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Beacons and Military Communication from Antiquity to the Early Modern Period

Edited by Marie Ødegaard, Stuart Brookes and Thorsten Lemm

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Cover illustration: A beacon foundation at Veten, Atløyna, Askvoll Municipality, Vestland County, western Norway. Photo: Marie Ødegaard.

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Preface

This volume grew out of conversations between the editors which led to a session at the European Association for Archaeologists conference in 2020, which explored the potentials of an archaeology of military communications. Researchers were invited to contribute with presentations addressing mobilisation, movement, strategy, and other military sites and defence networks; and the social dimensions of civil defence and its impacts on people. This led to a project examining Viking Age beacons, currently underway under the leadership of Marie Ødegaard at the University of Stavanger. The latter project is concerned principally with the nature of Viking Age signalling, and as a consequence several contributions to this volume focus on that. Most of the papers in this volume are from the conference, others were solicited from invited authors.

We are very pleased that we can present 18 papers, including an introduction and conclusion, on (pre)historic visual and acoustic signalling communications. Recognising how and where such communications worked is fundamental to understanding systems of military organisation, defensive capabilities, and the nature of hostilities in the past—yet they have so far featured little in archaeological studies. We hope this volume will contribute to these debates. Together, these papers open substantial regional and pan-regional perspectives, from antiquity to modern times. It is our hope that this volume will place these papers within a broader discussion of military communication and organisation, intelligence and the wider landscapes and human responses to military action.

We are grateful to all the authors and their patience in making this volume. We would also like to express our gratitude to the two peer reviewers who commented on the whole manuscript, and to UCL and the Research Council of Norway for funding the publication.

In recognition of his huge influence to the field, we are especially grateful to our colleague and friend Frode Iversen, who sadly passed away over the course of this books' development. We dedicate the book to his memory.

Figures and Tables

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Abbreviations

aOD	above Ordnance Datum/mean UK sea level
AH	Anno Hegirae
Dan.	Modern Danish
FRNs	Fortified regional networks
GIS	Geographical Information System(s)
MBA	Middle Bronze Age
Mx	Manx Gaelic
Norw.	Modern Norwegian
OD	Old Danish
OI	Old Icelandic
OE	Old English
ON	Old Norse
OS	Old Swedish
Sw.	Modern Swedish

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CHAPTER 1

Signalling Intent: Beacons and Military Communications from Antiquity to Early Modern Times—Introduction

Marie Ødegaard, Stuart Brookes and Thorsten Lemm

1 Signalling in Space and Time

One of the earliest accounts of beacon signalling appears in Aeschylus's early 5th century B.C. play *Agamemnon.* Already in the opening scene a beacon is used for dramatic effect, enhancing the sense of foreboding as Queen Clytemnestra waits for the flame that will signal the end of the Trojan War.[1] Later on, a signal relay is described as news of the fall of Troy travels from the west coast of present-day Turkey to Mycenae in the Greek Peloponnese.[2] From the first beacon lit on Ida, the mountain of Troy, a relay of lights is carried in one night over eight further places passing by Lemnos and Mount Athos down the eastern coast of Greece, and south to the Peloponnese.[3] Further details about the composition of the beacons is described in the original source. At Athos, dry pine wood was ready for lighting; in Messapion withered gorse was used to spark the flame.[4] Watchguards were ready to forward the signal, often waiting atop significant geographical eminences, such as Athos, Dirphys, and Kithairon, that all rise above 1,400 m. Modern plotting of the named relay stations shows that they were separated by distances of up to 176 km, and has tested both their intervisibility and the impact the beacons would have had on their locales: lights atop Kithairon and Egina would have been seen by all around the Megara Gulf, including the inhabitants of Athens.[5] If the story can be believed, nearly all of Greece learnt about the fall of Troy from the flames lit on landmarks that were both prominent geographical features and famous in legend.[6]

1 Æschylus, *Agamemnon*, lines 8–10, trans. Gilbert Murray (London: George Allen & Unwin Ltd., 2004).
2 Æschylus, *Agamemnon*, lines 281–316.
3 A.J. Beattie, "Aeschylus, *Agamemnon* 281–316," *The Classical Review* 4, no. 2 (1954), pp. 77–81.
4 Æschylus, *Agamemnon*, pp. 287 and 294.
5 Beattie, "Aeschylus," pp. 78–9.
6 Beattie, "Aeschylus," p. 81.

 | DOI:10.1163/9789004749702_002

Aeschylus's account—written more than 2,500 years ago—highlights many of the topics discussed in this book. The first is the ubiquity of beacons in both time and space. Aeschylus is but one early account. One might also cite Hannibal's campaign of 218 B.C. in which smoke signals were used to coordinate the manoeuvres of two contingents of the Carthaginian army in the run up to the Battle of the Rhône Crossing.[7] Or, Thucydides's account of how in the Peloponnesian War in 425 B.C., Corinthian forces, alerted by beacons, were able to intercept the Athenian navy.[8] But non-verbal communication by smoke and fire is common also to non-Classical contexts. European commentators describe indigenous Australian peoples who used fire signals to communicate over long distances. For example, in A. T. Magarey's account of 1893, aboriginal smoke signals were used to communicate complex messages by using combinations of material making different types of smoke columns to send different messages.[9]

This volume draws together archaeological evidence for non-verbal distance communication that exceeded voice range. As is highlighted by these examples, such communication was (and is) common to people in many times and places. Communicating over distances is something that many societies have tried to deal with. Indeed, considered in its most broad sense, non-verbal communication over distances could be regarded as one of the most important aspects of human endeavour. It is cross cultural, and not specific to particular 'levels' of social complexity. It is therefore a subject of huge importance to understanding many past societies, their cooperation, alliances, leadership, and not least, strategic decision making.

It is remarkable, therefore that there has been only intermittent attention in the archaeological literature. There have been hyper-minimalist text-critical readings by ancient and early medieval historians who tended to dismiss written reports of complex long-distance messaging systems.[10] Most often, the

7 Theodore Ayrault Dodge, *Hannibal* (Mechanicsburg, PA: Greenhill Books, 1994), pp. 180–81.

8 Thucydides, *The Peloponnesian War* IV, trans. C.F. Smith. Loeb Classical Library 169 (Cambridge, MA: Harvard University Press, 1923), p. 42.

9 A.T. Magarey, "Smoke signals of the Australian aborigines," *Adelaide Advertiser*, 10 Oct 1893; see also Ray Kerkhove, "Smoke Signalling Resistance. Aboriginal Use of Long-Distance Communication During Australia's Frontier Wars," *Queensland Review* 28, no. 1 (2021), pp. 1–24. doi: 10.1017/qre.2021.3.

10 E.g. A.W. Verrall, The Agamemnon, with an introduction, commentary and translation (London: Macmillan, 1904), pp. XV–XXVIII; see also Edward Selwyn Hoernle, The problem of the Agamemnon (Oxford: B. Blackwell 1921), 14–24; G.H. Donaldson "Signalling Communications and the Roman Imperial Army," *Britannia* 19 (1988), pp. 353–54.

study of beacons has been in the realm of military geography, with particular attention paid to their role in border defence. Examples include the signals (*fenghuo* 'beacon fire') atop the Great Wall of China that alerted defenders of imminent threat,[11] or the sophisticated beacon system of the Byzantine Empire utilized to transmit messages from the Taurus frontier to Constantinople—an optical telegraph that allowed for the rapid relay of information across Asia Minor, stretching approximately 720 km and able to transmit messages within an hour,[12] or the beacon relays of Tudor England that forewarned of attacks by the French and Spanish fleets (Figure 1.1).[13] Perhaps the most famous of such systems are those that protected the Roman Empire. Papers by various authors,

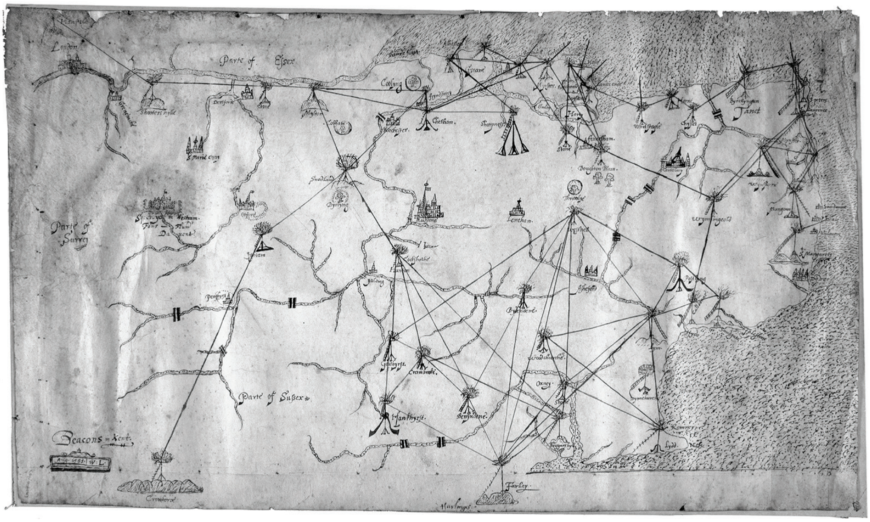

FIGURE 1.1 Map of beacons in Kent, by William Lambarde, "commissioned by Lord Cobham in order to have multiple copies made, as a guide to the effective use of beacons. The positions of about fifty beacons are marked, with lines indicating the direction of the signals given off by them." Originally published/produced in 1585
IMAGE COURTESY OF THE BRITISH LIBRARY

11 Bin Li, "Beacon Fire, Placard, and Imperial Diaries," in *Communication, Civilization and China. Discovering the Tang Dynasty (618–907)*. Sociology, Media and Journalism in China, (Singapore: Palgrave Macmillan, 2020), pp. 129–61. doi.org/10.1007/978-981-15-7808-3_5.

12 E.g. Philip Pattenden, "The Byzantine early warning system," *Byzantion* 53, no. 1 (1983), pp. 258–99; Hans-Joachim Kühn, *Die byzantinische Armee im 10. Jahrhundert* (Vienna: Fassbaender, 1991); John Haldon, *Warfare, State, and Society in the Byzantine World, 565–1204* (London: Routledge , 1999), p. 150; see also McMahon this volume.

13 As described most vividly in Lord Thomas Babington Macaulay's poem "The Armada: a fragment" of 1832, in which news of the sighting of the Spanish Armada at Plymouth in 1588, is communicated by beacon chain to London and across England.

including in this volume, Andreas Thiel, Andrew White and Joey Williams, examine the infrastructure, manning, and sophistication of signalling that underpinned these systems.

This book is concerned with developing archaeological approaches to non-verbal communication in the past, particularly in the context of military signalling. The ubiquity of examples of non-verbal distance communication across time and space cannot be adequately explored fully in a single book, so here we focus geographically just on the European and Mediterranean worlds, ranging chronologically from Classical to late medieval times.

2 Communications by Different Means

People throughout the past have developed tools to enable communication over long-distance. Most of the contributors in this volume focus on visibility, but of course some such communication was enabled by amplifying sound. In his contribution, Alexandre Bertaud explores some of the archaeological evidence for acoustic communication, focussing on the distinctive copper-alloy carnyces that survive from across Iron Age Europe. Likewise, Ainhoa Pancorbo Picó and Andreu Galera Pedrosa in their paper describe the importance of sounds, specifically horns, for signalling, and how the combination of visual and acoustic signalling contributed to a sophisticated communication system in medieval Spain. Similarly, Andrew Johnson describes how church bells were employed to raise the alarm in 17th century Isle of Man. To these instruments might be added any number of trumpets, drums, bells, and bullroarers, known from ancient times;[14] as indeed, might objects that can serve secondary functions in audio-signalling. Such is the case of rocks and boomerangs used by Aboriginal Australians, who tapped these objects together, or used stones in water, to signal over distances of over 30 m.[15] All these objects represent a portable material culture of non-verbal communication.

