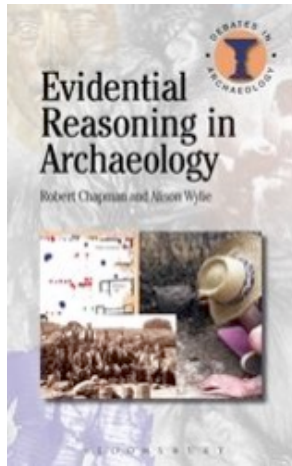


## Evidential Reasoning in Archaeology

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### Abstract

How do archaeologists work with the material traces they identify as a record of the cultural past? How are these data collected and how are they construed as evidence? What is the impact on archaeological practice of new techniques of data recovery and analysis (especially those that originate in the physical and life sciences)? How do archaeologists work with old evidence in pursuit of new interpretations, and how do they adjudicate conflicting evidential claims based on the same or overlapping bodies of data?

To answer these questions, the authors of this book identify key examples of evidential reasoning in archaeology that are widely regarded as successful, as pivotal to the development of the field, or as instructive failures, and build nuanced analyses of the forms of reasoning they exemplify. This case-based approach is predicated on a conviction that archaeological practice is a repository of considerable methodological wisdom, embodied in tacit norms and skilled expertise; it is rarely made explicit, except when contested, and has been largely obscured by the abstractions of high profile crisis debates.

*Evidential Reasoning in Archaeology* captures this wisdom in a set of close-to-ground principles of best practice.

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## Introduction: The Paradox of Material Evidence

The allure of archaeology is, for many, the thrill of an encounter with tangible traces of a human past irrevocably beyond reach, but somehow made present with an intensely compelling immediacy. A compendium of *Wonders of the Past* dating to the 1920s, brimming with enthusiasm for discoveries of the previous century, trades on just this sense that, whether these traces are grand monuments and ancient art or the surviving fragments of daily craft production, they put in uniquely direct contact with the past. In the absence of the actual ruins and artefacts, lavish illustrations promise to convey what archaeology has to teach better than descriptions could do:

They are visible evidence of the cultures and civilisations which have passed away, of the marvellous achievements of human genius and art which have been ruthlessly mutilated or destroyed. They enable us to see once more a fragment of what civilized man has achieved in earlier ages and in other lands, to lift the veil that hangs over his life and mental powers in the distant past. (Sayce 1923/1933: 9)

Narratives of discovery convey the power, and sometimes the shock, of material confrontation with the past in particularly vivid terms. Perhaps the most famous of these is the romantic story of Schliemann's great discovery at Troy in 1873: working alone with his young Greek wife, Sofia, to forestall the risk of thievery, 'the pair brushed the dirt from gold vessels and diadems', exulting in the momentous discovery of the 'great Trojan treasure', Priam's hoard (Klejn 1999: 110, 115).<sup>1</sup> Evidently the hoard itself was assembled from a number of different sources, and the story of its discovery a blatant fabrication – a 'florid archaeological fantasy' (Gere 2009: 23-4) – but at the time it immediately captured public imagination, as tangible evidence that Schliemann had located the famous city of Homeric legend.

Less romantic but, if anything, more consequential are the accounts recorded throughout the nineteenth century of a growing number of human remains and artefacts found in association with the bones of extinct Pleistocene mammals in stratified deposits, discoveries that were pivotal in challenging the biblical timeframe that had sharply delimited the horizons of human history. In one of the most famous of these, Paviland Cave, William Buckland discovered a seemingly undisturbed, ochre-covered burial with a rich array of worked ivory that came to be known as the Red Lady of Paviland. A figure of legend, she inspired an astonishingly diverse array of mythologizing narratives about the past that she represented. She was at one point an excise man murdered by coastal smugglers and then, when the associated burial goods convinced Buckland that she was a woman, a witch, a high-born Welsh ancestor, or a Roman army

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<sup>1</sup> Schliemann's (1875: 323; see also Trail 1995: 111) report on his discovery of Priam's hoard in May 1873:

In excavating this wall further and directly by the side of the palace of King Priam, I came upon a large copper article of the most remarkable form, which attracted my attention all the more as I thought I saw gold behind it ... In order to withdraw the treasure from the greed of my workmen, and to save it for archaeology ... I immediately had 'paidos' (lunch break) called ... While the men were eating and resting, I cut out the Treasure with a large knife ... It would, however, have been impossible for me to have removed the Treasure without the help of my dear wife, who stood by me ready to pack the things which I cut out in her shawl and to carry them away.

camp-follower of questionable character (Sommer 2007: 62-70; Grayson 1983: 64-9).

