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Command and Control on Hadrian's Wall: Exploring the Use of Analogy in Roman Frontier Archaeology

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Analogy is a ubiquitous but contested feature in archaeological reasoning, used differently in the contexts of discovery, justification and communication. The limitations of the archaeological record make the use of analogies unavoidable, yet their role in archaeological reasoning nonetheless continues to be a source of epistemic anxiety. This has direct relevance for Roman frontier archaeology as a research area that is politically contested, but at times theoretically siloed. Establishing firmer epistemological foundations requires a systematic appraisal of analogies in the contexts of discovery and justification, through both source-side and subject-side testing. A discussion of how analogies are used in conceptualizing Hadrian's Wall, specifically the question of its command and control, illustrates and explores these issues. Adopting a systematic appraisal approach, embracing and elucidating the ambiguities in archaeological reasoning, allows archaeologists to mitigate the challenges posed by the quality of the archaeological record without limiting the questions they pose or the methods they employ.

Introduction

Analogy is a ubiquitous feature in archaeological reasoning, driven by the considerable limitations imposed by a partial and fragmentary archaeological record. It is also a contested feature; assumptions of similarities between ethnographic analogies and prehistoric peoples, rooted in a unilinear and teleological view of the stages of human cultural development (e.g. Sollas 1924), were early contributors to a persistently problematic reputation. In the decades since, analogy in archaeology has veered from being written off as entirely unreliable by advocates of the New Archaeology (Freeman 1968; Gould 1980) to being applied more freely, if often euphemistically, by post-processual archaeologists (e.g. Tilley 2003). More recently, it has been suggested that archaeologists are better occupied with the search for specific causal 'smoking guns' rather than pursuing explanatory analogies which are underdetermined by the archaeological record (Perreault 2019: 14–22). The fact that the issue is an old one does not detract from its relevance for Roman frontier archaeology for, while the theoretical background has shifted, the dangers of disciplinary fragmentation and siloing have arguably hampered debate (Gardner 2017a: 207–209; Mattingly 2017: 152).

Although discussion has often focused on the use of ethnographic analogies by archaeologists of prehistory, there are important implications for those working in Roman archaeology. Firstly, while Roman archaeologists benefit from working in a period which allows for literary points of reference to act as a background check on the use of analogy (Hawkes 1954: 160), they are not without the ethical and methodological issues raised for ethnographic analogies (Allison 2001: 194–195). Secondly, Roman archaeology is neither an apolitical nor an uncontested space (Hanscam 2019) and practitioners have an obligation to guard against the misappropriation of their work by ensuring it has a sound epistemological foundation; selective, vague and superficial analogies are a hallmark of pseudoarchaeology and polemical history (Fagan 2006: 34–38, 41; Greenberg 2023: 577–578). Even the ostensible 'hard' sciences have seen claims of inappropriate analogies overreaching what the evidence specifically supports (e.g. Karst et al. 2023). As such, the requirement to place the use of analogy on a firm methodological and epistemological footing remains clear (Ascher 1961; Wylie 1985; Currie 2016). This paper will discuss how analogy is used in archaeological reasoning and how such a firmer footing may be realized, using as a case study the analogies adopted to investigate the question of command and control on Hadrian's Wall. In so doing, the case is made for the continuing role of analogy in Roman frontier archaeology, and for the adoption of a framework to strengthen its epistemological foundations without insisting that archaeologists unnecessarily restrict themselves in the questions they pose and methods they employ.

The Use of Analogy in Archaeological Reasoning

Various attempts to define analogy have been made (Keynes 1963: 221–232; Hesse 1966; Bartha 2010), typically alighting on a form of reasoning through comparison in which a feature of a known entity can be inferred in an unknown one. Such comparison can include similarities, or positive analogies, as well as differences, or negative analogies. More broadly, analogy comes in many forms and is used differently in the processes of discovery, justification and communication. The use of analogy in discovery and justification concerns conceptualizing and warranting interpretations and are ideally both reciprocal and reflexive; analogy in communication concerns conveying an established idea in a familiar form and is invariably unidirectional. **Figure 1** illustrates these differing contexts and shows how, in discovery, the selection of an analogy (the source) from a known entity can be used to infer a property in an unknown one (the subject). Conversely, in justification, a new hypothesis (the subject) can be warranted by reference to an analogy with a known example (the source). In **Figure 1**, the reciprocal and reflexive nature of these processes is represented by the smaller 'feedback' arrows. In contrast, analogies used in the context of communication are unidirectional, conveying a pre-established idea and with no feedback.

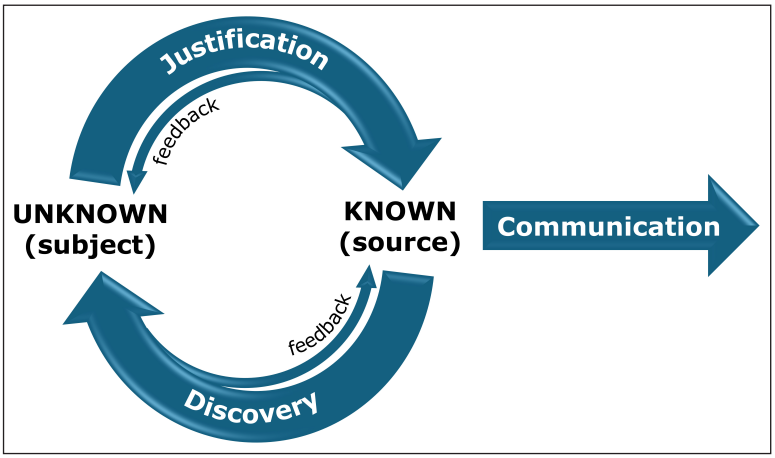

Figure 1: The different contexts and directionality of analogy in archaeological reasoning. In discovery and justification, the processes are reflexive. In contrast, analogies used in the context of communication are unidirectional and lacking feedback. Source: Author.