More often long-distance communication was done by sight, commonly using fire or smoke, but also by raising flags or signalling by other physical means. Most simply, this would require just a bonfire, though slightly more complicated messages could be delivered through bonfire combinations, varying the flame colour, or altering the character of the smoke by changing its colour, width, density, frequency and form, either by using different fuels or

14 Also, Thiel and Bakke in this volume describe musical instruments and the use of acoustic communication, as well as semaphore systems.

15 Kerkhove, "Smoke Signalling Resistance," pp. 16 and 17.

using wet blankets or bark to smother the flame.[16] Specific types of wood could be used at night, to employ "flash lights" for better visibility at night-time.[17]

Much if not all of this process may be impossible to identify archaeologically; nor might the recoverable remains be distinctive enough to discriminate from other fire-places or sites of burning. This is not always the case. Some of the monuments that are discussed in this book—such as the Greek, Roman, Byzantine, and medieval towers described by Bakke, Elbl, Pancorbo Picó and Galera Pedrosa, Thiel, White, Williams—certainly leave an impressive archaeological footprint; in other cases there is a distinctive and rich array of material remains than can be used to gain insights into ancient communications. Bertaud makes the important point that the Iron Age carnyces were not simply acoustic tools, but could also serve as visual ones by adorning them with 'ears' or pennants in a manner similar to a semaphore. Similarly, the iron stand discovered in the early medieval Sutton Hoo Mound 1 ship burial, England, has recently been reinterpreted as a cresset: a frame in which a naked flame could be fitted in the bow of a flagship for maintaining contact with land and other ships.[18] Other reflective objects, including mirrors and shields, might similarly have had a use in long-range signalling, even if this function is difficult to prove archaeologically. The effectiveness of such heliographic communication—reflecting sunlight to send messages—was demonstrated during the Apache campaigns in the south-west of North America during the late 19th century,[19] and might be what is described by Xenephon in 405 B.C. when Lysander ordered his troops to 'signal with a shield'.[20]

Distance and speed of these kinds of signalling varied with elevation, visibility and weather conditions. Different claims have been put forward to how far it is possible to signal, ranging from 32 to 960 km. Woolliscroft claims smoke signalling used by Romans could be visible at 48 km in Britain and northern Europe, despite the denser nature of the air.[21] This fits well with archaeological reconstructions of visibility on former Pueblo Indian's signalling stations 42 km apart, and south-eastern Queensland (Australia) with relays every 40 km.[22]

16 Magarey, "Smoke signals of the Australian aborigines." See also Kerkhove, "Smoke Signalling Resistance".

17 Kerkhove "Smoke Signalling Resistance," pp. 4 and 9.

18 Valerie Fenwick, "Sutton Hoo: re-imagining the ship and chamber," *The Antiquaries Journal* 102 (2023), pp. 36–62.

19 Bruno J. Rolak, "General Miles' Mirrors: The Heliograph in the Geromino Campaign of 1886," *The Journal of Arizona History* 16, no. 2 (1975), pp. 145–60.

20 Xenephon, *Hellenica* II, 1.27.

21 Davis Wolliscroft, *Roman Military Signalling* (Stroud and Charleston: Tempus, 2001), p. 24.

22 Kerkhove "Smoke Signalling Resistance," p. 5 with references.

More impressively, experiments by the U.S. Coast and Geodetic Survey at the end of the 19th century showed that large beacons could be seen as far away as 257–321 km on a clear night between mountain tops.[23] Similarly, in southern Queensland, rival tribal alliances could be assembled for battle from distances of 160–700 km apart.[24] More conservatively, in the Himalayas, it is assumed that 15–25 km line-of-sight networks were most likely,[25] and this distance accords well with the observations made by Tiffany Earley-Spadoni (Ancient Near East) and Marie Ødegaard (Viking Age Norway) in this volume.

With topography and the placement of beacons evidently being important for signalling, it stands to reason that some signalling sites were more significant in the network than others. Sometimes, these became hubs in the system, with more intervisible line-of-sight than others, and thus transmitting more signals to other stations.[26] In Stuart Brookes' contribution, the existence of one such main beacon in early medieval England can be attested by its prominence in contemporary written sources. Similarly, Frode Iversen draws attention to beacons in early modern Norway that were not set on fire until a signal was transmitted from specific beacons or the threat was confirmed by riders with messages.

While some beacons may have been particularly prominent features in the landscape, in many cases discussed here the evidence for signalling can leave only faint archaeological traces. An important observation made by many of the contributions in this volume is the variable nature of the archaeological resource, and the methods that need to be adopted to infer ancient communications. These are discussed in greater detail below.

3 Means and Purposes of Long-Distance Communication

Unlike messenger systems, where complex ideas could potentially be communicated, most of the systems discussed here restricted themselves to relatively simple messages. While these systems might be tailored to receive and transmit messages relating to specific events and circumstances, they nevertheless required a pre-determined understanding of the message sent.

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23 Augustus Chapman Merriam, *Telegraphing Among the Ancients* (London: Forgotten Books, 2018 [1890]), pp. 26–28.

24 Kerkhove, "Smoke Signalling Resistance," p. 6.

25 Nagendra Singh Rawat, Tom Brughmans, Vinod Nautiyal and Devi Dutt Chauniyal, "Networked medieval strongholds in Garhwal Himalaya, India," *Antiquity* 95, no. 381 (2021), pp. 753–72. doi: 10.15184/aqy.2021.4.

26 Rawat *et al.*, "Networked medieval strongholds," p. 753–72.

This is an obvious, but important, point. There is little flexibility in the message to be transmitted by fire-beacon, horn or mirror, and the adequate response needed to be unambiguous. Of course, it is possible that beacon signals were complemented by a supplementary messenger system (e.g., as discussed by Earley-Spadoni and Iversen) which was used to properly express the nature of the impending threat, but as a first form of communication, the beacon signal needed to be concise and straightforward. In most of the cases discussed here, they were an early warning of trouble, serving only a limited number of purposes: to muster or manoeuvre armed civilians, militia or troops, to ready civilians for flight, and to indicate the direction of the threat. The message of the beacon might be understood simply as "danger", or "we are under attack"!

In ancient Greece and Rome, beacon messages would seem to have been this simple, but over time more sophisticated messages could be generated by using different fuels, coverings, positions, or sizes of fires. On the Great Wall of China, a crude form of multi-level signalling used numbers of lanterns or the colour of smoke to indicate the size of an invading enemy.[27] In the accounts of Australian aboriginals, smoke signals could be manipulated to describe the precise movements of intruders through the territory.[28] Even more sophisticated signalling was developed by Native Americans. Combinations of dots and dashes, made of long and short clouds resembling a visual Morse code, were used, particularly in the context of warfare, to convey detailed intelligence, such as numbers of cavalry and military intentions, to signal the movements of troops and camps, and describe the conditions within the camps.[29] These signals could transmit over three hundred miles (482 km) in two or three hours—much faster than a courier, who might take five or six days to prove the news to be correct.[30]

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27 Ivan Djordjevic, William Ryan and Bane Vasic, "Introduction," in *Coding for Optical Channels* (Berlin: Springer, 2010), p. 2.

28 Magarey, "Smoke signals of the Australian aborigines".

29 Garrick Mallery, *Sign Language Among North American Indians, compared with that among other peoples and deaf-mutes* (Washington: Government Printing Office, 1881), pp. 537–39. https://www.gutenberg.org/files/17451/17451-h/17451-h.htm [accessed January 2023]; Ward Beers, "Fire and Smoke: Ethnographic and Archaeological Evidence for Line-of-Sight Signaling in North America," in *Papers in Honor of Sheila K. Brewer, Papers of the Archaeological Society of New Mexico 40*, ed. Emily J. Brown, Carol J. Condie and Helen K. Crotty (Albuquerque: Archaeological Society of New Mexico, 2014), pp. 23–32; Kerkhove, "Smoke Signalling Resistance," p. 8.

30 William H. Hardy, "Early Trouble with Indians – 1866," *Mojave County Miner*, December 8, 1888 (Copy in the Munk Library of Arizona, Southwest Museum, Los Angeles), p. 1; ref. in Beers "Fire and smoke", pp. 24–25.

Amongst certain Native American groups smoke signals were used also to communicate in peace-time, indicating the safe arrival of a party at an appointed place (Figure 1.2),[31] or to communicate that traders were approaching.[32] In the 17th to 19th centuries, smoke signals were used at Federal Hill in Baltimore to notify merchants that the ships had arrived safely ashore.

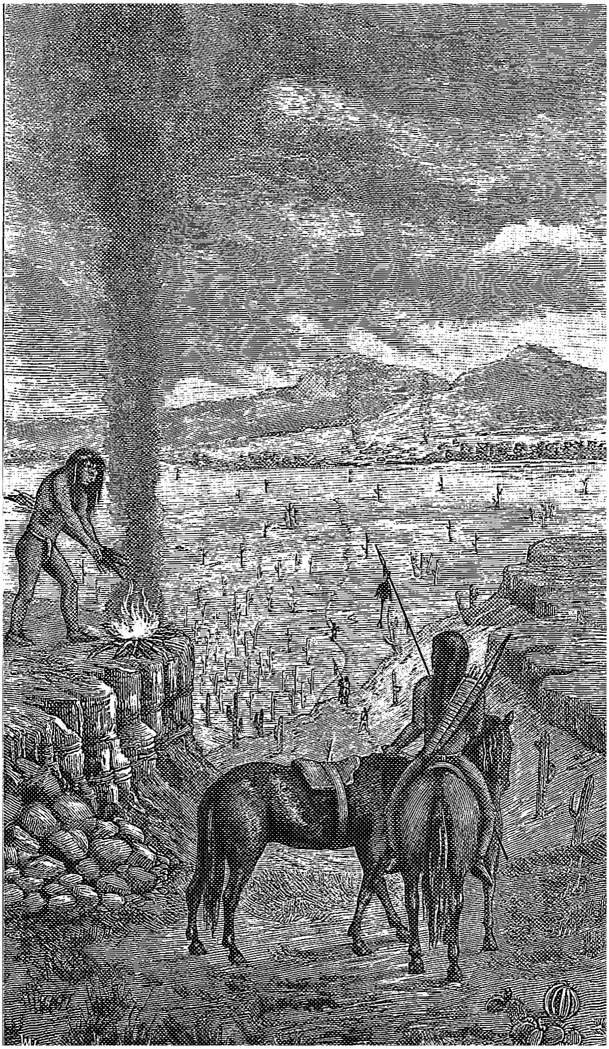

FIGURE 1.2
Signal of successful war-party
REPRODUCED FROM MALLERY 1881: FIG. 339

31 Mallery, *Sign Language*, p. 538.

32 Ward Beers, "No One Here Gets Out Alive: Line-of-Sight Communication and Regional Defence in the Prehistorie Rio Abajo, New Mexico," in *Collected Papers from the 18th Biennial Mogo/Jon Archaeology Conference. October 9–11, 2014, New Mexico State University, Las*

Beacon signalling may thus be an effective system for conveying a variety of messages.

During conflicts signals could function both offensively and defensively. North American indigenous groups used offensive signalling for harassment rather than communications.[33] War participation was a group activity, and this could give different motives for social cooperation.[34] If people were facing threats, it would be easier to mobilise them for warfare. Lines of transport, supply and communication were often targeted by military intelligence,[35] and could be used for resistance strategies. Aboriginal Australians, for example, used to trick the enemy with demoralizing news from the "front".[36] From the Old Icelandic (OI) *Sverris saga*, it is known how an army tried to "take out" the enemy's beacons and take their boats, to "trick" the enemy and the system.[37] Similarly, in 16th century England, unauthorised persons sometimes had fun raising the civil militia by setting alight the bonfires in a false alarm.[38]

Different forms of messaging could also overlap each other. The Hannibal example cited above highlights how signalling was used to manoeuvre troops during battle, and a similar interpretation is reached in Bertaud's contribution in this volume. Beacon lights, mirrors, or musical instruments might be used to give orders, enabling commanders to organize combatants on the battlefield. In such contexts, it is important that signals can be recognised amidst the theatre of combat, with different forms of communication relating to phases and conditions of conflict. For those coordinating troop movement visual signalling may be more relevant, whilst for those engaged in pitched battle, audible signalling could be preferred.

