Recent reconceptualizations of scale in geography are relevant to the theory and practice of landscape archaeology. If we want to understand past landscapes as fields of human engagement, then the way we think about scale in both space and time matters. As Raper and Livingstone (1995: 364) argued, “the way that spatio-temporal processes are studied is strongly influenced by the model of space and time that is adopted.” A large literature in geography, particularly human geography, in the last few decades has focused on the theorizing of scale. The particular context of these debates has been the economics of globalization, and the ways in which it is expressed and worked through at local, regional, and national levels. This is not to say that archaeologists have not thought about scale, but rather that they have not theorized it quite so explicitly. Further, juxtaposing discussions from very different empirical contexts to archaeological ones is a useful way to identify commonalities and differences.

Scale is defined in The Dictionary of Human Geography as “one or more levels of representation, experience, and organization of geographical events and processes” (Johnston et al. 2000: 724). Geographers commonly distinguish among cartographic scale (“the level of abstraction at which a map is constructed”), methodological scale (“the choice of scale made by a researcher” to answer a research problem), and geographical scale (724–25). The last term “refers to the dimensions of specific landscapes: geographers might talk of the regional scale, the scale of a watershed, or the global scale, for example. These scales are also of course conceptualized, but the conceptualization of geographical scale here follows specific processes in the physical and human landscape rather than conceptual abstractions lain over it” (Johnston et al. 2000: 725).

This chapter is primarily concerned with the latter two uses of scale, and the interactions between them; that is, what scale choices do and should landscape archaeologists make in trying to understand landscapes of prehistoric human interaction? To answer this, I discuss three important themes in the literature on scale; first, its social construction; second, its relational qualities; and third, the relationship between space and time. These themes should be thought of as applying to the scales of both prehistoric behavior and contemporary research. I illustrate the challenges and the potential of operationalizing a more dynamic understanding of scale with examples from a collaborative landscape archaeology project in northwestern Australia. In this case, the landscapes of prehistoric human interaction are hunter-gatherer ones in northwestern Australia.
The Social Construction of Scale

Within both the social and natural sciences there has been a shift over recent decades away from essentialist understandings of categories and concepts toward contingency. The critique of scale should be understood as part of this trend.

In these recent social theoretical studies, the fundamental point being made is that scale is not necessarily a preordained hierarchical framework for ordering the world—local, regional, national and global. It is instead a contingent outcome of the tensions that exist between structural forces and the practices of human agents. (Marston 2000: 220)

Archaeologists may not have theorized much explicitly about scale, but the idea of social construction is not a foreign concept and is present in many empirical studies.

For example, there is the issue of how the landscape of the prehistoric inhabitants meshes or otherwise with the analytical landscape of the contemporary archaeologist. There is both implicit and explicit discussion of scale in the literature on sites. What is the appropriate scale of analysis? What is a site? How does it sit in the landscape? Where will I put the boundaries for my study?

Within landscape archaeology in particular, there is an awareness of processes that can occur at the scale of the individual body, right up to the broadest of physical landscapes.

Scale is constituted in the process of social relations:

All social relations (capital accumulation, politics, social and cultural development) have a geographic expression, and it is the complex expression of these relations in space that produces scale. The geographical expression of varied social relations establishes a range of differentiated geographic scales that become temporarily fixed and are reproduced through their expression in the built environment and through social networks . . . Therefore, socially produced scale both establishes and is established through the geographical structure of social relations. (McGuirk 1997: 483)

As geographers, then, our goal with respect to scale should be to understand how particular scales become constituted and transformed in response to social-spatial dynamics. (Marston 2000: 221)

Archaeologists can take these points and then need to extend them to consider how we read off the scale of past social experience from the material evidence. It is also important to consider how the disciplinary conventions of archaeology pin certain understandings of scale in place. As Wishart (2004) points out, these ideas apply also to temporal scale; the idea of historical period needs as much critical scrutiny as region.

Scale as Relational

If scale is contingent and worked out through human processes, it follows that it is relational—scales are constituted in relationship with one another rather than as discrete entities. Doreen Massey (2001) has referred to this as the “Russian Doll” problem. The idea that we might be able to take scales apart right down to the micro level misses the point that they are constituted in relation to one another.

To see scale as relational has implications for understandings of causation, since “the notion of nesting assumes or implies that the sum of all the small-scale parts produces the large-scale total” (Howitt 1993: 36). Relationality challenges the idea that we can “identify discrete scales from which causes originate and at which effects are felt. In such an approach processes, outcomes, and responses are categorized into distinct ‘boxes’ that are seen as discrete entities originating at a particular level in an indisputable hierarchy of scales” (McGuirk 1997: 482).