Analogy in archaeological discovery

Developing new hypotheses about the past, the process of archaeological 'discovery', can involve analogies whose only purpose is to provide a point of inspiration and comparison. For example, hypotheses for the function of the enigmatic late second-century AD Site XI at Corbridge have included a stores building (*horreum*), by analogy

with *horrea* at the legionary fortresses of Carnuntum and Vindonissa or the *Horrea Lolliana* and *Horrea di Hortensius* in Rome and Ostia, and a marketplace (*macellum*), by analogy with the *Macellum Magnum* of Nero on the Caelian Hill in Rome (**Figure 2**).

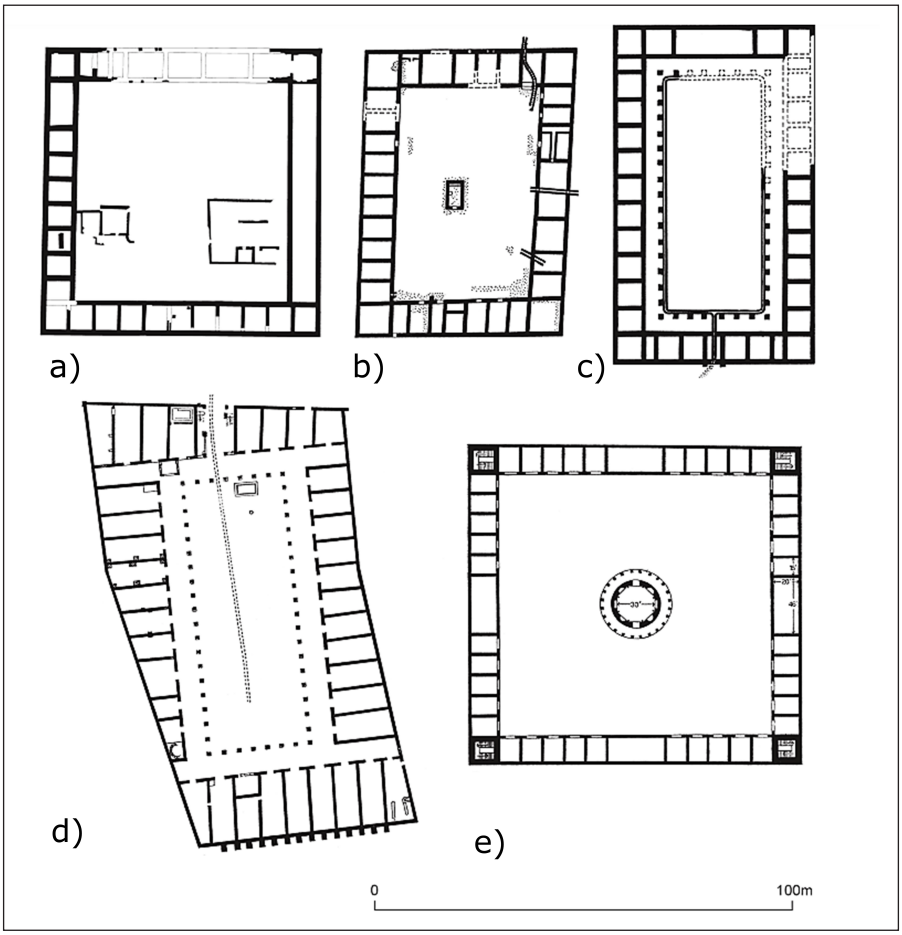

Figure 2: (a) Site XI at Corbridge and some of the analogous sites used in generating hypotheses for its function: **(b)** Carnuntum legionary fortress; **(c)** Vindonissa legionary fortress; **(d)** Horrea Lolliana, Rome; and **(e)** Macellum Magnum of Nero. (After Hodgson 2008, fig. 3, 64. Reproduced with permission).

However, the example of Site XI makes it clear that the analogies do not only provide a new interpretation but can also be employed as evidence in justifying the acceptance of said interpretation. In other words, Site XI is most plausibly interpreted as a *macellum* because, alongside other lines of evidence, it resembles an analogous structure known to be used for this purpose (Hodgson 2008). The context of discovery is therefore tightly interwoven with the context of justification.

Analogy in archaeological justification

The use of analogy to warrant provisional acceptance of hypotheses about the past, the process of 'justification', operates at different scales. Micro-scale analogies, such as the experimental analogues for human-powered weapon ranges considered by Bill Griffiths (2022), are more constrained by physical and mechanical factors and thus more secure than macro-scale analogies of social behaviour and ideology, such as whether an object was practical or ritualistic (Collins and Sands 2023) — a point articulated 70 years ago as Hawkes' ladder of inference (1954). This has also been characterized as the difference between analogies of immanence and those of configuration — in other words, between properties that are constant through time and those that are contingent (Wolverton and Lyman 2000). However, even apparently immanent analogies underpinning such archaeological fundamentals as superposition and radiocarbon dating rest on background knowledge and assumptions still open to review. The realization that radiocarbon dates required calibration to accurately reflect calendar dates (Aitken 1990: 66–67, 92–107) illustrates this point. Thus, the background information in assigning weight to analogies used in warranting interpretations must always be made clear, at whatever scale they operate.

It has been argued that analogy should be restricted to the context of discovery and removed from justification (Binford 1967; Perreault 2019: 15–17) based on the reasonable assertion that analogical reasoning is fundamentally uncertain. This is not a new concern, most pessimistically articulated in the 1950s (Smith 1955), although such a delineation seems untenable in practice (Wylie 1985: 86–87). Indeed, as the example of Site XI shows, the two are profoundly entangled and often occur simultaneously rather than necessarily sequentially. At Corbridge, as well as using analogies to suggest the hypothesis of an *horreum*, the lack of analogous examples was concurrently used to argue against the idea of a *principia* or a civil forum (Hodgson 2008: 63). In short, the separation of discovery and justification may be useful in theory but is difficult to achieve in practice (Kuhn 1970: 8).

