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LANDSCAPE ARCHAEOLOGY

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Introduction

Archaeologists study past human societies through material remains. Archaeology is therefore concerned with both the physical world and the ways it has been inhabited, experienced and shaped by people and their changing societies over time. The transdisciplinary concept of landscape expressed in Article 1 of the European Landscape Convention is intimately related to the aims of archaeologists, since it includes both cultural and physical aspects: 'an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors' (Council of Europe 2000). This idea of landscape, which spans both the human and natural sciences, has consequently come to occupy a place of central importance for archaeology in recent decades (Gamble 2001: 15; David and Thomas 2008). In addition to the study of the past, the transdisciplinary potential of landscape as an approach means that there is increasing scope for landscape archaeologists to collaborate on the challenges facing society by contributing to knowledge about the long-term trajectories of landscape change. By working in partnership with others, archaeologists' results can be used to inform conservation strategies, landscape management and spatial planning. Whilst the focus of most archaeological work will remain on the analysis of past landscapes, the field of landscape archaeology can also make valuable contributions to managing and improving the landscapes of the present and future (Turner and Fairclough 2007; Fairclough and Møller 2009).

This chapter outlines some of the principal developments in landscape archaeology. In the 1950s–1970s, landscape archaeologists were either writing in rather a romantic mode, without much theoretical self-criticism, or turning to scientific analytical methods that focussed on economic and environmental drivers but seemed to neglect the relationships between people (Johnson 2007). In the 1980s and 90s, much theoretical writing in archaeology was focussed on interpreting representations, textual metaphors and cultural perceptions. Archaeologists were strongly influenced by geography, where the dominant paradigm at the time concentrated more on analysing representations than on studies of physical landscapes. Archaeologists engaged usefully with these standpoints, but they have continued to develop empirical approaches through scientific lab- and field-based research. Over the last decade, theoretical writing in archaeology has been characterised by the development of relational perspectives which are compatible with the kind of transdisciplinary approaches epitomised by the concept of landscape (Chouquer and Watteaux 2011; Conneller 2011; Lucas 2012).

Landscape archaeology is by definition an interdisciplinary field, but the varying nature and strength of influences from the humanities (particularly history and studies of the ancient world), the biological and physical sciences, and the social sciences (particularly anthropology and geography) has shaped different approaches in different ways.

Landscape history and historical geography

In the early twentieth century, little or no training was available specifically in archaeology, so archaeologists who studied landscapes normally had backgrounds in other disciplines. A good example is O.G.S. Crawford, who trained originally in geography. One of the most influential landscape archaeologists of the early twentieth century, he had realised during active service as an airman in the 1914-18 war that archaeological sites could be identified from the air and recorded using air photography. He spent much of his career surveying features in archaeological landscapes as Archaeological Officer for the UK national mapping agency, the Ordnance Survey. Crawford made a famous and powerful analogy between the landscape and a 'palimpsest' – a piece of vellum used many times for different texts. According to Crawford, the landscape is like:

> …a document that has been written on and erased over and over again; and it is the business of the field archaeologist to decipher it. The features concerned are of course the field boundaries, the woods, the farms and other habitations, and all the other products of human labour; these are the letters and words inscribed on the land. But it is not always easy to read them because, whereas the vellum document was seldom wiped clean more than once or twice, the land has been subject to continual change throughout the ages.
>
> *(Crawford 1953: 51)*

At the time Crawford was writing, this comparison between the landscape and a historical document would have appealed immediately to his academic contemporaries, since many of them were primarily historians. It was from about this time that scholars such as W.G. Hoskins, H.P.R. Finberg, M.W. Beresford and J.G. Hurst began to take increasing account of the physical remains from the past. Nevertheless, the research of Hoskins and his colleagues in the 'Leicester School' of local and landscape history was firmly rooted in traditional historical methods which entailed the detailed study of documentary sources from particular localities. In this respect their approach was similar to many European historical geographers in the mid-twentieth century (e.g. Flatrès 1957). Whilst some landscape historians continue to work within a largely empiricist framework, critical historiographers like Matthew Johnson have identified a strong strand of romanticism in this approach (Johnson 2007: 34-69), and discussed how Hoskins in particular wrote evocative, nostalgic (English) histories but failed to engage with important issues such as colonialism or the exercise of power (Johnson 2005: 114-9).