While these examples of dramatic discovery vividly illustrate how material finds can mobilize the projection of personal ambitions and collective imaginings, they also bring into sharp focus the capacity of surviving traces to bear witness to pasts that are otherwise unimagined or unimaginable. Whether it is the grandeur of a lost civilization, the crumbled legacy of an Ozymandias encountered in the desert sands, the skeletal remains of unexpectedly ancient forebears, or worn tools and shattered bones that testify to the hardship of marginal lives in more recent contexts (Blakey 2008), time and again material evidence has proved to be a powerful corrective to the myopia of presentism and the elitism of much text-based history. The history of archaeology is replete with examples of reasoning from material evidence that challenges entrenched dogma, countering inadvertent ignorance and opening up vistas on this ‘foreign country’ that is the past that no one had even thought to explore (Lowenthal 1985). This paradoxical robustness of material evidence as an epistemic resource has attracted the attention of historians and is reflected in the epistemic optimism expressed by the advocates of ‘object studies’, a rapidly growing, vigorously interdisciplinary field (see Wylie and Chapman 2015: 1-5). For example, the historian Lorraine Daston reflects on the ‘brute intransigence of matter’ (2008: 11), as giving reason for a certain optimism about what historians can learn from surviving traces (2008: 15-16). She notes a long tradition of thinking about things – in European legal codes, Baconian science, Christian theology – in which, despite its often enigmatic status as evidence, ‘the talking thing’ is valorized as that which ‘spoke the truth, the truest, most indubitable truth conceivable ... [because] it had been uttered by the things themselves, without the distorting filter of human interpretation’ (2008: 13). Neil MacGregor describes the motivation for *A History of the World in 100 Objects* as an ambition to ‘tell a history of the world’ that is more comprehensive, ‘truer ... more equitable than one based solely on texts’ (2010: xv, xxv, xix). Historical archaeologists have been especially forthright in claiming this epistemic high ground from the inception of their discipline-bridging field. For example, Henry Glassie and Robert Ascher insisted that material evidence is not just a supplement to text-based histories but often the only resource we have for exposing and correcting ‘superficial and elitist ... myth[s] for the contemporary power structure’ (Glassie 1977: 29), the systematic distortions that arise from ignoring ‘the inarticulate’ (Ascher 1974: 11). On this account, archaeology as a discipline is a family of theory-rich empirical research practices designed to systematically exploit the belief-challenging, horizon-expanding capacity of material traces as evidence of the human, cultural past

In practice, of course, realizing this promise is never as simple as suggested by Schliemann-style ‘confrontation-with-the-past’ narratives of discovery. The data rarely ever speak with a single voice, self-warranting and prophetic; what they say is never unmediated by interpretation.<sup>2</sup> The complexity of the

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<sup>2</sup> Gere (2009) explores the cultural context and history of Schliemann’s and Evans’ archaeological exploits, characterizing them as self-made ‘prophets of modernism’. For a sustained and uncompromising critique of the presumption that archaeological data are somehow a ‘yardstick’ against which text-based claims about antiquity can be decisively tested, see Ullmann-Margalit (2006: 45). She develops this point through close analysis of the interplay