All these forms of communication conflate several different aspects, though they are closely related. Firstly, is the function of guarding/observing. As much is implied by some of the terminology associated with such places. The Old English (OE) *weard* and Old Norse (ON) *wardu* "to watch", both imply keen and

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Cruces, New Mexico, ed. Lonnie C. Ludeman (Friends of Mogollon Archaeology: Las Cruces, New Mexico, 2015), pp. 205–16.

33 Beers, "Fire and Smoke," p. 24.

34 Hugo C. Ikehara-Tsukayama and Juan Carlos Vargas Ruix (eds), "Landscapes of People at War," in *Global Perspectives on Landscapes of Warfare* 9 (University Press of Colorado, Boulder, 2022), pp. 3–25. https://www.jstor.org/stable/j.ctv2bgz3gr.3.

35 John Keegan, *Intelligence in war: knowledge of the enemy from Napoleon to Al-Qaeda* (London: Hutchinson, 2003), p. 16.

36 Kerkhove, "Smoke Signalling Resistance," p. 16.

37 *Sverris saga*, ed. Þorleifur Hauksson. Íslenzk fornrit, XXX (Reykjavík: Hið íslenzka fornritafélag 2007), chap. 76–78.

38 Beauchamp, "The Beacons that Summoned Oxfordshire in 1545", p. 36.

attentive visual observation: an action that might best be done from high or commanding vantage points. In many examples here, beacons are found along boundaries, coasts and travel routes. Many nations had "sea watch" with lookouts and lighthouses providing surveillance of the coast.[39]

Here we might distinguish between observation and signalling. Watching alone serves little purpose, unless the sense is to "watch over", as might be implied, for example, by paying close attention to livestock, or overseeing the carrying out of orders. By contrast, among the ancient Greek verbs associated with beacons is *phrouréô* "the activity of making fire-signals",[40] a word that suggests "watching" also implied some form of signalling: using the intelligence gained from observation to communicate a practical action to a particular situation.

Finally, related to this we must suppose also a third aspect, namely the receiving of information and the intended response. Unlike signalling, which could be carried out by individuals, the receiving of information, whether through visual or audible cues, was public, even if the range of transmission could vary greatly. How this public responded to the signal depended on a predetermined understanding of the message sent.

Of these three aspects, the signalling and receiving of messages must be studied and understood in a relational way. What was the message, and what was the response? In many examples featured in this book fire and smoke signals are used to transmit news, signal danger, or to gather people to a common area. Messages could be sent to other garrisons and soldiers for aid and defence (Brookes, Earley-Spadoni, McMahon, Thiel) or used to communicate imminent threats to local population, as in the Viking Age Scandinavian examples (Ødegaard, Iversen, Lemm).

Here a contrast can be drawn with systems of long-distance messaging that are less discussed in this book, namely systems of written communication transferred by riders, runners, or carrier pigeons. Unlike bonfires, flags or horns, these kinds of messages could be private, and accordingly there is often some overlap between messenger-runners, spying, and intelligence gathering.[41] They could operate regardless of weather—which could be a challenge for fire beacons—or geographical obstacles. It was a way of confirming the message, delivering details, and clarifying uncertain points.

Full discussion of this form of long-distance communication could form an entire companion volume. Throughout history, all major empires have

39 Kerkhove, "Smoke Signalling Resistance".
40 Bakke, this volume.
41 Keegan, "Intelligence in war," p. 20; see also the Conclusion to this volume.

developed their own systems of couriers, road networks, and transportation services, which delivered messages and goods over vast distances. One of the best-known examples is the *Cursus Publicus*, the postal and transportation system of ancient Rome. Civic buildings have been uncovered, illustrating some of the infrastructrure supporting the systems. Other similar systems are the royal road and mounted couriers of the Persian Empire,[42] the Inca empire's road system: the Qhapaq Ñan,[43] and the Mongol postal system: the Yām,[44] amongst others; and all had formative influences on, for example, the development of bureaucratic practices and institutions. These systems were vast networks, invariably faced with different issues, such as maintenance, insecurity due to bandit activity, and bureaucratic inefficiencies, and were dependent on political stability.

The cases presented here serve merely to illustrate a wider phenomenon and flag some important points. Firstly, Earley-Spadoni's discussion of relay systems with riders in the Ancient Middle East reminds us of the important connections that existed between long-distance communications and terrestrial route networks. Even without roads, in Australia, runners are recorded traveling up to 300 km a day.[45] Secondly, Iversen stresses the importance of riders to the efficacy of the beacon system in 17th- and 18th-century Norway. Whether in code or simply written notes, these messages were supplemental to visual signalling and represented a more direct exchange of information in which complexity, nuance, and subjectivity could be clearly articulated. In this regard, messaging systems can have their own unique archaeological signatures, not least in the form of message or bidding sticks which are known from throughout the world.[46] In discussing message sticks from Viking Age Norway, Ødegaard highlights a third point, namely that different networks existed within communication systems. She describes two types of message sticks: ones that were sent between royal representatives, and others between farmers. Further emphasising this point, Earley-Spadoni stresses how spying and messaging were intertwined, and that this might involve different participants. Children, adolescents, and women, for example, could be better at

42 Mehrdad Kia, *The Persian Empire. A Historical Encyclopedia*, 2 (Empires of the World) (Santa Barbara: ABC-CLIO, 2016).

43 John Hyslop, *Inka Road System* (New York: Academic Press, 1984).

44 Adam J. Silverstein, "The Mongol Yām and its legacy," in *Postal Systems in the Pre-Modern Islamic World* (Cambridge Studies in Islamic Civilization) (Cambridge: Cambridge University Press, 2009), pp. 141–164.

45 Kerkhove, "Smoke Signalling Resistance," p. 14.

46 Kerkhove, "Smoke Signalling Resistance," p. 14; see also Johnson this volume.

spying unobtrusively to gather information, and even alert warriors of the best time to strike.[47]

These different types of signalling emphasise just how historically contingent long-distance communication is. The systems here described are responsive and can change quickly depending on the circumstances. They can underpin specific military engagements, help coordinate troops in the field, warn of imminent threats, and signal between naval and terrestrial forces. In this regard they form an important heuristic device for considering agency in the past, particularly in the context of warfare and conflict. Moreover, despite the large geographical and chronological scope of the papers assembled here, the systems they describe all emphasise the importance that visual communications between places served. It is quite literally an archaeology of the connections between people and places.

4 Reconstructing Ancient Communications

4.1 *Identifying Beacons—Archaeology, Written Sources and Place-Names*

Beacons can be hard to find. Because they are often quite ephemeral archaeological sites, identification needs to draw upon a range of existing archaeological, written, toponymical and in very few cases pictorial evidence as well as modern and historical maps, remote sensing and LiDAR data. Problematically, even when they can be identified, the fact that beacon sites can be used (or re-used) over long periods of time, means that, it is often difficult to date individual sites with certainty (Figure 1.3). In his paper, Martin M. Elbl uses a number of different sources to study lookouts and beacons used and re-used by the Moroccan and Portuguese/Spanish along the shore of the Strait of Gibraltar, and finds a high density of local sources which likely represents an intersection of different local and micro-regional warning systems that served variable and conflicting needs at different times.

Remains of stone—or brick-built watchtowers have been identified in Middle Bronze Age Syro-Mesopotamia (Earley-Spadoni), in ancient Greece (Bakke), and in medieval Spain (Pancorbo Picó and Galera Pedrosa). So too have stone and wooden towers of the (Western-) Roman Empire located at the frontiers and within their immediate hinterland, which, if placed in isolation, are sometimes fortified by massive fences and ditches that together

47 Kerkhove, “Smoke Signalling Resistance,” p. 14.

FIGURE 1.3 The probable Viking Age beacon site at Hå, Rogaland county in Norway, was heavily modified by a Second World War German coastal lookout, constructed as part of the Atlantic Wall defences.
PHOTO: S. BROOKES

form distinctive archaeological monuments. These sites functioned not only to watch, but also to signal, as is shown by one of the few early instances of pictorial evidence: the Column of Trajan in Rome, which depicts towers with poles bearing torches (Thiel, Williams). In other cases, it is evidence for the act of burning that has been interpreted as the archaeological signature for signalling. At Yatesbury, England, evidence for a possible beacon within an early medieval circular enclosure consists of charcoal-rich and burnt soils found on a flattened prehistoric burial mound (Brookes). In other cases, physical evidence comes from the structures ancillary to beacons. From written sources we know that guardhouses are commonly associated with medieval and post-medieval beacons in Norway (Iversen). One such guardhouse was excavated at Veten in Åsane, Norway, in 2020, containing several layers dating from the 15th to the 20th centuries.[48] Coastal shelters for the night—and day-watch from the same period have also been identified on several windswept headlands and exposed hilltops on the Isle of Man (Johnson). Stone rings—forming the foundations for beacons—are in several cases observed on mountaintops in Norway, and represent yet another feature by which such sites can be identified archaeologically.[49] Such features are not restricted to Scandinavia, and are known also from other parts of the world, including Texas and Mexico.[50]

Depending on the literacy of certain cultures at different times, and whether it was considered necessary or of interest to report on these matters, in some cases preserved written sources can shed light on the use of fire-signals and beacons. Besides the accounts from ancient Greece and Rome mentioned at the beginning of this chapter, a unique example stems from the ancient city-state of Mari in eastern Syria. There, around 1800 B.C., a royal official reported to his king on clay tablets of the lighting of beacons near the frontier (Earley-Spadoni). Several papers gathered here (Iversen, Lemm, Ødegaard) discuss medieval Scandinavian law texts that provide information on the rules and regulations connected with the use of beacons in coastal defence. Early modern sources can also be invaluable. By mentioning beacon sites by name, 17th century Norwegian written documents represent a valuable source for the identification of the actual sites within the landscape (Iversen), and from around this time stem the first maps depicting beacon systems (Figure 1.1).

Beyond written accounts a hugely important source for the study of many regions is place-name evidence, not least as such places can often be closely located in the landscape. Place-names containing the OE elements *weard* "watch" and **tōt* "lookout" often in combination with generics denoting vantage points such as hills or mounds have been extremely valuable for the discussion of beacons in early medieval England (Brookes, Johnson).[51] Equally important are the place-names of Scandinavia (Iversen, Lemm, Ødegaard, Ravn and Juel, Runge and Stauersbøl Mogensen), where, however, a distinction between the terms used for beacons must be made.

48 Øystein Skår and Anbjørg Reinsnos, *Kulturhistoriske registreringar: Registrering av vetetuft, Veten, gnr. 196 bnr. 3, Åsane, Bergen kommune* (Unpublished report) 5 (Bergen: Vestland Fylkeskommune 2020); Geirmund Tryti, *Elle melle, en undersøkelse av vetene i Vestland* (Unpublished master thesis) (Bergen: University of Bergen 2022).

49 Ødegaard, Marie 2024. Database of Norwegian beacon sites. Available at: https://arcg.is/1zPSqi0. See also Conclusion to this volume.

50 See Beers, "Fire and Smoke," p. 28.

51 See full discussion of the etymology of these place-name elements in John Baker and Stuart Brookes, *Beyond the Burghal Hidage. Anglo-Saxon Civil Defence in the Viking Age* (History of Warfare Series) 84 (Leiden: Brill, 2013), pp. 179–99.