Thus the relationships between scale and order, or scale and causation, should not be assumed but be the subject of empirical enquiry. In the context of economic debates, this challenge is usually applied to the assumption that the global is the primary scale. In the context of hunter-gatherer archaeology, the assumption needing critique might be the primacy of the local. Gille and O’Riain (2002: 286) make the further point that level of analysis should not be confused with the level of abstraction—the global is not necessarily universal, and the local is not necessarily particular. Extending these arguments to the relationship between space and time, we see that the long term is not necessarily global, and the short term not necessarily local.

To say that scale is both socially produced and relational does not deny that particular scales can become fixed, reproduced, and influential—they can come to be seen as natural. Indeed, this is what had happened to the local, the regional, and the global to require the critique within economic
become fixed in any particular field of landscape archaeology? What scales and assumed causal relationships have become fixed at the analytical level? What scales might have become fixed in any particular past context that we are studying?

**Space, Time, and Space-time**

It follows that these issues apply to the relationships between space and time, a point argued from a different direction by Albert Einstein. Doreen Massey (1999) reviewed critiques of separation of space and time, and the privileging of time as the engine of history. In this view, space was simply the container in which history took place. Using an image with obvious relevance to archaeology, Massey argued that "the closed-system/slice-through-time imagination of space denies the possibility of a real temporality—for there is no mechanism for moving from one slice to the next" (264):

> time needs space to get itself going; time and space are born together, along with the relations that produce them both. Time and space must be thought together, therefore, for they are inextricably intermixed. A first implication, then, of this impetus to envisage temporality/history as genuinely open is that spatiality must be integrated as an essential part of that process of “the continuous creation of novelty.” (Massey 1999: 274)

She used the term *space/time* to denote the inextricability of the two. I follow that usage here, while noting that it has been used in various configurations (for example, time/space) by a number of writers, including in anthropology.

An issue I return to below is the extent to which our methods, particularly our methods of visual representation, inadvertently reinforce the false separation of space and time. With temporal cross-sections that hold space static, and vice versa, can we really imagine the more dynamic understanding that Massey advocates:

> for time genuinely to be held open, space could be imagined as the sphere of the existence of multiplicity, of the possibility of the existence of difference. Such a space is the sphere in which distinct stories coexist, meet up, affect each other, come into conflict or cooperate. This space is not static, not a cross-section through time; it is disrupted, active and generative. It is not a closed system; it is constantly, as space-time, being

This understanding would not be foreign to any archaeologist who has tried to understand past landscapes as fields of human engagement; the problem is the intractability of the archaeological data. Massey did acknowledge that “it can make your head hurt to think in this way” (1999: 262).

A powerful expression of this concept of space/time is the recent discovery and analysis of the Willandra Lakes Mungo footprints (Webb et al. 2006). Found across 700 m² of exposed hardpan, near the stranded shoreline of a relict lake basin, are footprints left by at least eight individuals, including adults, adolescents, and children. OSL dating puts this space/time between 23,000 and 19,000 B.P. This is a very embodied landscape. The mud squeezes between their toes. Two tall individuals are inferred to have been fast runners. Some of the tracks disappear beneath overlying sediments; there could well be more to be found. It is a captured moment, albeit the long sort of moment provided by archaeological dating. It is a moment from which we can spin out in both space and time to understand the broader context. We can understand, to reprise both William Blake and Howitt (1993), how “to see a world in a grain of sand.”

But could Webb and colleagues have pinned this space/time together without first understanding the cross-sections that are such familiar archaeological signifiers of Lake Mungo, for example, in the work of Bowler (1998) or in their own figure 3? It seems unlikely. And how do the rest of us tease out embodied landscapes when we have the cross-sections but not the footprints? These are perennial issues with the intractable evidence of hunter-gatherer archaeology. In the following section, I illustrate how we have grappled with these dilemmas in a collaborative landscape archaeology project.

**Case Study: Landscape Archaeology in Northwestern Australia**

The Keep River region of northwestern Australia is a landscape of considerable and continuing Aboriginal significance. As in other sandstone landscapes of northern Australia, there are many difficulties in terms of archaeological preservation and visibility, although the rock art provides a spectacular above-ground archaeology. The methodological challenge has been to take landscapes designated separately for analytical purposes and to try to pin them together to get an embodied landscape prehistory. Rather than assume a total cultural “package” that all operates together, we aim to explicitly identify convergences and
of elements with very different archaeological signatures.