interpretive process is radically misrepresented by hackneyed analogies with solving a jigsaw puzzle. Despite the proliferation of floridly imagined pasts, the ochre-stained skeleton that Buckland discovered did play a central role in nineteenth-century debates that culminated, in the 1860s, in a provisional consensus that human antiquity was considerably deeper than proposed on the basis of the framework of biblical chronology within which material evidence of human ancestors had been understood. But the trajectory of this debate was never smooth, and in the 1870s this first ‘Antiquity of Man’ debate gave way to a second that took at least five decades to resolve. The dramatic reframing of the time depth of human history that took shape over a century required not just the discovery of a growing number of puzzling remains like those of the Red Lady but also the development of background knowledge in a number of key areas: in geological understanding of the stratified cave and gravel deposits in which these remains were found; in the use of a growing roster of analytic techniques to assess the age and composition of the skeletal remains themselves; and through the reinterpretation of puzzling stone ‘eoliths’ as human tools, a process that depended on recruiting the resources of ethnographic analogy and the results of early taphonomic experiments to distinguish natural fracturing from the products of deliberate knapping. The fortunes of the shifting array of hypotheses that were explored, refined, rejected and reconfigured in the context of these debates – about humans as ancient but post-diluvial, then post-glacial, then dubiously in the Tertiary and finally firmly rooted in the Quaternary – also depended on successive refinements of Darwinian evolutionary theory and its contentious extension to biological humans and their social and cultural worlds. All of this was, in addition, heavily inflected by profound shifts in the *fin de siècle* intellectual culture, the contradictory romantic and secular impulses of modernism described by Gere (2009); the impact of industrial capitalism, instrumental to the discovery of many of the central finds; and the massive expansion and reconfiguration of the antiquarian societies, and the museum and emerging university-based professions, that made possible the formation of the disciplines of geology, archaeology and palaeontology.<sup>3</sup> With this array of technical, conceptual, theoretical and institutional scaffolding in play, by 1913 it was established that the ‘Red Lady of Paviland’ was male and, in the 1960s, that his remains date to the Upper Palaeolithic, approximately 26,000 BP (Grayson 1983: 67) – no whiff of a Roman prostitute or ancient Celtic witch in sight!

In short, the recognition of an antediluvian human (pre)-history was a hard-won accomplishment, realized against stiff resistance on a number of fronts, contingent in its course and outcome, and dependent on a broad array of background knowledge, including both technical and conceptual resources drawn from

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between textual and archaeological interpretation of the Dead Sea Scrolls, at several junctures emphasizing the point that ‘finds are not raw material: they are materials under interpretive description’ (p. 46).

<sup>3</sup> Toulmin and Goodfield (1965) provide a classic account of the complex, extended, multi-disciplinary process by which this was accomplished, and Grayson (1983) details the contingent process by which French and, later, British researchers came to recognize geological time depth and stratigraphic sequencing in the contexts where Pleistocene fauna were found in association with human remains and tools. Sommer uses a sharply focused object biography of the Red Lady of Paviland as the lens through which to trace the interplay between diverse bodies of background knowledge, expectation and rapidly evolving research practices that configured this skeleton as an object of scientific investigation (2007: 9).

collateral fields, all of which were rapidly evolving and often contentious in their own terms. As such, the Red Lady of Paviland and the fortunes of Schliemann's claims to have discovered Priam's Troy<sup>4</sup> make clear how complicated it is to read surviving traces as evidence and yet, at the same time, how stubbornly recalcitrant these data can be, no matter how entrenched their assumed meaning comes to be. Even when surviving traces are without question game-changing archaeological discoveries, understanding their import as evidence is a painstakingly hard process of learning to see and, crucially, learning to 'see as' (Hanson 1958). This is not unique to archaeology; Hasok Chang describes just such a process as it unfolded in the centuries-long struggle by physical chemists to establish a reliable system for measuring temperature (2004). As much as we take thermometers for granted now, it was by no means clear in the seventeenth and eighteenth centuries, even in much of the nineteenth century, what should count as the 'fixed points' to which temperature scales could be anchored. There were no absolute foundations to which experimenters could appeal; they had to be constructed through a process of successive approximation – what we will refer to as a matter of scaffolding and bootstrapping (see chapter one) – by which chemists relied on assumptions and methods they knew to be faulty but that made it possible to refine their understanding of the phenomenon of temperature to the point where they could eliminate some initial hypotheses and articulate new, more sharply specified questions, questions that would require the construction of new scaffolding. Chang describes this process of 'epistemic iteration' as both conservative, embodying a 'principle of respect' for previously accepted standards, and driven by an 'imperative' to progressively refine and reach beyond these provisional foundations (2004: 43-44). It is, he says, a 'valid and effective method of building scientific knowledge in the absence of infallible foundations' (2004: 231).