Analogy in archaeological communication

Using metaphors to explain accepted knowledge is common in Roman archaeology, for instance in the myriad references to the Roman army as a 'machine' (Birley 1988: 5; Peddie 1994; Brewer 2002). Such analogies are 'versatile and effective pedagogical tools' (Fischer 1970: 244) but are nonetheless unidirectional, existing merely to articulate what is already known. They are thus characterized by David Fischer (1970: 259) as examples of 'false analogy' that, unless preceded by careful analysis, can be employed 'to persuade without proof, or to indoctrinate without understanding,

or to settle an empirical question without empirical evidence'. Conversely, genuine analogical reasoning works reflexively and sheds light also on the contemporary analogues used in interpretation (Hingley 2017: 105–106).

Evaluating the Epistemological Foundations of Analogy in Archaeology

Analogy is such a crucial part of human reasoning that it seems difficult to imagine how archaeology could be conducted without it (Wylie 1982; Ravn 2011). Nevertheless, the use of analogy by archaeologists has been accompanied by recurring bouts of epistemic anxiety. Areas of concern include the dubious nature of the essentialist and uniformitarian principles that provide the grounds for assuming similarities between subject and analogy, the risk of circular reasoning, and the restrictive presentism of models for the past drawn from a small and selective supply of analogies (Wylie 1985: 68). However, if analogies are fundamentally uncertain, they are not equally or indiscriminately so (Wylie 1980) and, if this is accepted, it only remains to examine how they can be more effectively employed. If we reject the extreme position of dispensing with analogy entirely and insisting on eliminative testing, which is highly restrictive, it is possible to place the use of analogy on a firmer epistemological footing by subjecting it to a systematic appraisal. This appraisal, crucially, should take place in the context of both discovery and justification, in both the selection and evaluation of analogies. This is what is referred to by Alison Wylie (1985: 100–105; 1994: 758) as source-side and subject-side testing. To take a famous example from Tacitus (*Agr.* 30.5), the analogy in Calgacus' speech between the *Pax Romana* and a desert or desolation might be questioned from a source-side perspective when there is no inherent link between desolate places and Roman provincial administration. A subject-side analysis might provide some support for the analogy in the specific context it is used here, the aftermath of a particularly violent battle, but wider evidence of the diverse experiences of the empire, including examples of urbanisation and population growth, would question its broader applicability. Ultimately, such testing reveals the analogy for what it is — a rhetorical device designed to communicate the perspective of a key Roman adversary at a specific point in time. Source-side testing thus seeks to interrogate on what grounds an analogy might be considered applicable to questions about the past, whilst subject-side testing examines how well the analogy corresponds to the constraints imposed by the archaeological evidence.

The selection of analogies and source-side testing

Lewis Binford (1967: 1–3) emphasized that, in the context of discovery, the source of an analogy is not particularly important and placed the emphasis on subject-side

testing against the archaeological record. Given the intertwined nature of discovery and justification, however, it is clear that the selection of an analogy has direct bearing on its subsequent utility. Source-side testing thus seeks to clarify in what ways and to what degree an analogy is relevant to a given archaeological problem.

Following assumptions derived from cultural diffusionist doctrine, analogies have often been considered adequate if they are temporally or spatially proximate. Vere Gordon Childe (1956: 51), for instance, advised that an analogue 'drawn from the same region or ecological province is likely to give the most reliable hints' when constructing interpretations about the past. Similarly, it has been argued that analogies where a direct historical link could be demonstrated are to be preferred (Clark 1951; von Gernet 1993). Strictly speaking, the culture-historical archaeologists were advocating for the use of homologies (Currie 2016), sometimes referred to as 'direct' analogies (Nappo et al. 2022), where their relevance is founded on a demonstrable genealogical connection to the subject. Nonetheless, such connection can never be assumed and, given the potential for variation within even a small geographic area and the inherent diversity within even a clearly defined epoch such as 'Roman Britain', direct analogies still require systematic elucidation to demonstrate why they should inspire any more epistemological confidence than an analogy drawn entirely arbitrarily.

Where a direct historical link cannot be demonstrated, a preference for correspondence between the subject and the analogy in terms of environmental and technological constraints has been specified (Clark 1953: 351–355; Gould 1980: 50). Francesco Nappo et al. (2022: 439) describe these 'indirect' analogies, rather than the homologies discussed above, as akin to homoplasies in biology 'whereby two not closely related species are predicted to possess functionally similar traits as the result of similar environmental pressures'. Again, such causal relationships must be interrogated rather than assumed.

Aside from historical lineage or environmental similarities, there are broader cultural aspects which merit discussion. Definitions of culture are infamously various and eclectic (Kroeber and Kluckhohn 1952: 41–42) but the term is used here to mean group values and practises acquired through socialization (Hofstede 1994). Though influenced by the external constraints of the physical environment (Clark 1965: 174–176), these have their own internal dynamics which may prompt change despite the absence of external stimuli or, conversely, resist change despite external pressure to do so. The selection of an appropriate analogy can therefore consider these broader cultural similarities beyond environmental and technological constraints alone. Roman archaeologists, with their access to literary texts and concomitant (albeit selective) cultural insights, are at an advantage over the prehistorian in identifying similarities

in values and practices between different groups. A consideration of such similarities will by necessity be a qualitative rather than quantitative one, and is idiographic rather than nomothetic, but can nonetheless provide rational grounds for determining the relevance of the analogy to the subject in question.

It has been cautioned that such analogies, where historical or environmental equivalence cannot be demonstrated, risk circularity (Clark 1951: 52). However, selective interpretation, whereby archaeologists find only what they have set out to look for, can be avoided through the use of multiple analogies. Such an approach was advocated by Robert Ascher (1961: 323) and summarized by Peter Ucko and Andrée Rosenfeld (1967: 157) thus:

> 'The more varied and the more numerous the analogies that can be adduced, the more likely one is to find a convincing interpretation for an archaeological fact. The more numerous and the more detailed the parallels, the more likely one is to be able to assess the likelihood of a particular parallel being a significant one'.

The use of multiple analogies thus ensures that a favoured hypothesis is not considered in isolation and helps avoid satisficing (Simon 1997: 295–297). The adoption of a multiple hypothesis testing methodology can tack within and between different interpretations and the archaeological evidence, exploring and evaluating their epistemological foundations (Wylie 1989). It is an approach to which Roman frontier studies, rich in both data and interpretation, is well suited (Kitching 2024a). Unlike in eliminative testing, the use of multiple analogies rests not only on a consideration of the differences and those elements which do not fit (Hesse 1966), but also on the basis that some elements will be useful (Harré 1970: 47–49; Wylie 1985) and that these useful elements can be stitched together into a new interpretation (Wylie 1988; Currie 2018: 203–228).