Archaeologists working in this tradition of landscape study also developed various methods that are still widely used today. Crawford's air photography laid foundations for modern aerial survey. Historical archaeologists have developed new approaches to integrating different sources about the past including texts, place-names, maps and

landscapes (Hicks and Beaudry 2006). Surveyors have recorded earthworks and other features visible on the surface, and developed ways to present and map them (Bowden 1999). In some ways, modern innovations facilitated by new technologies, such as the use of LiDAR data to identify archaeological sites, build directly on this earlier work (Bewley et al. 2005). It was also largely thanks to the success of scholars such as Hoskins in communicating with a popular audience (e.g. Hoskins 1955; Aston 1985) that the social value of the 'historic landscape' became more widely recognised. The growing public awareness of the historic character of features such as hedgerows, roads and farm buildings meant that it was possible to use research programmes to inform and influence large-scale planning of major infrastructure projects such as motorways (Rippon 1996; Clarke et al. 2004; Highways Agency 2007).

[Fig. 1]

Physical landscapes and spatial analysis

The 1960s and 70s saw the development of a new type of landscape archaeology very much influenced by earlier developments in geographical theory and practice. It was particularly concerned with explaining the past using scientific theory and systems thinking and by testing hypotheses with the aim of building models (Clarke 1968; Greene and Moore 2010: 264-72). This 'new' or 'processual' archaeology had several key impacts on landscape archaeology.

Firstly, excavation methods were designed to address questions about landscapes ranging from very large-scale interventions designed to reveal archaeological features over large continuous areas (e.g. Hamerow 1991), to very small trenches or 'test pits' scattered across an area, whose aim was to analyse the extent and chronology of past activity by identifying artefacts or ecofacts deposited in the soil through settlement or agricultural activity (e.g. Jones and Page 2006). Many of the excavation methods that began to be developed in the 60s and 70s have continued to be used and refined to the present day (see Carver 2009; Greene and Moore 2010).

Secondly, there was a growing emphasis on quantitative spatial methods. These are particularly associated with techniques such as intensive field survey, where teams of archaeologists methodically collect and plot surface finds (such as ceramics and stone tools) to identify sites and areas that were the focus of past activity. Sophisticated methods are required to disentangle the spatial and temporal complexity of historic and archaeological landscapes (Hodder and Orton 1976). Since the 1980s, Geographic Information Systems (GIS)have provided a useful tool to address this issue since they enable the joint management of geographic and attribute data within a digital platform (Conolly and Lake 2006; Conolly 2008), and have thus enabled the spread of quantitative analyses in landscape archaeology.

Quantitative analysis of spatial patterns is characterised by two distinct and complementary approaches: the creation of maps for the visual assessment of spatial organization and the use of statistics to test hypotheses. Some pioneering applications of GIS in archaeological research belong to the first approach, including the use of Thiessen polygons to investigate the role of specific site-types (Renfrew 1976) and the estimation of regions of intervisibility (viewsheds) to infer past locational patterns and relationships between sites (Wheatley 1995).

Many of the methods currently employed for spatial statistics in archaeology were originally developed in geography and ecology. They are used to analyse the spatial structure of complex datasets against a null hypothesis (i.e. the absence of any significant spatial organization) in order to identify patterns and inform interpretations. The analysis of spatial clustering was one of the first statistical methods used by archaeologists for spatial analysis (Hodder and Hassell 1971). Its most popular implementations are nearest-neighbour analysis to identify clustering and *k*-means statistics to identify the number of clusters, but more sophisticated methods are increasingly being used (Bevan et al. 2013).

Spatial dependency, the correlation between attribute values at different locations and their geographical distance, is widely investigated using methods such as Moran's *I* statistics (Premo 2004). The identification of spatial dependency enables the use of geostatistical modelling (Lloyd and Atkinson 2004). The analysis of locational patterns is often carried out using regression-based methods, which model the relationship between a dependent variable (e.g. density of archaeological evidence, presence/absence of archaeological sites) and the spatial variation of other parameters (e.g. morphology, distance to water sources or roads) (Löwenborg 2010; Eve and Crema 2014). Geostatistics and regression can also be used to create predictive models for those areas most likely to yield archaeological evidence based on the spatial analysis of existing datasets (inductive modelling) or on the identification of specific locational strategies (deductive modelling). Such methods were frequently used in research and heritage management in the 1980s and 90s, although the recognition of theoretical and methodological problems led to a decrease in their popularity during the 2000s (Ebert 2000).

