1901301.96	0.32
Ex2	0	0.00	2776581.26	0.47
Ex3	0	0.00	1813304.33	0.31
Ex4	0	0.00	320464.91	0.05
Gr	0	0.00	59136001.20	10.02
Ha	0	0.00	1586676.20	0.27
IN	71	98.61	248993110.73	42.17
LH	0	0.00	1264533.48	0.21
MB	0	0.00	28662421.13	4.85
MF	0	0.00	19117848.48	3.24
Ng	0	0.00	21981670.75	3.72
Pf	0	0.00	5437636.00	0.92
Pg	0	0.00	8676646.22	1.47
SK	0	0.00	5888019.34	1.00
TM	0	0.00	12959213.29	2.19
Va	0	0.00	2417295.22	0.41
Vg	0	0.00	24011.96	0.00
TOTAL	**72**	**100.0000**	**590458649.85**	**100.00**

Dingle bedrock geology data.

Geological Formation	No. of panels	Panels %	Area (m.sq)	Area of formation %
AL	5	8.93	28421329.8727	4.078
BA	0	0.00	8482090.8313	1.217
BD	0	0.00	3600075.1056	0.517
BF	0	0.00	5807462.7498	0.833
BH	0	0.00	12519006.3369	1.796
BM	26	46.43	170988233.8774	24.537
BN	0	0.00	511199.1803	0.073
CA	1	1.79	93781825.5202	13.458
CC	0	0.00	251796.5878	0.036
CG	0	0.00	146410.0824	0.021
CH	0	0.00	2377590.4296	0.341
CL	0	0.00	11458434.1215	1.644
CLcr	0	0.00	1298911.4188	0.186
CM	1	1.79	9280311.0917	1.332
CO	15	26.79	82561032.8713	11.848
DG	0	0.00	1612963.7539	0.231
DI	0	0.00	7685611.4764	1.103
DIN	0	0.00	30913031.1431	4.436
DP	0	0.00	3648744.8856	0.524
EK	3	5.36	21950503.8341	3.150
FM	0	0.00	212263.0876	0.030
FN	0	0.00	4597077.5055	0.660
GB	0	0.00	21438248.0167	3.076
GBcm	0	0.00	45438.2934	0.007
GBco	0	0.00	108467.4299	0.016
IC	0	0.00	14999122.4672	2.152
KM	0	0.00	28993910.3986	4.161
LK	0	0.00	12071394.9886	1.732

LS	1	1.79	11530758.2289	1.655
MC	0	0.00	1910043.1903	0.274
NAM	0	0.00	14902579.8224	2.139
PGG	1	1.79	28246835.1225	4.053
RF	0	0.00	5567508.9079	0.799
SC	0	0.00	106382.7760	0.015
SH	1	1.79	19085729.1904	2.739
SMG	0	0.00	9101900.7198	1.306
SWG	0	0.00	895572.1989	0.129
TC	0	0.00	3275079.9288	0.470
WA	2	3.57	22475669.7773	3.225
TOTAL	**56**	**100.00**	**696860547.22**	**100.00**

3.2 Data used to create graphs analyzing elevation zones in Chapter 3.

Number of panels within 50m elevation zones.

Elevation zone	0-50	50-100	100-150	150-200	200-250	250-300	Total
Louth / Monaghan	49	23	0	0	0	0	72
Dingle	9	22	20	4	1	0	56
Inishowen	108	37	14	7	1	0	167
Total	**166**	**82**	**34**	**11**	**2**	**0**	**295**

Number of panels within 50m elevation zones, Inishowen.

Elevation zone	No. of panels	Panels %	Area (m.sq)	Area %
0-50	108	64.67	444756871.1	37.72
50-100	37	22.16	230744897.52	19.57
100-150	14	8.38	188845857.67	16.02
150-200	7	4.19	134922421.34	11.44
200-250	1	0.60	92550489.63	7.85
250-300	0	0.00	50910131.38	4.32
300-350	0	0.00	20886485.31	1.77
350-400	0	0.00	9303799.96	0.79
400-450	0	0.00	3669576.73	0.31
450-500	0	0.00	1814303.32	0.15
500-550	0	0.00	470332.68	0.04
550-600	0	0.00	238228.74	0.02
600-650	0	0.00	28977.14	0.00
TOTAL	**167**	**100.00**	**1179142372.50**	**100.00**

Number of panels within 50m elevation zones, Louth / Monaghan.