Archaeological constraints and subject-side testing

If source-side testing can help determine the relevance of an analogy to an archaeological problem, then subject-side testing imposes further constraints on the conclusions archaeologists can draw. The potential for archaeological data to act as a check on analogically derived hypotheses has long been recognized (Collingwood 1946: 246). For instance, the assumption that Roman forts were male-only spaces — by selective analogy with nineteenth-century European military practice — has been effectively refuted by the archaeological recovery of material culture associated with women and children from secure military contexts (Driel-Murray 1995; Allison

2006). Nevertheless, even analogies that do not stand up to scrutiny are still of use in generating criticism and directing new research, as Rune Nyrup (2021) demonstrates through a case study of *mortaria*. Crucially, claiming objective support for a hypothesis through an examination of its relationship with subjectively constructed evidence does not remove that subjectivity nor preclude subsequent re-interpretation (Keynes 1963: 4; Hodder 1999: 103), but both source- and subject-side testing can place an analogy on the firmest possible epistemological foundations (Wylie 1985: 100–105).

A Roman Frontier Case Study: Command and Control on Hadrian's Wall

The aforementioned fragmentation of the discipline of archaeology is particularly acute when it comes to Roman frontier studies, where obstacles to its full re-integration with broader archaeological theory (Gardner 2017b: 35–36) risk it developing into a siloed research area. It has been remarked that the study of the Roman military has suffered from theoretical stagnation (James 2002) and, even if more recent years have seen a marked improvement in engagement between Roman archaeology and wider archaeological theory (Gardner 2017a), a broader theoretical approach to the study of Roman frontiers is still often conspicuous in its absence (Breeze 2019b: 159). This is significant for the subject at hand, for analogies are frequently employed in the study of frontiers and can be understood only if the theoretical background to the topic is carefully explored and articulated. To take Hadrian's Wall as an example, the analogies used in interpretation both inform, and are informed by, assumptions about its function.

Analogies and the question of function

Hadrian's Wall had a complex building history (**Figure 3**), the design undergoing significant alterations (often termed the 'fort decision') soon after construction commenced (Birley 1961: 269–270), and the story of the Wall's interpretation is no less convoluted (Hingley 2012; Breeze 2014). Interpretations for the function of Hadrian's Wall, and Roman frontiers more generally, are profuse (Breeze 2018: 3), but can be grouped into three main categories of defence, control-of-movement and symbolism.

Early antiquarians such as William Camden and John Horsley implicitly referred to the Wall as a defensive structure against either pre-Pictish tribes to the north or rebelling *Brigantes* to the south (Camden 1610: 775; Horsley 1732: 125), drawing on the early literary references to the Wall in the works of Gildas and the Venerable Bede. The latter, however, were not writing history but were themselves using the Wall as an analogy to communicate broader religious, moral and nationalist arguments (Hingley 2012: 43–50). A defensive interpretation remained predominant until the

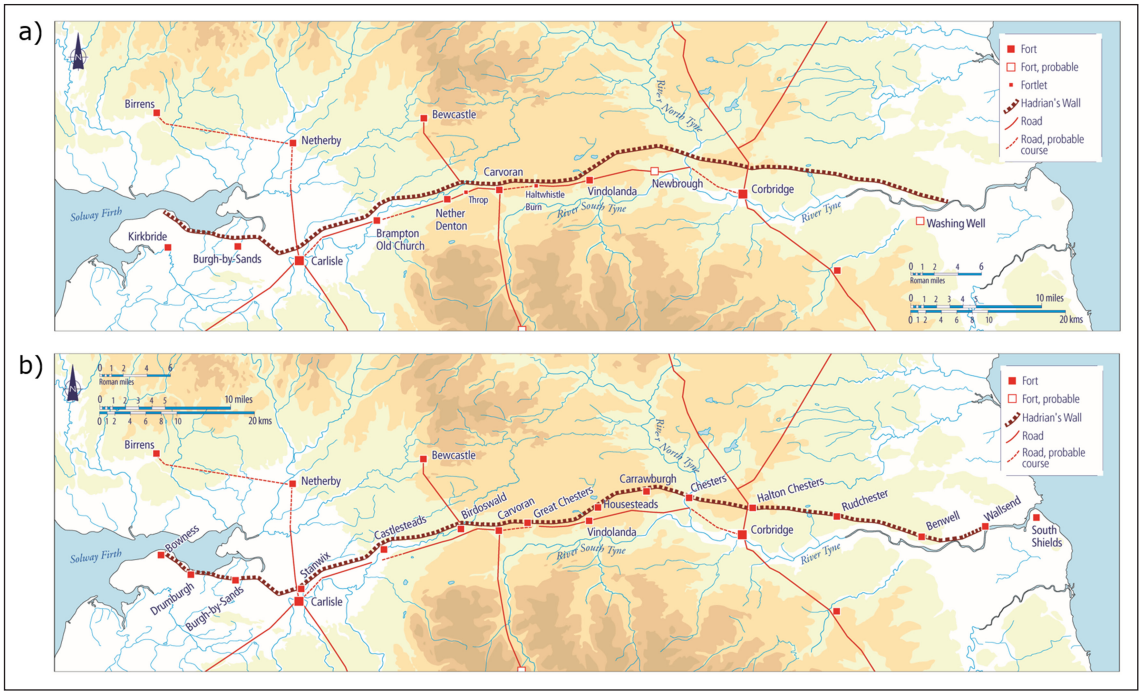

Figure 3: The changing design of the Hadrian's Wall **(a)** as originally conceived and **(b)** following the 'fort decision'. Changes included the addition of forts along the line of the curtain and a switch to construction entirely of stone, as opposed to the earlier use of turf in the western sector (CC BY-NC 3.0; Courtesy of David Breeze, reproduced with permission).