I compare what I have called “the geoarchaeological landscape” and the “landscape of fruit seed processing.” In each case, as researchers we chose a methodological scale that matched the available evidence and that we hoped would get us closer to geographical scale, that is, to “specific processes in the prehistoric physical and human landscape” (Johnston et al. 2000: 725). In the geoarchaeological landscape, we were attempting a landscape overview, and the specific processes of interest were the context of archaeological site deposition and preservation. The fruit seed landscape focused on a set of plant remains preserved very well in some times and places, but not at all in others. The remains connected to detailed present-day indigenous ecological knowledge.

These two examples are emblematic of wider issues in the project, but I do not go into any detail here about what we can think of as the stone artifact and the rock art landscapes (Akerman, Fullagar, and van Gijn 2002; Head and Fullagar 1997; Tacon et al. 1997). Nor do I present new data or describe old data in any detail; readers are referred to recent publications for further details on the data (Atchison, Head, and Fullagar 2005; Head, Atchison, and Fullagar 2002; Ward et al. 2005, 2006).

The Geoarchaeological Landscape—The False Promise of Holism

The geoarchaeological landscape was the subject of Ph.D. research by Ingrid Ward, who examined sedimentation patterns in the context of long-term landscape evolution and climate change (Ward et al. 2005). Particularly important to understanding occupation patterns across the landscape was the ability to compare the more visible rockshelter occupation with that on the adjacent sand plains. Rockshelter deposits at the base of sandstone outcrops were visible, easily identifiable, and often associated with rock art. They were also places that Aboriginal people knew about and took us to. This was a significant scale issue for the project as a whole: what was “on-site” and “off-site” occupation, and how might we understand prehistoric settlement differently if we could compare the two (Ward et al. 2006)? In the event, this scale question became one of specifying conditions of invisibility as well as visibility. (It gave us a particular take on what Donna Haraway [1991] has called “situated knowledge.”)

The labor of geoarchaeology produces as its results cross-sections such as that seen in Figure 37.2. This figure holds space, albeit a stylized space, constant, and cutting through time. It summarizes important findings that enhance the archaeological interpretations. There is no evidence to date of human occupation in the oldest sand sheet layers, which date beyond 100,000 years ago. The rockshelters and adjacent sand sheet occupation display very different patterns, most particularly that rockshelter occupation generally does not date beyond 4,000 years ago, whereas on the sand sheets nearby there is occupation evidence dating to and beyond 19,000 years ago. This is interpreted to indicate that the rockshelters are less perfect archaeological traps—that is, they do not “hold” sediments until surounds have built to that level and/or local scree forms a trap. The sand plains have imperfections of their own: notably, organic materials are not preserved there as well as they are in the rockshelters.

The most important practical finding of this work is that there is a whole suite of sand plain occupation, dating back to at least 19,000 years ago, that would have been missed if we had focused exclusively on those parts of the landscape that were more obviously “sites.” Most of it has very little expression at the surface, even though it may be as little as 20 meters from the adjacent rockshelter. This has considerable implications for settlement models of northern Australia, such as those that emphasize the increase in late Holocene site numbers but that are all dominated by rockshelter excavations (Ulm 2004).

This is a significant finding in landscape archaeology considered at the broad scale, and it reiterates the importance of taking a landscape perspective, in the sense of understanding the broad depositional and erosional contexts. More specifically, it is a situation in which the scale of the “site” was not assumed (that is, the rockshelter as a site type was not given total primacy, but was investigated empirically).

That said, it is difficult to go beyond this to a more dynamic understanding of human landscapes. At the risk of being negative about our own data, how do we go beyond presenting the geoarchaeology as background, as the stage on which social life is acted out? This is an ongoing challenge, but three points present themselves.

First, it is important not to confuse a broad-
This is not the total picture, but rather a means of situating our archaeological knowledge, of specifying some of the things that we do not know. This should not be taken to mean that if we had more dates, or more dots on the map, we could somehow get to a totality. As it happens, these sites are some of the most intensively dated in Australia, since the initial dates were controversial and problematic (Fullagar, Price, and Head 1996; Roberts et al. 1998), but an ever-denser data set does not, in itself, solve the problem identified by Massey of moving from one time slice to the next.

Second, we need to beware of a “zooming in” approach to scale, in which broad scale is implicitly conflated with the long term, and the small scale or local is necessarily conflated with the short term. This would really be the Russian Doll problem. If age, for example, we won’t find it. For one thing, the termites are undermining the possible temporal resolution by processing the sediments. But even if we could find a magical time surface, we would have to acknowledge it as multiply dimensioned. One way to think about how all the different scales are intermixed and held simultaneously is to think again of the sand grains from which the luminescence dates are produced. They hold within them signals of many different times, including the one the archaeologist wants via the luminescence date, the last time they were exposed to heat or light. Their spatial positioning is also crucial to their capacity to pin time in place; if we do not know exactly where they come from in relation to evidence of human activity (for example, below the lowest stone artifact at a particular site), they are useless.
Finally, we need to remain conscious of the power of archaeological representations of space and time, such as those evident in the diagrams presented here. These are images that should be understood as having agency in the process of archaeological thinking about space, time, and scale. This is not to suggest that we abandon them, but rather that we maintain a critical reflexivity toward our acts of translating data.