In Denmark and Sweden certain place-names are traced back to the Old Danish (OD) *warth* and Old Swedish (OS) *varþer*, which both originally derived from the ON *vǫrðr* meaning "watch", "lookout", "supervision" or "guardianship".[52] Certainly in Denmark, and very likely also in Sweden, such place-names (e.g. Vorbjerg) belong to a stratum dating to the Viking Age or earlier (Lemm). In Norway on the other hand, the oldest term to denote beacons appears to be the ON *viti* meaning "sign, mark, or signal". The term is also used in 13th century OI literature describing events from the Viking Age, and in medieval laws. However, later Danish scribes employed by the Danish-Norwegian king Christian IV misunderstood passages in the latter texts and erroneously introduced *vard/varde* as new designation for beacons in the Norwegian Law from 1604 (Iversen, Ødegaard). In doing so they have complicated modern interpretations, making it difficult to know whether this younger stratum of place-naming represented genuinely new locations identified by *varde*-names, or the renaming of older beacons. Something similar also applies to Denmark and Sweden, where in the medieval period the OD *bākæn* (Dan. *bavn*) and OS *böte* were introduced to denote beacons, and thereby may have substituted the older names deriving from *vǫrðr*.[53]

Moreover, the term *vǫrðr* is also of particular interest in another context. It is mentioned in a slightly different meaning on the 11th century rune stone U 617 at Husby in Uppland, central Sweden (Figure 1.4). According to the inscription, Ginnlaug had the stone raised in memory of her husband Ǫzurr/Assur, son of a certain Jarl Hákon. He was a viking watch (*víkinga vǫrðr*) together with a man named Geitir.[54] Based on this information, we may assume that both men were responsible for the defence of the shores of Lake Mälaren against vikings—i.e. Scandinavian and non-Scandinavian sea-raiders. They presumably played a central role for the organisation of a defence system in the region, which as of yet has not been investigated in detail, but may be deduced from place-names and archaeological evidence with regard to beacons and sea barrages at the lake and its waterway connections with the Baltic Sea.

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52 Bertil Ejder, "Var på din vakt!," *Sydsvenska Ortnamnssällskapets Årsskrift* (1961–62), p. 84; Holger Arbmann, "Svenska vårdkasar," *Föreningen Sveriges Sjöfartsmuseum i Stockholm Årsbok* (1942), p. 11.

53 Bertil Ejder, "Var på din vakt!," p. 98; Jytte Ringtved, "Settlement organization in a time of war and conflict," in *Settlement and Landscape. Proceedings of a conference in* Århus*, Denmark, May 4–7 1998*, ed. Charlotte Fabech and Jytte Ringtved (Højbjerg: Aarhus Universitetsforlag, 1999), p. 368.

54 Samnordisk runtextdatabas 2020, Institutionen för nordiska språk, Uppsala universitet. https://app.raa.se/open/runor.

FIGURE 1.4 Rune stone U 617 at Husby (Bro socken, Bro härad) in Uppland, central Sweden
PHOTO: THORSTEN LEMM

4.2 *Taking a Landscape Systems Approach*

This introduces a further theme developed by multiple contributions: systems of beacons or rather systems of defence, in which beacons played a crucial part. As impressive as individual monuments may be, all beacons – even single, isolated ones—communicated to other sites. Therefore, beacons normally cannot be properly understood in isolation. Instead, the function and significance of these structures can only be appreciated by taking a broader perspective, in both the physical and historical senses. This applies to the positions of beacons in a landscape, their relationships with other sites existing in that landscape, their incorporation within interlinked systems, and the particular historical context in which these systems (may have) functioned.

Consequently, in almost all the contributions of this book there is a great emphasis on situating the sites within their topographic settings to understand how they might have functioned as part of local, regional, national—and on occasion, imperial—military projects. In several cases these approaches make use of Geographical Information Systems (GIS), which greatly enhance our understanding of the systems the beacons were (potentially) embedded in. In particular, analyses focussing on viewsheds and (inter)visibility have expanded the perspective to consider the relationships that may have existed between 'sites'.

Intervisibility and viewshed analysis are often used to study the distance between beacons and their line-of-sight as well as the efficiency of beacon networks.[55] In their paper, Mads Runge and Mette Stauersbøl Mogensen test one such system in Denmark, by conducting archaeological experimental work lighting fires at potential beacon sites. This demonstrated that the beacons were probably part of a network and that this must have been an effective communication system in the 10th to 12th centuries.

Common to all the papers in this book is the belief that systems of defence can be uncovered through the close study of sites in their landscapes. Both of these factors—the systemness of defensive structures, and their relationships to the lie of the land—make abundant military sense. Many authors also, whether explicitly or implicitly, deploy military concepts to try and understand sites and their settings and the probable strategic rationale behind them. In many of the examples described, sites are demonstrably located on important roads or waterways, are intervisible with each other, or can be associated with specific strongholds, linear defences, landing places, stations of warships or fighters, locations for dragging ships across land or sea barrages, etc., underlining their use within systems of surveillance or defence.

Defence systems incorporating these elements require a great deal of logistical support and administration, that from an archaeological point of view may be deduced from the positions of the sites, their character—watching and signalling posts, fortifications, military units, communication routes—and their correlations with each other. Additionally, in certain cases written sources can provide more detailed information on mustering sites and military cohorts as well as rules and regulations regarding military service. This is for example the

55 See e.g. Stephen Kay and Timothy Sly, "An application of Cumulative Viewshed Analysis to a medieval archaeological study: the beacon system of the Isle of Wight, United Kingdom," *Archeologia e Calcolatori* 12 (2001), pp. 167–79; Tiffany Earley-Spadoni, "Landscapes of warfare: Intervisibility analysis of Early Iron and Urartian fire beacon stations (Armenia)," *Journal of Archaeological Science: Reports* 3 (2015), pp. 22–30. doi: 10.1016/j.jasrep.2015.05.008; Jianfeng Zhu, Yueping Nie, Huaguang Gao, Fang Liu and Lijun Yu, "GIS-Based Visibility Network and Defensibility Model to Reconstruct Defensive System of the Han Dynasty in Central Xinjiang, China," *ISPRS International Journal of Geo-Information* 6, no. 8 (2017), p. 247. doi: 10.3390/ijgi6080247; Thorsten Lemm, "Protecting Hedeby – Reconstructing a Viking Age maritime defence system based on visual communication," in *Early medieval waterscapes: risks and opportunities for (im)material cultural exchange*, ed. Rica Annaert (Neue Studien zur Sachsenforschung) 8 (Wendeburg: Verlag Uwe Krebs, 2019), pp. 101–14; Stephen Edwards, "On the Lookout: Directional Visibility Cones and Defence in the Nebo Region, West-Central Jordan," *Open Archaeology* 6, no. 1 (2020), pp. 2–18. doi: 10.1515/opar-2020-0002.

case with the so-called *leiðangr*—the maritime troop levy serving both attack and national defence—which is documented in late 12th- and 13th-century legal texts from all three Scandinavian kingdoms. In combination with place-names and archaeological sites these medieval texts not only provide insights into the administration and logistics of contemporary coastal defence, but may potentially also allow retrospective conclusions concerning Viking Age correlations (Iversen, Lemm, Ødegaard). Mads Ravn and Christian Juel in their paper suggest that a number of beacons along the coast may have been part of a system to defend the aristocratic settlement at Erritsø in Denmark. This indicates how beacons should be regarded as components of landscapes of power, as addressed further below.

Moreover, by looking more closely at beacons themselves differences in function and significance can be determined. With a 17th century document as starting point, for example, Iversen differentiates between main and secondary beacons based on their different character, location, and supporting infrastructure, and thereby establishes hierarchies of beacons in western Norway. Judging from their locations and a presence or absence of intervisibility between them, a hierarchy can sometimes be determined even without written evidence. This is the case, for example, when main beacons on the coast convey a message from the mouth of an inlet or fjord back and along the waterway, with further beacons branching off this chain with the purpose of informing the hinterland (Lemm, Ødegaard). Brookes similarly contrasts linear beacon chains and 'nets' of areal coverage, which in the case of early England might be connected to chronological changes in the organisation of civil defence. Johnson is able to show how a watch-keeping system on the Isle of Man operated on a parochial basis, with hilltops at different heights and distances in use at day and/or night.

In the absence of precise archaeological dating for beacons, their actual period of active use and thus also that of the defence systems in which they were integrated can often only be viewed against a broad historical background. However, defensive strategies were designed to meet very particular threats, and these could be very politically and militarily contingent. Only in rare cases does a closer link to historical events or phases succeed: Jørgen Bakke for example places the system of Greek watchtowers of the territory of Tegea within a specific chronological window. Likewise, Brookes suggests that different systems of beacons can be identified within the corpus of OE beacon-names relating to different phases of conflict. But often, the system worked over decades and changed according to circumstances, thus making it difficult to date (the different parts of) the system.

5 Responses to Threats and War

While this book is ostensibly about non-verbal long-distance communications many of the contributors focus on this in the context of civil defence. In this regard it is worth emphasizing also the psychological dimensions that defensive systems engender. Beacons are not just physical entities, they express also broader concerns spanning fear, preparedness, resilience, and information gathering. Although historical research has provided profound knowledge of war and social and military organisation, it has to a lesser extent studied societies' responses to fear, particularly the efforts of risk reduction that lead to community resilience; the sustained ability of a community to use available resources to respond to, withstand, and recover from adverse situations.[56]

War and conflict have social, political and cultural effects on any given society and these effects can last a long time. Cultural trauma shapes collective identity and leaves psychological scars. This is especially true of conflicts that threaten the very survival of a group.[57] War, conflict and fear also transform material lives and can be fixed in the landscape. It may affect generations to come, and as such can also be harnessed for politico-military projects. A militarisation of the landscape may take place, resulting in the building of fortifications and defences, sometimes transforming the whole landscape and society to centre around war or its constant threat in which violence and its material and social structures are replicated and reproduced at each level of society.[58] The idea of war thus creates new architectures of fear. The materiality of violence often becomes a symbol of strength and group solidarity, in addition to being a physical manifestation of power relations within societies. Some places thus symbolise the power of specific groups (often at the expense of others), thereby reinforcing and recreating social identities. The investments in the landscape or the materiality of conflict in the form of infrastructure, such as signalling sites and fortifications, may be a critical source or resource for the negotiation of power relations in human society.[59] There has been, however, a focus on the built aspect of the landscape, and not the emotional aspect; how

56 Lee Bosher and Ksenia Chemuta, *Disaster Risk Reduction for the Built Environment* (Oxford: John Wiley & Sons Ltd., 2017), p. 32.

57 Alfredo González-Ruibal, "War between neighbours: the archaeology of internal conflict and civil war," *World Archaeology* 51, no. 5 (2019), pp. 641–53. doi: 10.1080/00438243.2020.1760475.

58 González-Ruibal, "War between neighbours," p. 644; Ikehara-Tsukayama and Ruix, "Landscapes of People".

59 Ikehara-Tsukayama and Ruix, "Landscapes of People," p. 6.

the landscape as well as social boundaries and community-identities, were shaped by perceptions of fear and threat.[60]

Fear can be eliminated with preparation, making civil defence and militarism important drivers for the organisation and coordination of people from local to regional levels. In conflicts within and between societies, such political fear can cross social boundaries. Under conditions of fear, the pursuit of actions that ensure survival will reign supreme. Fear can harm people's collective well-being, alert them to danger, and drive them to act.[61] There are opportunities for collective renewal when facing threats, when standing together facing a common enemy. As such, fear is an important instrument of political rule that can be used to reduce conflict.

However, fear can also be used as a political instrument by leaders: to manipulate it for specific political goals or moral and political beliefs, or both. Leaders can use fear to ensure we stay in thrall to fear.[62] They may heighten the perception of threats to make others agree to wage war or build fortification systems. Fear, and thus ultimately instilling terror in a targeted population, or on the battlefield, can also be used as a strategy towards the enemy, making them more likely to make fatal mistakes or even surrender.[63] Signalling, both visual and audible, can boost morale, but it could also be a tool to deceive and terrify the enemy, as mentioned in the examples of North American and Australian indigenous groups. Walking into enemy land would surely have been terrifying if accompanied by trumpets and horns, signalling the moment when an enemy might strike.[64] The same can be said about e.g. the campaign when the Assyrian king Sargon II went with his army into the Urartu kingdom, in modern-day Turkey, Armenia, and Iran, in 714 B.C., in which beacons were lit on the mountains as they passed through the land, as described in Earley-Spadoni's article.

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60 Ikehara-Tsukayama and Ruix, "Landscapes of People," p. 7.