early twentieth century, with archaeologists continuing to employ analogies in the processes of discovery and justification. Francis Haverfield, for example, developed a view of Roman frontiers as defensive or preclusive lines arguably informed by implicit analogies in continental Europe (Kitching forthcoming). He described the Indian customs hedge as 'an interesting and little known parallel to Roman and other frontiers' (Haverfield 1911a: 323) and noted how the Roman Empire 'lights up' and 'concern[s] in many ways our own age and Empire' (Haverfield 1911b: xviii). Haverfield (1905: 6) nonetheless acknowledged that non-caveated analogies between the Roman and British Empires were problematic, describing the analogy of British India as having 'very little value as history'. He thus stressed the importance of considering both similarities and differences alike. The defensive interpretation was later revised by Edward Luttwak (1976), who proposed a model of preclusive defence based on an analogy with Cold War western defence planning. Notwithstanding Luttwak's helpful theoretical distinction between power and force, his framing of Roman frontiers was criticized as anachronistic from a source-side perspective and as inappropriate when exposed to subject-side testing (Whittaker 1989: 23–50; Isaac 1990: 372–377). Arguably, the great contribution of Luttwak's synthesis is in making these hitherto implicit defence analogies explicit and prompting a vigorous debate (Woolf 1993: 180).

More recently, Matthew Symonds (2021: 15–17) has used the analogy of the land border in Northern Ireland during the Troubles as part of an effective discussion of the impact of an arbitrary border on local communities. A key benefit of this analogy is that, rather than taking the traditional approach of comparing the structural remains of Hadrian's Wall to other linear barriers, it focuses attention toward social and cultural relationships in the broader frontier landscape. Symonds (2021) goes on to make the case for Hadrian's Wall as a counterinsurgency response to a guerilla campaign although, in this regard, the Northern Ireland analogy is arguably less relevant from a source-side perspective. Contemporary British counterinsurgency literature is grounded in assumptions about modern weapon efficacy, tolerance of casualties, and the types of responses justified by international law and public opinion (Rid and Keaney 2010), few of which are directly relevant to Roman Britain. For instance, Symonds (2021: 16) notes the difficulties encountered 'unless states waging counterinsurgency are willing to exterminate an entire population', a course of action that Rome appears to have been consistently willing to pursue (Roymans 2019; Raviv and Ben David 2021). Another analogy used by Symonds (2022: 322) elsewhere, regarding the indiscriminate punitive operations carried out by the British on the northwest frontier in India in the nineteenth century, is arguably more apt in this regard. Ultimately, source-side testing suggests the Northern Ireland analogy is less useful in trying to understand the reasons behind Hadrian's Wall than it is for understanding its impact. Symonds (2021: 17) is clear that it tells us less about Roman Britain than about the 'complexities' and the 'spectrum of responses borders can elicit'. The contextual contingency of an analogy in determining its relevance and utility to specific research questions, interrogated through source-side testing, is evident.

In contrast to the defensive interpretation, the idea that the Wall was primarily designed to control the movement of people was first posited by R.G. Collingwood (1921b: 4–9; 1921a: 65), and developed by Eric Birley (1956: 33; 1961: 273) who, by analogy with Jean Baradez's aerial research in Numidia (1949: 357–358), proposed that the Wall was built to support controlled economic development to the south. A discussion of the archaeological evidence for the emergence of civil settlements and farmsteads to the south of the Wall represents a degree of subject-side testing but, other than the implied relevance of the fact that both examples are Hadrianic, the analogy is not interrogated in any detail from a source-side perspective. Elsewhere, modern analogies with a primarily economic and security function have been used in discussion of Hadrian's Wall, including the Berlin Wall, Israeli West Bank barrier and the US-Mexico border (Breeze 2019a: xvii; Breeze 2019b: 73) but the analogies are typically used in the communicative sense, to explain the control of movement interpretation to a contemporary audience, rather than to justify its acceptance as an explanation for an

ancient frontier. The US-Mexico border analogy is developed further in the emerging interdisciplinary field of border studies which, with archaeological engagement, can examine and challenge the uncritical use of ancient analogies in modern discourse (Gardner 2022; Hanscam and Buchanan 2023).

Analogies have also been used to explore the symbolic aspects of the Wall. Although largely interpreting the monument from a military perspective, G.H. Donaldson (1988: 126) explained the Walls' scale — that gave 'the impression of power' and created a 'psychological barrier'— as the result of the personal influence of Hadrian by analogy with both the Roman Pantheon and Hadrian's villa at Tivoli. Along related lines, Richard Hingley and Rich Hartis (2009: 79) have emphasized 'the symbolic monumentality' of the Wall, which served to reinforce Roman identity in otherwise debatable lands, the latter an analogy with the ill-defined borders between the medieval kingdoms of England and Scotland. Hingley and Hartis (2009: 80) are clear that their cross-cultural comparison is not intended to be nomothetic and that they are using the analogy in the context of discovery 'to open new lines of enquiry'. Their analogy is nonetheless subjected to a degree of source-side testing, with discussion of the role of contested identities on imperial peripheries, and detailed subject-side testing, with reference to both archaeological data and literary texts.

Other long walls from Antiquity, such as those at Athens and Syracuse, have also been used as analogies in discussion of Hadrian's Wall, (Birley 2001: 133; Crow 2004: 129–130; Breeze 2019a: 90; Graafstal 2021: 139) but are not typically considered directly in relation to the question of function. However, there is good reason to think of the Long Walls of Athens, in particular, as a relevant analogy from a source-side perspective, given the acknowledged philhellenism of Hadrian and the wider imperial elite in the second century AD (Birley 2001: 16–17). Moreover, the Long Walls of Athens in the fifth century BC were largely deterrent in function (Conwell 2008) and subject-side testing suggests such an interpretation to be broadly consistent with the evidence for Hadrian's Wall as it is generally constructed and understood (Kitching 2024b). This, in turn, allows for a reconsideration of the function of the Wall not as performing a primarily defensive, economic or constabulary role, nor as an abstractly symbolic representation of Roman power, but as a means to inspire awe and enable punitive action in the maintenance of imperial influence.