The cases we discuss in the chapters that follow bring into sharp focus the scaffolding of various kinds – laden theory, background knowledge (tacit and explicit), technical skill, social networks, institutional infrastructure, and vigilant reflexive critique – required to make archaeological observation possible, and to put the resulting data to work as evidence. Neither these data nor the evidential claims based on them constitute a self-warranting empirical foundation, and yet they can powerfully challenge and constrain the reconstructive and explanatory claims we project onto the cultural past. This is the paradox of material evidence: that 'traces don't speak'. Material evidence is inescapably an interpretive construct; what it 'says' is contingent on the provisional scaffolding we bring to bear. And yet it has a striking capacity to function as a 'network of resistances to theoretical appropriation' that routinely destabilizes settled assumptions, redirects inquiry and expands interpretive horizons in directions no one had anticipated – a capacity acknowledged by even the most vigorously anti-foundationalist critics within archaeology (Shanks and Tilley 1989: 44).

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<sup>4</sup> Schliemann did not systematically record or analyse the stratigraphy of the site he claimed was Priam's Troy. Subsequent re-analysis suggests that the treasure that made Schliemann famous dates several centuries earlier than the period when Priam is assumed to have been king of Troy.

This paradox of material evidence lies at the heart of archaeology. It has been the catalyst for on-going creative innovation, methodological and conceptual, that has generated some strikingly transformative insights into the cultural past, but at the same time it is a perennial source of epistemic pessimism. The question we take up in this short book is, then, how are the successes realized? And how are specific risks of error, distortion, elision and the arbitrary projection of expectations most effectively countered? We proceed on the conviction that considerable wisdom is embodied in the creativity and skilled practice of archaeologists that is only made explicit when trouble arises, typically in the context of close-to-the-ground debate about specific cases. We also take inspiration from a caution issued by David Clarke in the mid-1970s: this wisdom is not likely to be well captured by idealized accounts of 'scientific' (or historical) practice constructed by philosophers in response to their own internal debates and modelled on what is often a simplistic understanding of fields that lie at considerable distance from archaeology, usually the physical sciences (1973).<sup>5</sup> Our aim is to capture the strategic wisdom-in-practice that lies between tactical norms and abstract theoretical ideals. If we succeed, much of what we present should seem obvious. But we hope that, in giving this wisdom explicit formulation, we will make it more widely accessible and contribute to the on-going process of learning from collective experience that is characteristic of archaeology at its best.

In chapter one we revisit the debate about epistemic ideals that has been a recurrent source of contention within archaeology. It is here that the paradox of evidence is framed in its starkest, most divisive terms as a dilemma animated by anxieties about the security of archaeological evidence that are generalized into all-or-nothing epistemic stances: if archaeologists set their sights on establishing claims that are empirically irreproachable they may foreclose (some) risks of error but at the expense of abandoning the very questions that make archaeology worth doing, and if they do not self-limit in this way they may have nothing to offer but speculation. These stances are evident in practice in the division between archaeologists who bear down closely on the data and those who range beyond the data, making bold conjectures and interpretive leaps. The most recent round of 'theory wars' – the long-running contretemps between the processual New Archaeology and the diverse array of post-processual initiatives mobilized by its critique<sup>6</sup> – has dissipated in the last two decades but the underlying issues that they raise for archaeology have not been resolved (M. Johnson 2010: 220-3). We argue that the intransigence of this debate – the vacillation between epistemic despair and aggressive optimism – is largely a function of the way it has been framed: in terms of abstract ideals of scientific certainty and objectivity that are unattainable and that provide little guidance for making well-reasoned judgments of evidence-based claims in a real world where these inevitably trade in degrees of plausibility and credibility rather than certainties. There are a number of less simplistic models of evidential reasoning on offer – in informal

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<sup>5</sup> See, for example, a strikingly parallel critique published in the same year by Mario Bunge, a philosopher of science. He particularly objects to philosophical accounts of science that rely on what he refers to as preface and textbook analysis: simplified accounts of scientific inquiry that reinforce a philosophical fixation on idealizations that are often radically "out of touch with [real] science," and misdirect philosophical attention to pseudo-problems (1973: 2, 4-6).