61 Corey Robin, *Fear: The History of a Political Idea* (Oxford: Oxford University Press, 2004), p. 3; Nayef Al-Rodhan, "A Neuro-Philosophy of Human Nature: Emotional Amoral Egoism and the Five Motivators of Humankind," *Blog of the APA*, 2019. Accessed 06.02.2024. https://blog.apaonline.org/2019/04/04/a-neuro-philosophy-of-human-nature-emotional-amoral-egoism-and-the-five-motivators-of-humankind/.

62 Robin, "Fear," p. 2–16; see also Daniel Kapust, "On the Ancient Uses of Political Fear and Its Modern Implications," *Journal of the History of Ideas* 69, no. 3 (2008), pp. 358–59.

63 Roger Petersen and Evangelos Liaras, "Countering Fear in War: The Strategic Use of Emotion," *Journal of Military Ethics* 5, no. 4 (2006), pp. 317–33.

64 See ethnographic descriptions in Kershove, "Smoke signalling resistance," p. 16; see also Goodman, *Sonic Warfare*, p. 65.

While fear as it seems is more or less universal—it is one basic emotion shared by almost all beings[65]—strategies to counter fear are not, and these strategies might change in time and space. Beacon signalling to prepare for attack is an effective way to counter fear. As Gold and Revil argue, fear is a social practice that can be expressed in the landscape, and leaders and people can "use cultural politics of fear and rhetoric strategies" to "justify oppression and articulate resistance".[66] By this it is possible to understand how landscapes are often used for ordering the world where it gives some people security (however, often at the expense of others) and gives leaders and other groups a renewed power.

6 Conclusion

The discussion above has shown that, more than other features and elements of landscapes of defence, beacons require a holistic approach to identify, analyse and understand them. The papers assembled in this book provide multiple examples of how to conduct such an approach, even if there is no clear consensus on what constitutes the 'proper' study of these interesting and often underrated cultural monuments. For many, situating sites in their landscape context—whether GIS-enabled or not—constitutes an important methodological approach. For others, the close reading of individual monuments or artefacts is paramount. What hopefully emerges from this book is how fruitful this topic can be across different places, times and historical circumstances. Although warfare and threats have different backgrounds, and are mediated by different people, political systems, natural conditions and contexts of conflict, there are nevertheless parallels and comparisons that can be drawn.

Acknowledgements

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65 John R. Gold and George Revil, "Exploring landscapes of fear: marginality, spectacle and surveillance," *Capital & Class* 27, no. 2 (2003), pp. 27–50. https://doi.org/10.1177/030981680308000.
66 Gold and Revil, "Exploring landscapes of fear".

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CHAPTER 2

Towers Built upon the Mountain Peaks: Communicating at the Speed of Light in the Ancient Middle East

Tiffany Earley-Spadoni

1 Introduction

Around 1800 B.C., in the ancient city-state of Mari, a scribe pressed his stylus rapidly into damp clay, composing an urgent letter to the king. The tablet, excavated thousands of years later in eastern Syria, revealed a desperate plea for reinforcements.[1] An official named Bannum had stopped at a waystation while traveling north and watched with growing dread as the beacons of nearby communities were lit one by one near Terqa. The signals had a single agreed-upon meaning: danger was brewing on the fringes of the city-state. Bannum urged the king and city officials to reinforce Mari's defenses and increase their vigilance.

Thus, the system functioned as intended: to provide a high-speed early warning system for the cities and towns of the region. The dramatic letter, along with others from Mari, represents the earliest known historical evidence for fire beacon signaling. Archaeological evidence confirms that these did not operate in isolation. These signaling platforms were integral components of holistic systems of regional defense and control organized along roads. The fortifications, fortresses, and fire beacons were strategically placed to create a network of protection and communication, allowing the city-state of Mari to expand its control and defend itself against threats. Textual and archaeological evidence paints a vivid portrait of the past, where fire beacons operated as a warning system in tandem with networks of forts and fortresses distributed across the landscape.

This chapter examines the historical and archaeological evidence for fire beacon signaling in various cultural and geographical contexts of ancient Syro-Mesopotamia. Evidence suggests that fire beacons were components of

1 Georges Dossin, "Signaux lumineux au pays de Mari," *Revue d'Assyriologie et d'Archéologie Orientale* 35 (1938), no. 3/4, pp. 174–86.

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integrated defensive networks. Therefore, I will discuss the earliest evidence for fortified regional networks (FRNs) and rural systems of defense, known from Middle Bronze Age Syria (*c.*2000–1600 B.C.), followed by a description of the more elaborate systems constructed during the early first millennium B.C. empire of Urartu (9th to 7th centuries B.C.). The beacon communication systems were embedded in complex, large-scale defense systems that functioned in various ways, including controlling routes, resupplying military personnel, transmitting information, and tracked movement through the territory. The templates of regional defense, first developed in the ancient Middle East, were later adopted, modified, and employed by a wide variety of subsequent state makers in Western Asia and beyond, as witnessed by the diversity of systems described in the present volume.

1.1 *Archaeological Evidence: Fortified Regional Networks*

The ancient Middle East is renowned for being the place where empires first developed, but what is less appreciated is that the formation of large and enduring states required development over time. Historians have argued that late third millennium Mesopotamian polities were "presumptive states," typified by ambitions to govern vast territories but lacking the administrative infrastructure to do so.[2] The capacity for state management at scale was deficient in the Syro-Mesopotamian sphere until the latter half of the second millennium B.C., when larger and more durable states began to develop.[3] The observed shift from a largely aspirational claim of governed territories to increasingly realized sovereignty was a pivotal moment in history. Indeed, a transformation of such magnitude prompts the query: What occurred in the second through early first millennia B.C. that permitted ancient state makers to administer their vast geographical holdings more effectively? Arguably, the emergence of practical ways to subdue and administer extra-urban territories was an innovation that allowed for the development of increasingly large states.

2 Seth Richardson, "Early Mesopotamia: The Presumptive State," *Past & Present 215* (2012), no. 1, pp. 3–49.

3 Bleda S. Düring, The Imperialisation of Assyria: An Archaeological Approach (Cambridge: Cambridge University Press, 2020); Claudia Glatz, The Making of Empire in Bronze Age Anatolia: Hittite Sovereign Practice, Resistance, and Negotiation (Cambridge: Cambridge University Press, 2020).

2 Evidence from Middle Bronze Age Syria (*c.*2000–1600 B.C.)

Syro-Mesopotamia in the Middle Bronze Age (MBA) was a land of highly fortified city-states that competed for regional supremacy amid constant conflict.[4] Siege warfare was central to the combat of the era, due to the prominence and wealth of cities. Attacks on cities would have served to destabilize the power structure of polities and provide invaders access to their wealth. The few territorial states that arose in the MBA tended to be fragile, characterized by a rapid rise followed in short order by collapse.[5]

During the Middle Bronze Age (MBA), two distinct styles of fortified landscapes emerged. The first is the "city-as-fortress," characterized by urban complexes with exaggerated fortress-like features such as massive city walls, like those of the city of Mari. The second is a regional, rural system consisting of fortresses, forts, wall segments, and towers, organized along roads and at river crossings, known as the "fortified regional network" (FRN). These urban and rural fortification systems were not mutually exclusive and were employed in tandem.

Evidence for the intensification of elaborate city defenses in the early second millennium has been widely identified in synthetic studies of Syrian and Levantine fortifications[6] The marked increase in city defenses preceded a subsequent uptick in rural, regional FRNs. Evidence suggests that networks of watchtowers began to be constructed in the hinterlands of city-states during the MBA to promote the defense of their territories, a development mirrored in the Mari letter that prefaces this chapter. By the Late Bronze Age (*c.*1600–1200 B.C.), sites featuring watchtowers, termed *magdalu*, were abundant in Levantine contexts, indicating the increasing prevalence of such systems.[7] Furthermore, evidence suggests that several stand-alone watchtowers may have expanded

4 Glenn M. Schwartz, "An Amorite Global Village: Syrian-Mesopotamian Relations in the Second Millennium B.C," in *Cultures in Contact: from Mesopotamia to the Mediterranean in the Second Millennium BC*, eds. Joan Aruz, Sarah B. Graff and Yelena Rakic (New York: Metropolitan Museum of Art, 2013), pp. 1–11.

5 Norman Yoffee and Andrea Seri, "Negotiating Fragility in Ancient Mesopotamia: Arenas of Contestation and Institutions of Resistance," in *The Evolution of Fragility: Setting the Terms*, ed. Norman Yoffee (Cambridge: McDonald Institute for Archaeological Research, 2019), p. 189.

6 Aaron Burke, *Walled Up to Heaven: the Evolution of Middle Bronze Age Fortification Strategies in History and Prehistory* (Eisenbrauns: Winona Lake, IN, 2008).

7 Aaron Burke, "'Magdalūma, Migdālîm, Magdoloi', and 'Majādīl': The Historical Geography and Archaeology of the 'Magdalu (Migdāl),'" *Bulletin of the American Schools of Oriental Research* 346 (2007), pp. 29–57.

into fully fledged settlements.[8] Given the suggestive evidence, it is possible that watchtowers provided an impetus for the nucleation of habitation in certain circumstances.

The Arid Margins of Northern Syria Project, directed by Nazir Awad (Direction Générale des Antiquités et des Musées de Syrie), Bernard Geyer (Archéorient, Maison de l'Orient et de la Méditerranée, Université Lumière, Lyon), and Ronald Jaubert (Graduate Institute of International and Development Studies, Genève), has provided valuable insights into the study of fortified regional networks (FRNs) through its archaeological survey of a 7000 km^2 region east of Hama in modern-day Syria.[9] The project, conducted between 1995 and 2002 with a final verification mission in 2010, focused on uncovering traces of rural, regional FRNs. The team identified over 100 individual elements of FRNs, including forts, fortresses, large and small watchtowers, and fortified settlements dating to the MBA. The fortified structures were organized along roads and were positioned at regular intervals of approximately 20 km apart, allowing forts and fortresses to function as intervisible waystations along the roads. The consistent spacing and positioning of these structures indicate that they played a significant role in controlling and facilitating communication within the region during their time of construction. Ultimately, the research team concluded that the structures were organized into coherent and hierarchical networks that included fire beacon signaling capabilities.

The textual evidence from the ancient city-state of Mari provides additional insight into the systematic fortification of hinterlands as a means of control and expression of sovereignty. The letter from a scribe to the king, which reports trouble brewing on the fringes of the city-state, highlights the importance of fortifications and fire beacons in maintaining control over these regions. Such a finding is consistent with the understanding that fortified regional networks—including forts, fortresses, and fire beacons—can promote expansionary state formation. Namely, the presence of FRNs enables the establishment of effective communication networks, which facilitate the dissemination of information and coordination of military and administrative activities, thereby consolidating the state's power and expanding its control over neighboring regions.

The FRN served as a specific and useful template of fortified structures and secured road systems that was borrowed, repeated, and elaborated upon in

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8 Burke, *Walled Up to Heaven*, p. 35.

9 Marie-Odile Rousset, Bernard Geyer, Nazir Awad and Shadi Shabo, "Un réseau défensif de l'âge du bronze moyen dans les marges arides de Syrie du nord." *Paléorient* 43 (2017), no. 2, pp. 115–63.

subsequent periods in the ancient Middle East. The Neo-Assyrian empire, for instance, expanded its control over neighboring regions by using heavily fortified towns and cities, rather than forts and fortresses, as the hubs in its frontier regions. By strengthening its urban centers and establishing a network of fortified cities along key roads and at river crossings, the empire exerted control over its territories by monitoring and discouraging the emergence of local resistance.

3 Evidence from the First Millennium B.C.

According to conventional narratives, the early first millennium in the ancient Near East was dominated by the Neo-Assyrian empire, an assertion that is only partially true.[10] In reality, two large states comprised a twin imperial system, Assyria and Urartu (Figure 2.1).[11] The former was a more or less traditional

FIGURE 2.1 Urartu and Assyria in the early first millennium B.C.
ILLUSTRATION: TIFFANY EARLEY-SPADONI

10 Marc Van De Mieroop, A *History of the Ancient Near East, ca. 3000–323 BC*. 3rd Edition (Malden, MA: Wiley Blackwell, 2016).