Analogies and the question of command and control

Hadrian's Wall scholarship has thus seen a mixture of analogies used to interpret function, subjected to various degrees of source-side and subject-side testing. A related question, which has seen surprisingly little research interest (Edwards 2009:

221–222), is how the military personnel based in the frontier zone would have been controlled and who, if anyone, was in overall command. The command and control of the Wall offers a good case study as discussion inevitably flows from the differing functional interpretations and thus the analogies underpinning them. While symbolic interpretations rather circumvent the question of command and control, tending to eschew a practical function at all and thus any requirement for such a command, both the defensive and control of movement interpretations rest on a degree of control which is implicit in the analogues used to reason for them. For example, the diagrammatic representations of the Wall's operational and tactical use by Ian Richmond (1957: 27) and Edward Luttwak (2016: 86–87, Fig. 2.4, 164–165, Fig. 3.3), which involve multiple fort garrisons working cooperatively in time to intercept attacking forces, draw from modern military analogies and imply a centralized command. Symonds (2018: 115) has stressed the theoretical requirement for such a command when the effectiveness of the Wall would be undermined if different garrisons were under different orders.

The insistence on an overall commander, however, may well be an anachronism derived from inappropriate modern military analogies which invariably involve a speed and fidelity of information flow which is likely unreasonable in a Roman context. Indeed, it should be emphasized that there is no evidence that an overall commander of the Wall existed. Norman Austin and Boris Rankov (1995: 124) estimate the speed of a courier using the imperial posting system as around 75km a day. By this estimate, it would take two days for a message to reach York from Corbridge, the closest and best-connected site to the road network, and two days to receive a reply, assuming a decision was immediate. Even the fastest possible estimates, using the Stanford Geospatial Network Model of the Roman World (ORBIS), assuming mounted relays in good weather in daylight, would take 1.2 days for the journey to York and back (Scheidel 2014). A round trip to London, which may well have been the provincial capital by the AD 120s (Hingley 2018: 136–139), would take five days using the ORBIS model (with a day turnaround for decision-making) and nearly a fortnight using Austin and Rankov's estimate. The fastest round trip for a message between the northern frontier and Rome, whether overland or incorporating a sea voyage between southern Gaul and Ostia, would take a matter of weeks. Source-side discussion of the technological and environmental assumptions underpinning modern analogies thus raises doubts about the feasibility of a centralized system of command and control.

Subject-side consideration of the archaeological evidence and background knowledge can similarly place constraints on our conceptualizations. The depiction of the Wall on the Rudge Cup and Amiens Patera (Ferris 2020: 115) implies that the Wall as a whole was viewed as a unified system, rather than disconnected elements, with an

operational model which assumed the outposting of personnel and the splitting up of whole units into geographically removed vexillations. The signalling system envisaged by David Woolliscroft (2001) certainly suggests a level of coordination, if not overall control. If the latter, then the signalling system was presumably linked to the location of a hypothetical overall commander. Several locations would appear suitable for such an overall headquarters, including the fort at Stanwix, where the prefect of the *Ala Petriana* was stationed, or at Corbridge, a key intersection in the road and river communications network. A military administrative function has been suggested (Birley 1959: 15) for the aforementioned Site XI at Corbridge, with its monumental scale and fine masonry (**Figure 4**). It is intriguing to consider the possibility that its grandness related to a broader command such as Hadrian's Wall, commenced at a time when the barrier itself was undergoing refurbishment. As noted above, however, Nick Hodgson's (2008: 63–65) review of the available evidence concluded that the most plausible interpretation of Site XI remains that of the storage and marketing of commodities, a function which did not preclude the use of monumental masonry. More fundamentally, whatever the original intention behind Site XI, it was never built to completion and thus can hardly have provided an effective headquarters in practice.

Figure 4: The monumental scale (top) and masonry (bottom left) of Site XI at Corbridge (Author's photos 2022). Equally monumental masonry at the Grandi Horrea at Ostia (bottom right) for comparison (Author's photo 2024).

As emphasized above, there is good reason to doubt that an overall Wall commander, with an associated permanent headquarters, existed at all, at least until the split of forces into *limitanei* and *comitatenses* in the fourth century, when the former answered to the *Dux Britanniarum* (*Not. Dign. [occ.],* XL.17). In the absence of such an appointment, there is no known precedent within the Roman army of the second century for an individual to assume command over another of equal rank (Breeze and Dobson 2000: 209). Thus, the nearest individual able to exercise such authority was the legionary legate at York, with Jarrett (1965: 32) suggesting that the auxiliary units garrisoning the Wall came under the legionary commander of *VI Victrix*. As Ben Edwards (2009: 222) has pointed out, however, the legate at York was hardly in a good position to exercise command and control of the Wall units given the communication constraints discussed above. In a detailed subject-side discussion, Edwards (2009: 222–224) emphasizes unit individuality and the primarily local concerns of fort commanders, deeming the search for an overall commander illusory.

A new analogy: source- and subject-side testing in practice

The discussion so far prompts a consideration of whether there are other analogies that may perform better under source- and subject-side testing and shed light on the question of command and control on Hadrian's Wall. From a source-side perspective, this analogy would need to offer useful similarities in terms of environmental and technological constraints, as well as in terms of the aforementioned complex concept of culture. Simon James (2002: 41–42) has briefly compared the culture of the Roman army to that of the Georgian (1714–1837) Navy of Britain and this analogy merits further exploration. Indeed, the number of usurpers originating in the Roman army show an organization far from the modern, standardized and professional force as is traditionally painted (Peddie 1994), and more akin to a Georgian Navy wherein

> 'connections were so important that most officers came to believe that nothing else mattered… and the result was that the officer corps was divided up into cliques which hated and mistrusted one another. It was a system in which breakdown of morale and discipline constantly threatened' (Baugh 2015: 141).

Certainly, this analogy would have avoided the aforementioned incorrect assumptions about the presence of women in military spaces, a generally normal practice in the Georgian Navy (Rodger 1986: 75–81). Similarly, although subject to higher standards of technical training than a Roman senator taking up a military post, it was not uncommon for senior officers in the Georgian Navy to move freely between naval and political appointments in a manner comparable to Roman practice (Lewis 1948: 370; Wilson 2017: 118–119).