Elevation zone	No. of panels	Panels %	Area (m.sq)	Area %
0-50	49	68.06	277236393.60	36.95
50-100	23	31.94	209472340.68	27.92
100-150	0	0.00	149786972.68	19.96
150-200	0	0.00	50855768.35	6.78
200-250	0	0.00	19731344.82	2.63
250-300	0	0.00	13616127.05	1.81
300-350	0	0.00	11287927.49	1.50
350-400	0	0.00	9664221.27	1.29
400-450	0	0.00	6031589.87	0.80
450-500	0	0.00	1939429.94	0.26
500-550	0	0.00	571524.50	0.08
550-600	0	0.00	114617.43	0.02
600-650	0	0.00	0	0.00
TOTAL	**72**	**100.00**	**750308257.69**	**100.00**

Number of panels within 50m elevation zones, Dingle.

Elevation zone	No. of panels	Panels %	Area (m.sq)	Area %
0-50	9	16.07	243175429.92	35.51992
50-100	22	39.29	105793377.31	15.45293
100-150	20	35.71	73039340.84	10.66864
150-200	4	7.14	52855213.56	7.72041
200-250	1	1.79	43396236.71	6.33876
250-300	0	0.00	33695761.08	4.92184
300-350	0	0.00	29768148.32	4.34815
350-400	0	0.00	27017877.12	3.94642
400-450	0	0.00	19554405.11	2.85625
450-500	0	0.00	15484219.37	2.26173
500-550	0	0.00	12756075.28	1.86324
550-600	0	0.00	10545917.86	1.54041
600-650	0	0.00	6569094.31	0.95953
650-700	0	0.00	4545769.82	0.66399
700-750	0	0.00	3255820.74	0.47557
750-800	0	0.00	2017365.24	0.29467
800-850	0	0.00	814321.66	0.11895
850-900	0	0.00	247634.97	0.03617
900-950	0	0.00	84861.20	0.01240
950-1000	0	0.00	231.67	0.00003
TOTAL	**56**	**100.00**	**684617102.07**	**100.00**

3.3 Data used to create graphs analyzing physiographic divisions in Chapter 3.

All study areas.

	No. of panels	% of panels
Peaty Podzols	***56***	***18.98***
Peaty Gleys	0	0.00
Blanket Peat	***18***	***6.10***
Lithosols & Outcrop	1	0.34
Brown Podzolics	48	16.27
ABE (Coarse)	***0***	***0.00***
ABE	***169***	***57.29***
Gleys	3	1.02
Grey Brown Podzolics	0	0.00
Urban	0	0.00
Total	**295**	**100.00**

Inishowen physiographic division data.

Physiographic division	No. of panels	Panels %	Area (m.sq)	Area of physiographic division %
No.1	39	23.35	303696157.08	25.89
No.2	0	0.00	18574572.48	1.58
No.3	0	0.00	3591096.57	0.31
No.4	0	0.00	18788018.08	1.60
No.5	0	0.00	139672549.49	11.91
No.16	97	58.08	8144387.12	0.69
No.20	26	15.57	495445308.58	42.23
No.24	5	2.99	54961587.65	4.69
No.28	0	0.00	52674690.20	4.49
No.43	0	0.00	68325901.45	5.82
No.51	0	0.00	9233933.61	0.79
TOTAL	**167**	**100.00**	**1173108202.31**	**100.00**

Louth / Monaghan physiographic division data.

Physiographic division	No. of panels	Panels %	Area (m.sq)	Area of physiographic division %
No.1	0	0.00	17132673.64	1.66
No.4	0	0.00	47350642.79	4.59
No.8	0	0.00	4441461.81	0.43
No.9	0	0.00	10744954.17	1.04
No.12	0	0.00	168185095.21	16.29
No.14	66	91.67	316240621.25	30.62
No.25	0	0.00	958722.66	0.09
No.27	0	0.00	26603799.58	2.58
No.28	0	0.00	44538916.23	4.31
No.29	6	8.33	363276618.44	35.18
No.43	0	0.00	26802727.34	2.60
No.44	0	0.00	2582301.46	0.25
No.50	0	0.00	3835066.92	0.37
TOTAL	**72**	**100.00**	**1032693601.50**	**100.00**

Dingle physiographic division data.

Physiographic division	No. of panels	Panels %	Area (m.sq)	Area of physiographic division %
No.1	17	30.36	257979769.90	37.09
No.4	1	1.79	52775584.45	7.59
No.5	2	3.57	43735251.53	6.29
No.15	22	39.29	199590037.58	28.70
No.22	2	3.57	48112122.97	6.92
No.24	11	19.64	38664667.61	5.56
No.34	0	0.00	36886909.19	5.30
No.43	1	1.79	17753667.93	2.55
TOTAL	**56**	**100.00**	**695498011.17**	**100.00**

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