<sup>6</sup> For an account of the New Archaeology and the debate with its post-processual critics, see chapter one.

logic, practice-grounded philosophy of science, and a growing body of philosophical work on the historical sciences – that provide a framework for characterizing the dynamic, process by which archaeologists develop the various kinds of scaffolding they need to interpret data as evidence, exploit the capacity of multiple methods and lines of evidence to constrain one another, and leverage what they learn to continuously rebuild and extend these provisional foundations. This process enables archaeologists to meet constructively the challenge issued by Binford, the dominant force behind the New Archaeology: ‘how to keep our feet on the “empirical” ground and our heads in the “theoretical” sky’ (1981: 21).

We then consider how these strategies play out in practice: first in the context of fieldwork (chapter two), and then in connection with the various means by which archaeologists induce old evidence to tell new stories (chapter three). It is in the recovery and recording of their primary data that archaeologists put in place scaffolding that is fundamental to the enterprise as a whole: the skills of identification and observation, the development of new ‘ways of seeing’ data (Bradley 1997), the conventions of recording and analysis that ‘capture’ the material traces that will constitute the empirical basis for evidential claims (Chippindale 2002). As critics of empiricist and positivist research programmes in archaeology have repeatedly pointed out, there is no theory-free, self-warranting foundation of evidence to be found in the stuff of the archaeological record; the empirical foundations of interpretation are themselves an interpretive construct, all the way down. The paradox of evidence first intrudes, then, in the context of fieldwork. It is here that we consider how, as problem-specific, selective and regimented as the conventions of primary data recovery and recording must be, the data recovered can nonetheless constrain interpretation and sometimes sustain the surprise of unexpected discovery. It is in the creative uses archaeologists make of legacy data that this capacity of things to resist appropriation is most clearly on display. In chapter three we focus on empirical and conceptual factors that make up the scaffolding arguments by which old data are put to new uses. We consider examples drawn from recent reappraisals of evidence generated by the long-running tradition of ‘Moundbuilder’ research in North America, and develop an extended case study of the successive rounds of critique and reuse of data recovered by late nineteenth century excavations of the Iron Age village of Glastonbury. Taken together, these illustrate how, even when the primary data are known to be incomplete and in various senses untrustworthy, they can nonetheless function as productive catalysts for new lines of research.

We turn, in chapter four, to consider the role played by external resources in expanding the range of data available to archaeologists and the reliability of their interpretation as evidence. The central insight here is that there are no silver bullets. No matter how scientifically or technically sophisticated it may be, the scaffolding drawn from neighbouring fields rarely establishes archaeologically relevant evidential claims without extensive reinforcement and calibration that depends on a great many internal (archaeological) and external resources. This is especially clear in the case of the multiple radiocarbon revolutions that have transformed archaeological dating, the first of three cases we consider in chapter four. We juxtapose

with this famous success story two contrasting examples of the use of different types of isotope analysis that illustrate what can go wrong and what is required for success in bringing external resources to bear on archaeological problems: the contentious history of debate in the UK about lead isotope analyses of Bronze Age copper artefacts (metals moving); and the dietary reconstructions that have been developed by the 'Diaspora Project' to address questions about migration within the Roman empire (people moving). We describe the process of recruiting and fine-tuning external resources for archaeological application as a process of triangulation in which, in the absence of self-warranting foundations, archaeologists play one line of evidence against another, using each to constrain and extend the other. Pulling together the threads of these arguments and examples we give an account of the epistemic rationale that underpins archaeological practices of 'robustness' reasoning that depend on mobilizing multiple lines of evidence.

Just as there are no technical fixes that can displace archaeological judgment, so too there is no methodological guarantee that the process of patiently building, testing, cross-checking, and calibrating a diverse suite of evidence will be self-correcting where framework assumptions are concerned. And yet, the history of archaeology is replete with examples of challenges to foundational beliefs that were so deeply entrenched, so much taken for granted, that their role in shaping the trajectory of archaeological inquiry was unrecognized until they were called to account. Indigenous, feminist, race and class-based, critiques are key examples of such challenges and in each case the resources of a self-consciously situated, often explicitly political standpoint play a central role in mobilizing epistemic critique. We argue that contextual values and interests cannot be eliminated but, contrary to ideals of objectivity that trade in the fiction of a 'view from nowhere' (Nagel 1986), this should not be considered a counsel of despair. The final question we address in the conclusions is how a commitment to critical reflexivity can be made concrete: how research communities can put the resources of diversely situated epistemic agents to work to ensure the possibility of such transformative criticism.