Building on this, the analogy is a useful one for understanding command and control in an organization that also operated within similar environmental and technological constraints, requiring long-distance administration before the advent of modern communication systems. For the Georgian Navy, communications typically took weeks to reach their intended recipient (Knight 2013: 131–133). Notably, the Admiralty and subordinate Boards were responsible for the administration of the navy, in ensuring that ships were built, manned and provisioned effectively, but naval strategy and the direction of naval operations remained the preserve of the King-in-Council via the Secretary of State (Baugh 2015: 64). The Admiralty had an advisory role, but decisions were made by a small elite circle of the King and his ministers. Orders outlining the general intent of an operation, with whatever constraints deemed necessary, were issued to individual commanders prior to their departure, on a handover of command, or as and when required. Michael Palmer (2005: 105) characterizes Admiralty instructions of the period as being 'drafted in a general fashion to meet a variety of contingencies, and heavily reliant on the commander's good sense and willingness to shoulder responsibility'. In essence, the system was one of control by patronage. As such, it rested on personal relations which varied by individual case but invariably involving a delegated amount of authority, a trust that subordinates would use their initiative to achieve their superiors' aim without overstepping previously agreed limits, and the ultimate power of veto (Rodger 1986: 303–314). In place of a tight system of control, was a general policy of aggression that was enabled through effective logistics, excellent equipment and tactical proficiency, in pursuit of a broadly defined overall aim (Mahan 1890).

This is perhaps best demonstrated by the conduct of Horatio Nelson at the Battle of the Nile in 1798, where a combination of aggression and delegation resulted in a decisive victory (Palmer 2005: 5–14). The Admiralty, having little in the way of up-to-date situational awareness, gave Nelson broad general instructions to locate and bring the French fleet to action, pursuing them to 'any part of the Mediterranean, Adriatic, Morea, Archipelago, or even into the Black Sea' (James 1837: 152–153). Having eventually located the French fleet in Aboukir Bay, and with no further requirement to communicate with superior authority, Nelson ordered an immediate attack, despite the disadvantages of fighting at night in the vicinity of dangerous shoals (Lewis 1948: 557–560). The battle was conducted without any signals between Nelson's flagship and his captains (Palmer 1997: 698). Further exemplifying the difficulties in communication, dispatches detailing the British victory would not reach the Admiralty for two months (Nelson 1798). The aggressive instinct to attack immediately, in spite of several logical objections and the profound psychological effect this had on the opposing forces, may be likened to the preference for immediate attack by the Roman army (Goldsworthy

2006: 94–95), reflecting the underlying principles of aggression and initiative rather than tight control.

Offering further cultural parallels with the Roman military, and contrasting with modern ideas of the primacy of scientific reason in the conduct of military operations, the significance of Nelson's religiosity and belief in the role of faith, fate and providence have also been highlighted (Palmer 1997: 699–703). In other words, tight control was not required if the outcome of a battle was divinely ordained. The notion of outlining a broad plan and allowing subordinates to achieve it with little to no interference or supervision is most associated with the figure of Nelson (Vincent 2003: 564–565) but other examples from the Georgian Navy suggest an emerging, albeit never completely realized, cultural norm. Edward Hawke, for instance, a distinguished naval commander and later First Lord of the Admiralty, 'was a command innovator who increased the fighting power of his fleet by rejecting centralization' (Palmer 2005: 112). Likewise, at the battle of Cape Finisterre in 1747, George Anson achieved victory through a commitment to decentralized command (Palmer 2005: 99–100). At the Battle of Camperdown in 1797, although he failed to outline his plan to his subordinates beforehand, Adam Duncan similarly 'relied not on signals but on the initiative of [his] captains' (Palmer 2005: 185). These were not tactical innovations, but part of a more general operational and strategic approach emerging from the limitations in contemporary communications and a culture of aggression and devolved responsibility.

It is important to understand the limitations of this analogy from a source-side perspective when applying it to the Roman military. Nelson's religious fervour, for instance, is not directly equivalent to the role of religion in the ancient world, and in any case was not universally shared by his own contemporaries. More fundamentally, the maritime environment has an impact on military culture largely absent from the Roman army (Wilson 2017: 183) and the standards of professional training are notably divergent. Collections of stratagems and textbooks on generalship certainly existed in the Roman world (Campbell 1987) but were by no means generally taught or examined, and there was no equivalent to the Georgian Navy's *Fighting Instructions* as far as we know. Similarly, given the copious evidence for written records, such as the Vindolanda tablets, we may assume that signalling mechanisms and best practice were written down. It is equally possible that much information was absorbed, copied and adapted without recourse to recording and formal teaching — as is indeed suggested for the design and layout of a fort by the *mensores* (Hodgson 2022: 273–275). Notwithstanding these caveats, however, the analogy appears a useful one when considering how the Roman Empire conducted military operations, within comparable technological constraints, cultural paradigms and decision-making apparatuses.

The analogy also performs well under subject-side testing against the archaeological evidence and broader background knowledge. For instance, any signalling arrangements via the turrets, milecastles and standalone towers would appear to have been optimized for a looser and delegated model of control, lacking the ability to convey detailed instructions in a timely manner, but more than capable of keeping individual units appraised of one another's activity. Similarly, there is no evidence for a single overall headquarters and the archaeology of the fort headquarters displays significant individuality. The *principia* courtyards at Wallsend and Chesters, for instance, are almost square, whereas those at Housesteads, Great Chesters and Benwell are elongated rectangles, and not all *principia* on the line of the Wall possess an aisle to the cross-hall (Taylor 1999: 118, 259). Elsewhere, the use of closely situated but autonomous forces in Roman military operations is strongly suggested by the excavation of separate headquarter camps and tribunals at the siege of Masada (Goldfus and Arubas 2002). Higher up the chain of command, there is very little evidence for a centralized and detailed bureaucracy in Rome, which in any case would have proved redundant when the emperor was travelling. Instead, it seems likely that, as Fergus Millar (1992: 266) proposes, 'the emperor's role was typically passive, and that he normally made his pronouncements in response to initiatives from below'. In a fashion that echoes the Georgian Admiralty and King-in-Council, the Senate and emperor in Rome exercised their authority through the power of patronage and the appointment of imperial administrators. As Cassius Dio (LII 33.3–4) makes clear, the aim was that the emperor

> 'may first become more intimately acquainted with their characters and may then be able to put them to the right kind of employment, and that they, on their part, may first become familiar with [his] habits of mind and [his] plans before they go out to govern the provinces'.