[Fig. 2]

Thirdly, from the mid-1960s interest intensified in developing scientific methods, including palaeoenvironmental and geoarchaeological techniques, which could help construct knowledge of earlier landscapes and environments (see e.g. Rapp and Hill 1998; Denham 2008). Environmental archaeology is broadly concerned with reconstructing the physical environment, including both landforms and vegetation, and the relationships between past environments and human activity. Within environmental archaeology are a range of approaches, such as geoarchaeology and palaeobotany, which address these themes. Environmental archaeology has seen the development of increasingly multidisciplinary approaches which bring together different types of material evidence and methodologies.

Geoarchaeological techniques are multiscalar. At larger scales, geoarchaeologists study processes such as the evolution of river systems, and the influence of human activities such as agriculture; while at the microscale they include studies of sediment particle size under the microscope. Analysis is focussed either upon undisturbed stratigraphic samples, or 'bulk' sediments. Bulk sediment analysis refers to methods where samples are removed from their context for analysis. 'Undisturbed' samples are sequences of material collected and analysed 'in situ'. Sediment cores or borehole surveys are commonly used to model buried deposits and inform the interpretation of past landscapes. For example, changes in the type and thickness of alluvial sediments enable the identification of palaeochannels and the examination of how rivers have shifted

through time. Standard descriptive characteristics include sediment colour and texture, and the thickness of each layer. Further chemical tests may be carried out, either qualitatively in the field using test kits, or using more quantitative methods back in the laboratory. Physical characteristics can help understand how a sediment has been deposited, for example whether it is water-laid or wind-blown, or to identify mixes of materials. Chemical information such as phosphate concentrations can potentially indicate inputs of material of anthropogenic origin. Further organic geochemical methods enable targeted investigations, for example analysis of sterol content to identify past manuring practices (Bull et al. 2001). At a more local scale, high resolution methods such as sediment micromorphology can be used to identify different processes on undisturbed samples. Micromorphology is a technique that was developed in soil science to investigate the formation processes of soils, though is now most commonly used by archaeologists to analyse soils and palaeosoils, or anthropogenic sediments on archaeological sites (e.g. Shillito 2011).

Reconstruction of vegetation is usually achieved through the analysis of pollen extracted from sediment cores from lakes or peat bogs. Continuous sequences of sediment are sampled at regular defined intervals, which influence the degree of resolution that can be achieved. The resulting data gives a quantitative estimate of how landscape vegetation has changed over time. Increasingly, the standard approach to analysing sediment cores is to use a multi-proxy approach, with complementary analyses including non-pollen palynomorphs, dung fungal spores, inorganic chemistry such as carbonates, and organic geochemical analyses for substances including lipids and alkanes. Each of these proxies provides a different strand of information, which in combination can give a very detailed picture of past landscape processes.

Understanding how these analyses relate to past landscapes requires a robust dating programme that enables the different records to be linked together. In the case of sediment cores, radiocarbon chronologies are preferred, while varved lake sediments can provide very high resolution pictures of landscape change which can be linked to archaeological chronologies. Other types of samples can be problematic if there is no suitable material for radiocarbon dating, although other methods such as the direct dating of sediments using optically stimulated luminescence (OSL) are becoming increasingly refined (e.g. Kinnaird et al. 2017).

Whilst analysis of these records gives a picture of how landscapes have changed physically over time, and what the landscape may have looked like in the past, they are also crucial for understanding modern landscape change. Human-induced environmental change has occurred against a backdrop of natural change that cycles over geological timescales, and it is important to understand these natural cycles. Geoarchaeology has been highly influenced by physical geography and vice versa, since both have mutual interests in understanding long term landscape history, and the human role in shaping the natural environment (Butzer 1966). Like geography, the real strength of landscape archaeology is the ability to combine diverse areas of investigation ranging from the humanities to the physical sciences, thereby enabling a deeper understanding of human relationships with landscapes over time (Butzer 2008). Landscape archaeology is uniquely placed to combine evidence from the geosciences with social, cultural and historical perspectives.

Social, cultural and material landscapes

From the early 1970s, geographers developed post-modern critiques of what they saw as positivist, data-driven interpretations of past landscapes. They were critical of the apparent lack of interest in social processes and social theory, and a general failure to appreciate that landscapes were not neutral 'containers' but contested spaces (Olwig 2004). They argued that landscapes are best understood as ways of seeing through a cultural lens. Consequently, their significance is always changing, constantly negotiated in relation to cultural values (Widgren 2004: 457-8; Cosgrove 2006: 50). There is no longer any possibility of discovering single 'authentic' meanings in landscapes. In practical terms, the growing emphasis on landscapes as representations led many geographers' studies away from detailed empirical research towards more general, theoretical work.