11 Karen Radner, "Assyrians and Urartians," in *The Oxford Handbook of Ancient Anatolia: (10,000-323 BCE)*, ed. Sharon R. Steadman and Gregory McMahon (Oxford: Oxford University Press, 2011), pp. 734–51.

empire: urban-centered with vast, rural agricultural holdings.[12] It encompassed a large portion of the ancient Middle East at its maximum extent, spanning from locations along the Mediterranean Sea in the west to the Persian Gulf in the east.

Instead, Urartu, situated in the imposing highlands of modern-day Turkey, Armenia, and Iran, was a non-urban and highly decentralized region. Its many loci of power consisted of hundreds of modestly sized forts and fortresses rather than being concentrated in massive imperial cities, as was the case with Assyria. Arguably, the placement of many forts and fortresses across a vast territory contributed to the empire's longevity since its wealth and power were distributed rather than concentrated. For most of its history, even the largest of Urartian fortress complexes measured a few hectares at most. Thus, the organizational principle of Urartu was that of the FRN, which made it an unusual case of empire. The Urartian state may have initially coalesced in response to the threat posed by the Assyrian menace; still, it quickly evolved into a unique expansionary empire that successfully opposed its nemesis for centuries.

Evidence from north-western Iran suggests that stand-alone watchtowers were a vital part of the signaling capacity of the Urartian empire, connecting fortresses with poor visibility to the network. One such example is the watchtower at Qalatgah, a large Urartian fortress located in Iranian Azerbaijan.[13] The visibility from the fortress itself is generally poor, and the massive site is not intervisible with the other Urartian structures distributed across the landscape. However, there is a sizable watchtower, approximately twenty meters by twenty meters, situated at the summit of a serpentine path above the fortress, which effectively connects the fortress with other forts and fortresses in the vicinity. The Urartian fortress of Bastam, also located in northwestern Iran, was provisioned with a watchtower similar to the one at Qalatgah, a feature that undoubtedly helped enhance the primary fortress's intervisibility with other sites in the region.[14]

In other regions of Urartu, the fire beacon capabilities were embedded within forts and fortresses rather than constructed as stand-alone watchtowers. A GIS-mobilized investigation of Pre-Urartian and Urartian forts and fortresses near the high alpine Lake Sevan in modern-day Armenia demonstrates that these sites were strategically placed with visual intervisibility

12 Jason Ur, "Physical and Cultural Landscapes of Assyria," in *The Blackwell Companion to Assyria*, ed. Eckart Frahm (Oxford: Wiley-Blackwell, 2017), pp. 13–35.

13 Wolfram Kleiss and Stephan Kroll, "Urartäische Plätze in Iran," *Archäologische Mitteilungen aus Iran* 10 (1977), p. 71.

14 Wolfram Kleiss, *Bastam I: Ausgrabungen in den Urartäischen Anlagen 1972–1975* (Berlin: Gebr. Mann Verlag, 1979). Wolfram Kleiss, *Bastam II: Ausgrabungen in den Urartischen Anlagen 1977–1978* (Berlin: Gebr. Mann Verlag, 1988).

in mind.[15] That is, the "connectedness" observed between them does not refer to roads or physical infrastructure but rather to their ability to see and signal to one another across the landscape. An intensive study of viewsheds between known archaeological sites in both the Early Iron (Pre-Urartian) and the subsequent Urartian periods suggests the deliberate creation or enhancement of fire beacon signaling networks. The 27 sites of the Early Iron period showed a dense web of intervisibility (Figure 2.2). In comparison, the 15 sites dating to the Urartian period also demonstrated a high degree of connectedness (Figure 2.3). In these visualizations, the forts and fortresses are depicted as points, while lines connecting them represent lines of sight.

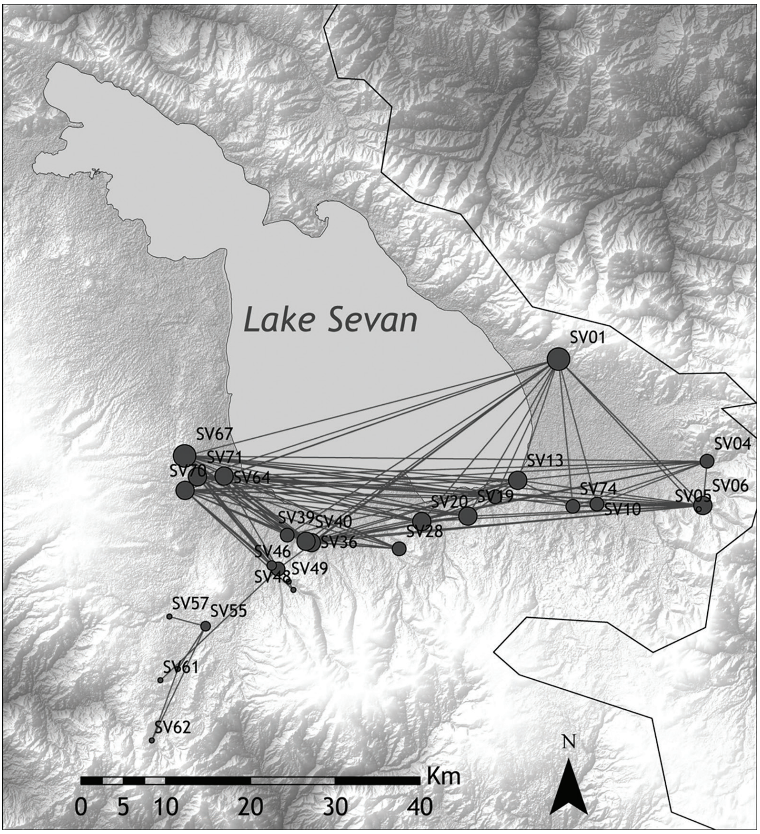

FIGURE 2.2 Intervisibility of Early Iron (Pre-Urartian) forts and fortresses near Lake Sevan, Armenia
ILLUSTRATION: TIFFANY EARLEY-SPADONI

15 Earley-Spadoni, "Landscapes of Warfare: Intervisibility Analysis of Early Iron and Urartian Fire Beacon Stations (Armenia)," *Journal of Archaeological Science: Reports* 3 (2015), pp. 22–30.

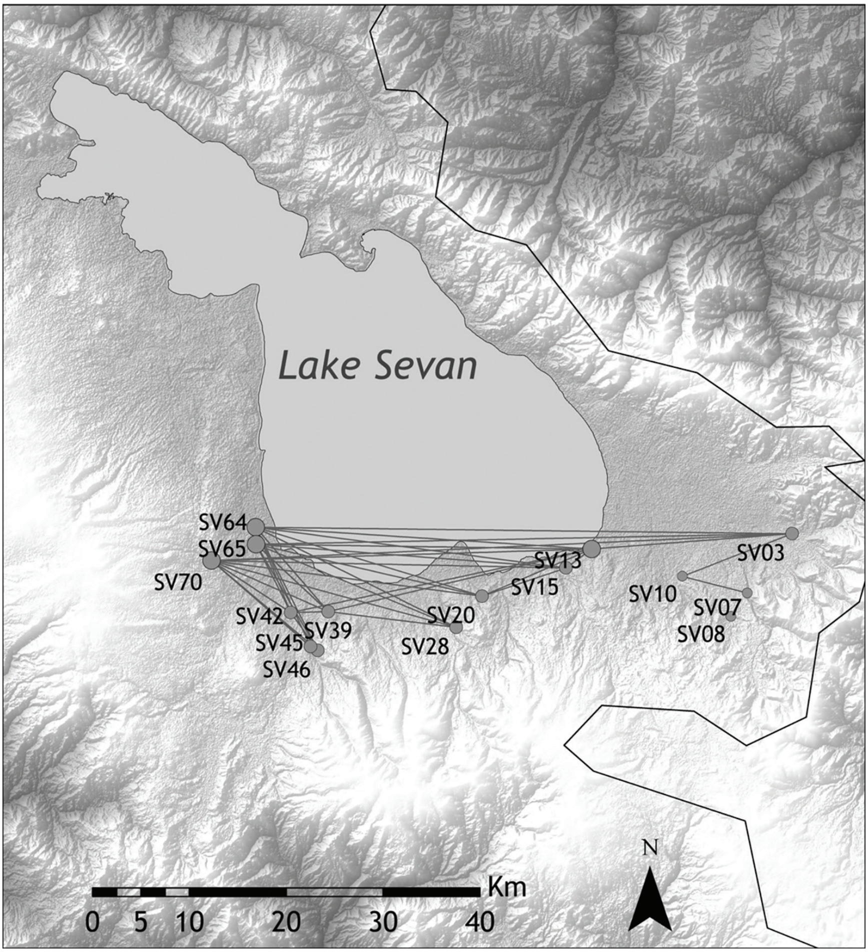

FIGURE 2.3 Intervisibility of Urartian Forts and Fortresses near Lake Sevan
ILLUSTRATION: TIFFANY EARLEY-SPADONI

The GIS analyses were supplemented with statistical verification methods, including Kolmogorov-Smirnov testing. The verification procedure involved creating populations of randomly generated sites located in the highly visible lake basin (n = 100). In other words, a computer simulation generated 100 sets of 27 randomly located sites for the Early Iron period and 100 sets of 15 sites for the Urartian period. Both the randomly generated sites and the archaeological sites were subsequently tested for Social Network Analysis (SNA) characteristics, such as redundancy and isolates, since it was hypothesized that the fortified sites were intentionally arranged to form a telecommunications network. The control populations of randomly generated sites were evaluated to assess whether they demonstrated the same intervisibility, connectivity, and redundancy by chance. Given the extreme differences between the discovered archaeological sites and the randomly generated lakeside locations, the study concluded that the archaeological sites had been intentionally arranged to create a fire beacon communication system, a conclusion bolstered by the textual evidence described below.

One unexpected finding of the Lake Sevan study described above was that the observed FRNs were not an innovation of the Urartian empire, since elaborate systems of intervisibility predated the Urartian annexation of territories.[16] Instead, the Urartian empire pragmatically and economically co-opted and improved existing networks, a pattern repeated to varying degrees in the sixteen regions analyzed as part of the larger study.

4 Other Historical Sources

In addition to the well-documented case of Mari, there are other textual references to fire beacon signaling. The distribution of these references across space and time suggests that it was a widespread and persistent cultural practice. An Old Babylonian (*c.*1800 B.C.) divination text employs beacon lighting as a metaphor for doom, while a Neo-Babylonian (6th century B.C.) letter mentions that the writer sent a message via fire signal.[17] There are references to fire communication in the Hebrew Bible in Jeremiah 6:1 and Judges 20:38.[18] A vivid Lachish letter warns of the imminent arrival of the Babylonians, remarking that the writer would watch for news of his tragic end by Lachish's fire beacon network.[19]

Along with the letter that prefaces this chapter, the most vivid source related to fire signaling is the long and richly textured Assyrian text known as "The Eighth Campaign of Sargon II." The complex composition, presented as a letter to the chief god of Assyria, defies modern categories of genre classification due to its combination of disparate elements, including state propaganda,

16 Earley-Spadoni, *Envisioning Landscapes.*

17 Earley-Spadoni, *Envisioning Landscapes,* p. 201.

18 New Revised Standard Version.

19 Oded Borowski, Burgess F. Howell and Thomas L. Sever, "Communication by Fire (and Smoke) Signals in the Kingdom of Judah," *NASA Technical Reports Server.* Available at https://ntrs.nasa.gov/citations/19980237255. Accessed 2023 Feb 15.

royal apology, historical argument, and religious celebration, all delivered in a high literary style.[20]

The text describes a military expedition conducted by the Assyrian king Sargon II in 714 B.C. The Assyrian army set out from modern-day Iraq, crossed a high pass in the Zagros Mountains, and entered territories in modern-day Iran to assist their vassals and allies, the Manneans. The Assyrians then marched north to the area near Lake Urmia, where they faced the Urartians. The text, written from the invaders' perspective, ridicules their nemesis by questioning their skill and bravery. To achieve this, they used a common Assyrian insult, comparing their adversaries to women. Despite a general tendency to belittle their enemies, the Assyrian narrative describes certain aspects of the Urartian landscape in admiring or even glowing terms, such as the portrayal of abundant orchards dripping with fruit like raindrops.