**Landscapes of Fruit-Seed Processing—The False Modesty of the Local**

A comparative refraction on these issues is provided by the landscape of fruit seed processing, part of the work of Jenny Atchison. We knew that fruits such as *Buchanania obovata* (bush mango, *kilen*) and *Persoonia* (bush pear, *kathan*) provided favored and abundant resources for a short period in the early wet season, and that there was ethnographic evidence of them having been pounded and preserved through drying and cooking for longer term storage (Head, Atchison, and Fullagar 2002). Fortunately, a number of the rockshelter excavations contained abundant seed remains that allowed us to trace the prehistory of these activities.

The necessary labor included examining the chronology and the taphonomy of the cultural plant remains, first then by distinguishing between cultural and noncultural components of the archaeobotanical record. Thus, cultural samples were demonstrated to be dominated by fragment-ed and burnt seeds, whereas noncultural samples had whole unburnt seeds and a high proportion of grass seeds (Atchison, Head, and Fullagar 2005).

Fruit seed processing spans the 3,500 years before present. It may have existed before that time, but this archaeological window is limited by the preservation factors common to organic remains in tropical Australia. There is considerable spatial and temporal variability after the first evidence of sustained fruit-seed processing at 3,500 B.P. until after European colonization in the late 19th century. In the last 150 to 100 years, there is a decline in fruit seeds at all sites where they had previously been present, possibly as a result of disrupted seasonal movements.

In contrast to the geoarchaeological landscape, the space/time of fruit-seed processing draws attention to its own partiality. It is seasonal; the fruits appear for a few weeks at the beginning of the wet season. The ethnographic evidence suggests that fruit-seed processing is gendered; although collection was undertaken by groups of all ages and both genders, the pounding and processing were likely women’s work. The hard (that is, archaeologically well preserved) seeds belong to just a few fruits, which are, in turn, just a subset of the plant foods that are only part of the total diet.

Yet, this is a landscape that is no less embodied for being partial. As we can with the Willandra Lakes footprints, we can imagine the labor, hear the sounds of a group of women pounding, hear the children grizzling or playing, and feel the heat and humidity of the early wet season.

Just as it would be wrong to think of the geoarchaeological landscape as a total landscape, it would be inaccurate to think of the fruit-seed processing landscape as a small and local one. Embedded within it are multiple connections: to later in the year (when the stored fruit seed cakes were used); distant places (they may have facilitated travel for ceremonies); and decadal patterns of seasonality across the Pacific (the role of the El Niño Southern Oscillation and its influence on Australia’s northwest monsoon), to name just a few.

**Conclusions: The Power of Partiality and Situated Knowledge**

Landscape archaeology can benefit from theoretical debates about scale in geography, but it also has dilemmas of its own, particularly those to do with a partially preserved material record. I have used the example of a geoarchaeological landscape that has delivered very significant findings, particularly about what is missing—or potentially missing—in the archaeological record if we look at only part of the landscape. Yet, if we try to pin it to any particular space/time, we face two problems, both to do with scale. One is the false promise of holism, the idea that the broad landscape view somehow provides a holistic picture of human landscapes. The other would be to try and undo the Russian Dolls to a point in space and time where the “human” dimensions of landscape are thought to reside. In contrast, we have no problem seeing the partiality of the space/time of fruit-seed processing. But if we have asked too much of the geoarchaeological overview, we have perhaps expected too little of the more situated engagements of runners on the Willandra hardpan and pounders sitting in the shade in the Keep River. As the luminescence sand grain gets its explanatory power from the constellation of spatial and temporal processes that it pins together, so the embodied ephemeral fruitscape holds within it and is in turn embedded in space/times of many different scales.
All our landscape knowledge is at its most powerful when we recognize its partiality. Thus, situated knowledge is understood as knowledge that, rather than pretending it can see everything, is able to be very specific about where it sees from and thus what it does not see as well as what it does see. In Australian archaeology at least, this will provide better understanding of prehistoric human landscapes as fields of human engagement than the sort of broader models that we have been building and then critiquing. Developing a more dynamic understanding of scale that draws on recent discussions in geography makes an important contribution.

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References