As in geography and many other social science and humanities disciplines, archaeological theory also went through a period of post-modern revision in the 1980s and 1990s (e.g. Hodder 1986; Shanks and Tilley 1987). Influenced by social theorists such as Bourdieu (1977) and Giddens (1984), post-processual archaeologists highlighted how people shaped social life by developing archaeologies that interpreted practice, agency and structure (Barrett 1994; Thomas 1996). They attempted to understand how people experienced the past by adapting phenomenological perspectives to archaeological landscapes (Tilley 1994; Bender *et al.* 2007). However, these post-processual and interpretative archaeologies continued to engage fully with material culture (Miller 1987; Hicks 2010). The emphasis on context, combined with the great time-depth of the archaeological record, has led many archaeologists to share the *annaliste* historians' concern for analysing trajectories of change over the long term (Gosden 1994; Morris 2000). In embracing these themes, landscape archaeologists have understood two key points: firstly, that knowledge and perception are fundamental to interpreting landscapes in the past and the present; and secondly, that landscapes always change (Antrop 2005; Turner and Fairclough 2007).

Although the 'interpretative' or 'representational' paradigm was dominant in cultural geography and other fields during the 1980s and 1990s, there were geographers who felt that the move to explain landscapes (and other aspects of culture) as perceptions failed to engage adequately with important aspects of human experience, particularly engagement with the material world (Whatmore 2006; Thrift 2007). Their work sought to overcome dichotomies such as 'nature' and 'culture' or 'mental' and 'material' (Latour 2007; Wylie 2007: 153-66). For archaeologists, the appeal of approaches which treat things seriously is clear, since the principal medium for their work is the fragmentary remains of past material culture (Witcher *et al.* 2010: 120-3; Fowler 2013). New approaches to a 'more-than-human' world have also been developed for landscape archaeology using relational perspectives which analyse the multifaceted connections between people and things, past and present, and how they are mixed and changed over time (González-Ruibal 2007; Webmoor and Witmore 2008; Hodder 2012; Fowler 2014).

Conclusion

In this chapter we have outlined how the development of landscape archaeology has been deeply influenced by many other disciplines. Self-reflexive, theoretically informed research is still at the forefront of efforts to create transdisciplinary landscape

archaeologies that draw in theories and methods from many areas of research (e.g. Chouquer 2007: 246-9; Tuddenham 2010). Landscape archaeology has developed multi-layered approaches with the capacity to enable communication, collaboration and co-investigation at all scales. While the relationship with geography has been fundamental, many sciences, social sciences and humanities have contributed to the development of theory and practical methods. It is clear that archaeologists will continue to work with other landscape practitioners including landscape architects, planners, sociologists, psychologists, environmental scientists, ecologists and geologists.

Change remains a central concern for landscape archaeologists, with their focus on explaining and presenting the chains of relationships that have created the landscapes in which we live today. They recognise that the 'ancient' landscapes they study are the result of hundreds or thousands of years of daily work and natural cycles, not 'fossils' stranded in time from Antiquity. Related to this, there is the recognition that archaeologists can use their knowledge of how landscapes emerge over the long term to contribute to the creation and management of sustainable landscapes. The relationships between people, places and things can be traced and explained not only for past landscapes, but also from the past into the present; while knowledge about rates and drivers of change can be used to model potential trajectories of change into the future. To maximise the benefits of their research, it will be important for landscape archaeologists to engage with other stakeholders, including all the public and professional groups who live in, work with, and pay visits to the landscapes they study. Successful studies in landscape archaeology have a long-established record of producing convincing analyses of past landscapes, but they also have the potential to engage in fruitful debates about how to shape sustainable landscapes for the future.

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FIGURE CAPTIONS

Fig. 1. Darras Hall, Newcastle upon Tyne, England, looking north. Vestiges of medieval and later agriculture remain as earthworks in the fields at the bottom of the picture, whereas later ploughing has destroyed visible features in the field beyond. Nevertheless, curving field boundaries of likely medieval date still define these fields, and have also shaped the layout of the twentieth-century housing estate across the road to the north-west. (Photo: S. Turner, November 2005).

Fig. 2. Historic Landscape Characterisation (HLC) at Vilalta, Catalonia (Turner et al. 2017). HLC is a formalised, GIS-based method for interpreting and mapping how the character of landscapes relates to the historic processes that have shaped them. The case study included luminescence dating of sediments which dated the terrace system to the medieval period. (Includes data © Institut Cartogràfic i Geològic de Catalunya, 2016. http://www.icc.cat/vissir/).

BIOGRAPHICAL NOTES

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