In advance of the arrival of the Assyrian troops, the text describes the lighting of the Urartian beacons, which illuminated the clustered mountain peaks like stars in the sky with their multitudinous, "towers … built upon the mountain peaks." The text also helpfully provides the information that stores of wood were kept ready both day and night for this purpose, implying that both daytime smoke and nocturnal fire signaling were employed.[21]

Historical texts indicate that fire beacon communication provided the distinct advantage of being rapid; however, the messages were less complex compared to other methods, such as letters or envoys. The writer of one Mari letter even complained that his intended fire beacon message was misunderstood.[22] Furthermore, all historical attestations of fire beacon communication from the ancient Middle East reference its use to summon aid in times of danger, rather than other applications known in later historical periods, such as communicating the safe arrival of boats in port.

20 Paul Zimansky, "Urartian Geography and Sargon's Eighth Campaign," *Journal of Near Eastern Studies* 49, (1990), no. 1, pp. 1–21; Mario Fales, "Narrative and Ideological Variations in the Account of Sargon's Eighth Campaign," in *Ah, Assyria: Studies in Assyrian History and Ancient Near Eastern Historiography Presented to Hayim Tadmor* (*Jerusalem 1991*), eds. Mordechai Cogan and Israel Eph'al (Jerusalem: Magnes Press, 1991), pp. 129–47; Marc Van De Mieroop, "A study in Contrast: Sargon of Assyria and Rusa of Urartu," in *Opening the Tablet Box: Near Eastern Studies in Honor of Benjamin R. Foster,* ed. Sarah Melville and Alice Slotsky (Leiden: Brill, 2010), pp. 417–34.

21 Tiffany Earley-Spadoni, "Danger in the Mesopotamian Night: Mitigating Peril in the Heartland of Cities," in *After Dark: The Nocturnal Landscape and Lightscape of Ancient Cities*, ed Nancy Gonlin and Meghan E. Strong (Boulder: University Press of Colorado, 2022), pp. 50–70.

22 Dossin, "Signaux lumineux au pays de Mari," p. 183.

Although they do not refer to fire beacon signaling, administrative letters sent to and from Assyrian officials allow scholars to reconstruct the development of other communication networks that emerged along roads, possibly in response to the limitations of fire beacon communication.[23] Assyrian roads were highly organized and staffed with a variety of specialized officials, including a postmaster. Official state messages were conveyed by horse relays using a dedicated system of forts that lined the central corridors. The same infrastructure was also used to collect and distribute espionage reports on the empire's periphery. Specific reports imply that spy administrators collected information directly from fort personnel in some instances. One wonders if the ability to communicate complex messages with stealth, versus public fire and smoke signals, drove the development of an efficient system of relayed messages along the roads of Assyria.

5 Conclusion

By way of historical coda, Herodotus described the famed king's road known from the Persian empire (*c*.550–330 B.C.) in detail in his *Histories*.[24] The highway was celebrated for a variety of marvels and conveniences located along its route.[25] The small forts that lined the road at regular intervals served as waystations and provided relay points for a message relay system. A system of fire beacon signals was another wonder of the road, a claim supported by archaeological evidence from Anatolian sites.[26] The organized system of regional security, an FRN like the ones discussed above, was the culmination of historical development over centuries in the ancient Near East. Once assembled, the template for extra-urban defense and control was widely adopted by would-be state builders and adapted for their own use.

The assembly of FRNs, which included fire and smoke beacons, involved both top-down and bottom-up dynamics. In the case of Urartu, the existence of such networks before the rise of the state demonstrates their local origins.

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23 Earley-Spadoni, "Fortified Roads as Communication and Defence Networks in the Ancient Near East." In *Global Perspectives to Landscapes of Warfare*, ed Hugo C. Ikehara-Tsukayama and Juan Carlos Vargas Ruiz (Boulder: University Press of Colorado, 2022), pp. 145–50.

24 Herodotus, "Book V." *The History of Herodotus,* trans. George Rawlinson. Available at http://classics.mit.edu/Herodotus/history.5.v.html. Accessed 2023 Feb 15.

25 Earley-Spadoni, "Fortified Roads," pp. 139–40.

26 Elspeth R. M. Dusinberre, *Empire, Authority and Autonomy in Achaemenid Anatolia* (Cambridge: Cambridge University Press, 2013).

Communities appear to have developed these systems to protect their territories, coordinate responses to threats, and assert autonomy. Governing powers later recognized their value and incorporated them into broader strategies of territorial control. Ethnographic and cross-cultural studies demonstrate that fire and smoke beacons have served a range of purposes, including celebration, maritime signaling, commemoration, and fostering community cohesion.[27] In the ancient Middle East, however, all documented references relate specifically to summoning aid or signaling danger. While the textual record is incomplete and may not capture the full range of uses, and although secondary uses for other reasons surely existed, the available evidence strongly suggests that military and emergency signaling were their dominant functions.

Fortified regional networks facilitate expansionary state formation by enabling more effective communication and control. The presence of these fortifications allows for the establishment of secure networks, promoting the dissemination of information and the coordination of military and administrative activities. In turn, reliable communications can assist in consolidating state power and expanding its control over neighboring regions. Finally, one can hypothesize that FRNs played a crucial role in the formation of early empires, as the construction and maintenance of these networks enabled effective communication and control over distant regions.

The FRN was one of the innovations that enabled Syro-Mesopotamian polities to expand their dominion beyond their city walls, not just invading but effectively annexing and administering progressively larger territories.[28] Communities in the ancient Middle East developed multi-tier regional fortification systems, composed of fortresses, forts, towers, and wall segments, similar to those discussed above, to enable them to impose sovereignty efficiently and economically in newly acquired territories. While FRNs as defensive structures date back to earlier periods, I suggest that the use of the FRN as an expansionary tool was an innovation of the second millennium B.C. that eventually allowed for the creation of the Neo-Assyrian, Urartian, and Persian empires, the largest states the world had ever known up until that point. It took ancient state makers several centuries to refine their template of regional fortifications. Still, once perfected, the FRN became a powerful and enduring instrument used for regional protection and imperial expansion. Thus, the fire beacon was a critical

27 Earley-Spadoni, "Landscapes of Warfare: Intervisibility Analysis of Early Iron and Urartian Fire Beacon Stations (Armenia);" see also the Introduction to this volume.

28 Earley-Spadoni, "Fortified Roads"; Earley-Spadoni, "*Landscapes of Warfare: Urartu and Assyria*".

component of a more holistic strategy to defend and control the extensive geographical holdings of the world's first significant and enduring territorial states and empires.

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CHAPTER 3

Military Communication Tools from Iron Age Western Europe

Alexandre Bertaud

Movable beacons were used to transmit information through visual and acoustic signals, especially in the conduct of warfare. While such a statement may be regarded as axiomatic, from an archaeological perspective there are challenges to understanding the use of objects related to ephemeral aspects such as music or signalling, especially when these objects were portable. This paper will focus on the analysis of movable military beacons in western Europe where several types have been found dating to the Late Iron Age (5th to 1st century B.C.). Some movable beacon tools are known from iconography and archaeology, such as the well-known carnyx used by Gallic people. In order to better understand these practices, it is worth considering the wider European continent during the last centuries B.C. I will therefore examine the vectors of sound and visual transmissions in order to understand the place of these instruments in the military organisation of Iron Age societies in Iberian, Celtiberian and Gallic areas.

1 Acoustic Communication

In military contexts, acoustic communication requires the use of specific sound instruments in order to be effective. The clash of weapons and warriors generates sound pollution, and the distance between warriors can make it difficult to give direct orders by voice. Nevertheless, the transmission of information during combat can be vital to ensure the victory, or at least survival.

Various musical instruments are known to have been used in military contexts; however, the archaeological record has only preserved certain types, notably those made from inorganic materials. There were almost certainly other types made of perishable materials that have not survived. From the Celtiberian domain of central-north-eastern Iberia ceramic trumpets are known (Figure 3.1). These consist of a ceramic tube bent back on itself to form a loop. The bell may be painted red in the tradition of painted ware, and sometimes they take a zoomorphic form. The mouthpiece has a circular rim and

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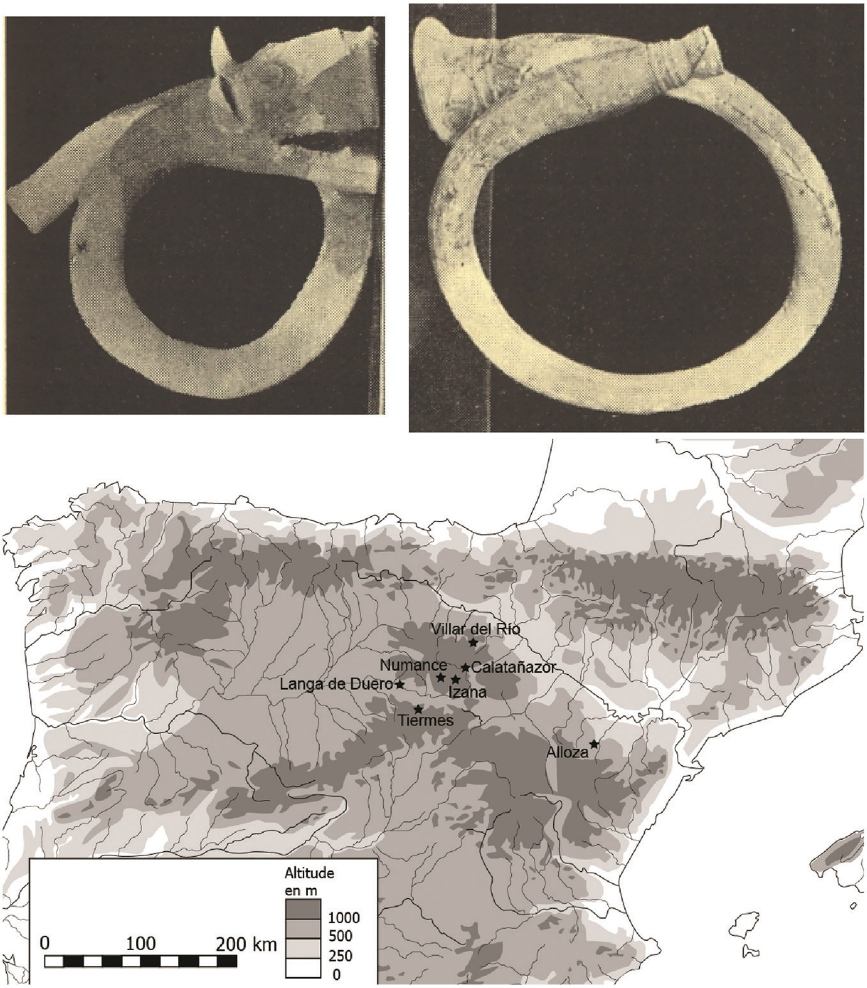

FIGURE 3.1 Ceramic horns from Numancia and the localisation map. After Taracena 1924: 16

an internal bowl. Twenty-eight such instruments were found in the Numance settlement,[1] and others derive from the same area in Izana (Sorian),[2] Tiermes (Soria),[3] Langa de Duero, Villard el Río,[4] with an easternmost example from

1 Federico Wattenberg, *Las cerámicas indígenas de Numancia* (Madrid: CSIC, 1963).

2 Martin Almagro-Gorbea, *Celtas y Vettones: Torreón de los Guzmanes, Iglesia de Santo Tomé el Viejo, Ávila, Septiembre-Diciembre 2001* (Ávila: Excema Diputación Provincial de Ávila, 2001), p. 425.