What we offer, then, is a close analysis of the various types of scaffolding that enable archaeological research and an argument for seeing the on-going revision of this scaffolding, not as evidence of a failure to locate empirical bedrock, but as a mark of success: an indication that archaeologists are engaged in a dynamic process of continuously building, extending, and refining provisional foundations. In the course of this analysis we identify a number of epistemic norms that we believe will serve archaeologists better than the all-or-nothing ideals of truth and objectivity that tend to dominate programmatic debate about the scientific status of evidential reasoning and of archaeology itself. These include virtues of epistemic humility captured by the principle of respect for the usefulness and also the provisionality of the scaffolding built by those who have come before that Chang (2004) describes. In archaeological contexts Joan Gero articulates a related virtue in terms of a commitment to 'honor ambiguity' (2007): a brief for keeping in view the contingent, context- and purpose-specific nature of the norms of practice and background assumptions on which archaeologists must rely. A respect for ambiguity and for unexplained



observations is the final nail in the coffin of the jigsaw-puzzle metaphor that is still often invoked in accounts of archaeological interpretation. Another virtue, ambivalently embraced but ubiquitous, is an expansive and sometimes wildly eclectic methodological and theoretical opportunism<sup>7</sup> that requires the cultivation of a working knowledge of resources – conceptual, empirical, technical – developed in a rich array of external fields that may be relevant to archaeological problems. Although the quest for a defining, uniquely archaeological methodology is a recurrent theme in internal debate, we argue that the distinctive successes of archaeology as a discipline could only have been realized by constructing the field as ‘trading zone’, in a sense like that suggested by Peter Galison (2010),<sup>8</sup> its boundaries permeable and its practitioners conversant enough in the languages and practices of dozens of other fields to bring radically diverse resources to bear on archaeological problems.

Finally, we offer a reformulation of ideals of objectivity; we argue that the virtues of practice we identify in earlier chapters are best captured by a pragmatic and procedural conception of objectivity, along lines suggested by Helen Longino’s account of norms of critical engagement that are instantiated in and required of well-functioning scientific communities (2002). On this account, the goal of inquiry is not to produce knowledge claims that are true in all contexts of practice and transcendent of local interests. It is, rather, to warrant knowledge claims as credible given available resources, and reliable for specific purposes. Objectivity is, then, characterized in terms of norms of practice that, together, secure the trustworthiness of specific knowledge claims as fit for purpose. In addition to the epistemic virtues we distil from analysis of archaeological best practice, these norms include requirements of rigour, integrity and transparency in the collective appraisal of knowledge claims that make them accountable to their contexts of production. The various cases we consider illustrate a range of degrees of success and failure in realizing such norms; some exemplify the central virtues of critical engagement continuously and on many fronts, while others are a sobering reminder of the fallibility of the archaeological enterprise. But even the most problematic examples are double-edged; however much they illustrate pitfalls they also throw into relief what could have been done, and what can be done in the future, to counteract the ever-present risks of local and systematic error. Together with more hopeful cases and those of mixed success, they illustrate why polarized debate about the epistemic status of archaeology is fundamentally misconceived. Material traces and the methods archaeologists use to constitute them as evidence are just too diverse and open-ended to sustain categorically pessimistic or optimistic conclusions. They require case-by-case assessment, a matter of concretely grounded reflexive analysis that is itself a crucial dimension of the bootstrapping practices we find characteristic of the best of archaeology.

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<sup>7</sup> Currie describes the historical sciences (chiefly paleontology and geology) as characterised by ‘methodological omnivory’ (Currie 2014a, b), an account that captures the ‘trading zone’ practices we find ubiquitous in archaeology.

<sup>8</sup> Galison describes boundary-crossing translational practices that have proved transformative in collaborations between theoretical physicists and engineers, computational modellers and experimentalists (2010). His account is expanded upon by sociologists of science Collins, Evans and Gorman (2007) and contributors to *Trading Zones and Interactional Expertise* (Gorman 2010). We find various of the trading zone practices they describe at work in archaeology, not only as a strategy for addressing problem-specific interfield engagements but as a characteristic of the field as a whole.