While *proconsules* were appointed by the Senate and only the *legati Augusti pro praetorae* by direct imperial appointment, it was ultimately the emperor who exercised authority over all provincial administrators (Millar 1966) through the power of dismissal (Suet. *Aug.* 88), the settling of matters brought to his attention in correspondence (*Dig.* I 16.10.1; XXII 5.3.3; XLVIII 8.4.1–2, I6.I4) and the issuing of *mandata*. The latter, it would appear, were issued to all administrators by the second century, including *procuratores*, *legati* and *proconsules* alike (Cass. Dio LIII 15.4; *Dig.* XLVIII 3.6.1). In short, there existed a level of delegated responsibility — the governors running the provinces largely on their own initiative (Millar 1966; Millar 1982: 9), within a set of likely standardized instructions (Millar 1992: 313–327), with exceptions and clarifications sought from the emperor in correspondence (Millar 1992: 328–341).

The governors, in turn, exercised authority over the military forces in their respective provinces, within the scope defined by the *mandata* and always subject, should their actions displease the emperor, to veto, recall or even, in extremis, death (Suet. *Dom.* 10.3). The governor in Britain exercised authority over the Prefect of the Fleet (Tac. *Agr.* 38.3), the three legionary legates and the auxiliary units. In doing so, he was assisted by his *cohors amicorum*, or informal circle of friends and advisors, and a permanent staff, or *officium*, administered by the *princeps praetorii* and legionary *cornicularii*. This organization was staffed by personnel drawn from the provinces' garrison including *commentarienses*, *adiutores*, *speculatores*, *beneficiarii*, *stratores*, *equisiones* and others (Frere 1981: 226). This was replicated, at a reduced scale, at the legionary level (Birley 2005: 11). While the provincial procurator, responsible for fiscal matters, appears to have been based in London, and there is evidence for members of an *officium* here too (RIB 19), we should probably accept a more mobile role for the governor and his staff, at least outside of the winter months (Mann and Jarrett 1967: 62).

Contrary to the levels of control assumed in readings of the Wall focused on defence (Richmond 1951: 301–302) or control-of-movement (Symonds 2018: 115), this analogy suggests that we should not envisage such a tightly controlled and integrated system. Anachronistic models of command and control were not prerequisites to the effective wielding of military force given a tradition of aggression, controlled through patronage and veto and enabled by an extensive logistics organization, effective equipment and sound tactical training. The broad intent of the emperor was known to the governor and his staff, who in turn articulated a broad intent to the individual commanders along the Wall. Systems of signalling and communication were sufficient to keep these commands appraised of each other's activities but generally they acted independently in support of a broad overall direction. Individual commanders would be expected to ensure their allocated section of the Wall, as outlined in standing instructions, was maintained and manned. Reacting to any threat or slight, perceived or actual, the garrison commanders would also be free to undertake punitive missions, keeping the governor appraised who, in turn, might cohere a larger response. The latter might entail punitive action far in advance of the Wall but need not require the permission of the emperor provided such activity was included in the scope of the *mandata*. Indeed, as in the case of Arrian's punitive expedition against the Alani (Bosworth 1977), the restrictions of time and distance would have made such authorization impossible (Mattern 2002: 11). Needless to say, where this scale of operations was deemed insufficient and a larger campaign planned, the direction, if not the presence, of the emperor was almost certainly required (Millar 1982).

Conclusion

In an increasingly fractured discipline, with a proliferation of increasingly specialized approaches and the concomitant risk of research being conducted in opaque siloes, the need for renewed attention to epistemology is only becoming more acute. This is especially true when it comes to the use of analogy in archaeological reasoning, where archaeologists must demonstrate why their analogical models are more valid than the selective, vague and superficial analogies of the pseudoarchaeologist and polemicist. Similarly, it is important to recognize how analogies with ancient frontiers are used in modern discourse and to not mistake effective communicative metaphors for strongly warranted arguments. As a case study, the use of analogies in the discussion of command and control on Hadrian's Wall in the second century AD illustrates these issues well.

Placing the use of analogy in archaeological reasoning on a firmer epistemological foundation through a systematic appraisal includes a detailed critique of the context in which the analogy is employed, the relevance of the analogy to the subject in question, and how it corresponds to the archaeological evidence and background knowledge. Source-side testing, including considerations of culture as well as environmental and technological constraints, and subject-side testing can clarify the epistemological basis for resultant knowledge claims. Any assessment, however, remains dynamic and contingent — the utility of the analogy will vary depending on the specific question it is being used to answer. If the Georgian Navy analogy is useful for exploring the question of command and control on Hadrian's Wall, it does not follow that it is equally useful for exploring, for instance, its impact on indigenous populations. Similarly, the Wall's longevity means that an analogy deemed relevant to the question of command and control in the second century may be markedly less so for the Wall in late-Roman Britain.

No analogy is perfect. Indeed, it is through the consideration of multiple analogies that multivocality is enabled, entrenched viewpoints and assumptions challenged, and partial analogues combined into new hypotheses. Fundamentally, the utility of analogies lie as much in their contradictory as their convergent aspects, working back and forth between different analogues, between the background knowledge underpinning our understanding, and the archaeological evidence that remains. The approach must therefore be critical, systematic and transparent. In this way, archaeologists tackling the challenges posed by the quality of the archaeological record and the variability of human behaviour need not restrict themselves to simpler questions but rather embrace and elucidate the ambiguity of complex answers.

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Abbreviations

RIB Roman Inscriptions in Britain – Collingwood, Robin George and Richard Pearson Wright. 1965. *The Roman Inscriptions of Britain. Volume I*. Oxford: Clarendon.

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