3 José Manuel Pastor Eixarch, «Las trompas de guerra celtibéricas,» *Celtiberia* 73 (1987), p. 9.

4 Raquel Jiménez Pasalodos, Fernando Agua Martínez, Juan Jesús Padilla Fernández, María Ángeles Villegas Broncano and Manuel García Heras, "Estudio acústico, arqueométrico.

Alloza (Teruel).[5] These finds cluster in a radius of 80 km around the city of Numancia (Garay, Soria). Most are found in settlements of a similar type, which leads us to associate their use with a specific society in central-north-eastern Iberia. The one exception to this distribution is that from Alloza, which might be explained either as the result exchange of prestigious goods between military elites, or the presence of a Celtiberian warrior in this settlement before its destruction by fire.

Ceramic horns are known from the Neolithic (like the Vallabrix example in Gard, France[6]) to today. Acoustic studies using archaeological reconstructions have shown that the ceramic horns can produce sound between 50 Hz and 6000 Hz, which is comparable to that produced by similar metal objects. These instruments can be used to produce notes across 3 or 3.5 octaves.[7]

The ceramic horns were mostly found in the settlement of Numancia during excavations from the beginning of 20th century. The contexts of recovery are poorly documented, and it is difficult to know if they came from Celtiberian-Roman layers or from contexts predating the Roman siege of 134–133 B.C. Classical texts describe the possible use of these instruments in a military context.[8] In Appian's account of the defence of the Celtiberian settlement of Numanica, warriors quickly mobilised and the trumpets (*salpynks*) sounded on every tower'.[9]

The most iconic musical instrument from Iron Age western Europe is the carnyx. This trumpet was made of copper-alloy tubing, with a zoomorphic main head with removable ears. Since the early 19th century, artefacts, such as the decorated boar-shaped head from Deskford (north-east Scotland), have been interpreted as being part of carnyces,[10] but it is only with discoveries of further examples from Mandeure (Doubs, France) in 1880, and Tintignac (Corrèze, France) in 2005, that we have been better able to understand this instrument. The Mandeure carnyx consisted of a fragment of a zoomorphic

y musicológico de instrumentos musicales arqueológicos: las trompetas de cerámica de Numancia (siglos III-I a.C.)," *Anuario Musical* 73 (2018), pp. 9–22.

5 Purificación Atrián Jordan, "Excavaciones en el poblado ibérico "El Castelillo" (Alloza, Teruel). Segunda y tercera campañas," *Teruel* 22 (1959), p. 231.

6 Jacques Coularou, Jean Vatou and Alain Vincent, "Une trompe en céramique dans un niveau chalcolithique (abri n7 de Brugas, Vallabrix, Gard)" *Bulletin de la Société Préhistorique Française 78* (1981), pp. 106–07.

7 Raquel Jiménez Pasalodos *et al.*, "Estudio acústico," pp. 14–18.

8 See also Thiel this volume.

9 Appian, *The Iberian book,* trans. Brian McGing (Harvard University Press, 2019), p. 93.

10 Fraser Hunter, "The Carnyx in Iron Age Europe," *The Antiquaries Journal* 81 (2001), pp. 77–108.

head with five ears.[11] The almost complete carnyx from Tintignac[12] consisted of a set of tubes, zoomorphic bell, four ears of different sizes and a straight mouthpiece, which could be reconstructed as an instrument similar to those in the modern brass family (Figure 3.2).[13] Using these discoveries, Fraser Hunter

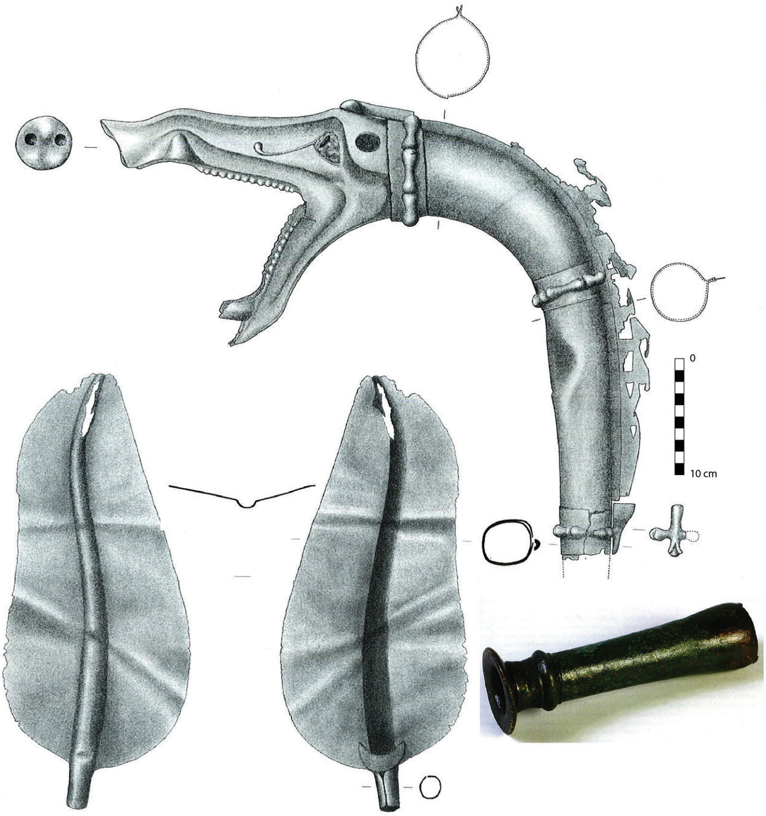

FIGURE 3.2 Parts of a carnyx from Tintignac with zoomorphic pavilion on top, an ear on the left and the mouth-piece on the right. After Maniquet *et al.*, 2011: 74, 78, 87

11 Philippe Barral and Matthieu Thivet, "Les sanctuaires de Mandeure," in *Aspects de la Romanisation dans l'Est de la Gaule*, eds. Michel Reddé, Philippe Barral, François Favory, Jean-Paul Guillaumet, Martine Joly, Jean-Yves Marc, Pierre Nouvel, Laure Nuninger and Christophe Petit (Glux-en-Glenne: Collection Bibracte 21, 2011), pp. 557– 65.

12 Christophe Maniquet, «Le dépôt du sanctuaire de Tintignac à Naves: de nouvelles références pour le site de La Tène,» in *Le site de la Tène: bilan des connaissances-état de la question. Actes de la table Ronde internationale de Neuchâtel, 1–3 novembre 2007*, eds. Matthieu Honegger, Denis Ramseyer, Gilbert Kaenel, Béar Arnold and Marc-Aantoine Kaeser (Hauterive: Office et musée cantonal d'archéologie de Neuchâtel, 2009), pp. 207–17.

13 Christophe Maniquet, Thierry Lejars, Barbara Armbruster, Michel Pernot, Monique Drieux Daguerre, Pascal Mora and Loïc Espinasse, «Le carnyx et le casque-oiseau celtiques

reinterpreted a number of large copper-alloy sheet metal ears discovered in different contexts, including two ears from the La Tène site at Neuchâtel (Switzerland), two ears from Abentheuer (Rhineland-Palatinate, Germany), and one ear from Sanzeno (Italy).[14] These ears, he suggested, were an integral part of the carnyx, perhaps not serving any acoustic function, but rather as a visual signalling device; by implication, throwing open to question whether the Deskford head—which has no ears—was ever part of this same class of musical instrument. Although none are complete, experiments with reconstructions of the Tintignac and Deskford carnyces suggest that they could have produced sound frequencies of between 50 Hz and 5000 Hz, with a clear melodic range over nearly 4 octaves.[15] We shall see later that other explanations can be offered for the interpretation of the ears.

The association of carnyces with military contexts is apparent from representations in both Celtic and Roman art, including coins, the Gundestrup cauldron from Denmark (Figure 3.4i), and the symbol of Gaul defeated by Rome.[16] Although the name 'carnyx' does not appear until much later in textual sources (the earliest attestations date back to the 12th century, in Eustathius of Thessalonica[17]), the idea of this musical instrument being closely associated with the Celtic populations and their armies is rooted in sources contemporary with the Gauls themselves.

The reconstruction of working carnyces allows us to reinterpret other archaeological objects from Iron Age Europe. Metal pieces, previously interpreted

de Tintignac (Naves-Corrèze). Description et étude technologique,» *Aquitania* 27 (2011), pp. 63–150.

14 Fraser Hunter, «Une Oreille de carnyx découverte à La Tène,» in *Le site de la Tène: bilan des connaissances-état de la question. Actes de la table Ronde internationale de Neuchâtel, 1–3 novembre 2007*, ed. Matthieu Honegger, Denis Ramseyer, Gilbert Kaenel, Béat Arnold and Marc-Antoine Kaeser (Hauterive: Office et musée cantonal d'archéologie de Neuchâtel, 2009), pp. 75–85.

15 Muray Campbell and John Kenny, "Acoustical and musical properties of the Deskford carnyx reconstruction," in *Proceedings of the Acoustics 2012 Nantes, Conference 23–27 April 2012* (Nantes: Acoustics 2012), pp. 3961–66; Joël Gilbert, Emmanuel Brasseur, Jean-Pierre Dalmont and Chistophe Maniquet, "Acoustical evaluation of the Carnyx of Tintignac," in *Proceedings of the Acoustics 2012 Nantes, Conference 23–27 April 2012* (Nantes: Acoustics 2012), pp. 3955–59.

16 Alexandre Bertaud,"Who's in charge here? The making of military communication vectors in the late Iron Age in western Europe," in *Artisans versus nobility? Multiple identities of elites and 'commoners' viewed through the lens of crafting from the Chalcolithic to the Iron Age in Europe and the Mediterranean*, eds. Ann Brysbaert and Alexis Gorgues (Leiden: Sidestone Press, 2017), pp. 125–28.

17 Catherine Homo-Lechner and Christophe Vendries, *Le carnyx et la lyre, Archéologie musicale en Gaule celtique et romaine* (Evreux: exposition Besançon-Orléans, 1993).

as drinking horn tips, can now be understood as carnyx mouthpieces.[18] Examples from the grave of Boé (Lot-et-Garonne, France)[19] (Figure 3.3a), grave D of Goeblingen-Nospelt (Luxembourg)[20] (Figure 3.3b), Grave 1926 from Grossromstedt (Thuringia, Germany)[21] (Figure 3.3b), Grave 5 and an old unstratified example from Schkopau (Saxony-Anhalt, Germany)[22] (Figure 3.3c), and an early, unstratified find from Vijni Vrh (Lower Sava, Slovenia)[23] (Figure 3.3e), all display an opening on the central part of the metal tip which distinguishes them from full specimens from the Early Iron Age, such as those from Hochdorf[24] or Klein Aspergle,[25] but also from a good number of metal tips dating to the last two centuries B.C.[26] Metal fittings of this kind have been placed into types since 1977,[27] but the peculiarities of the axial perforation of these mouthpieces has not been previously discussed. Because of this perforation, we can discard the drinking horn interpretation. The inner cup has a bowl shape and an opening similar to that observed on the carnyx mouthpiece from Tintignac[28] and is close in shape to mouthpieces of modern brass instruments. The circular shape of the rim is then extended by a large bowl followed by a hole of variable width. The other end of this mouthpiece is designed to hold elements in other

18 Alexandre Bertaud, "Who's in charge".

19 Martin Schönfelder, *Das Spätkeltische Wagengrab von Boé (dép. Lot-et-Garonne). Studien zu Wagen und Wagengräbern der Jüngeren Latènezeit* (Bonn: Verlag des Römisch-Germanischen Zentralmuseums, 2002), pp. 82–87.

20 Ronald Bockius and Piotr Luczkiewiez, *Kelten und Germanen im 2.-1. Jahrhundert vor Christus. Archäologische Bausteine zu einer Historischen Frage* (Mainz: Verlag des Römisch-Germanischen Zentralmuseums in Kommission bei Dr. Rudolf Habelt GMBH, 2004), p. 104.

21 Ronald Bockius and Piotr Luczkiewiez, *Kelten und Germanen,* p. 109.

22 Ronld Bockius and Piotr Luczkiewiez, *Kelten und Germanen,* p. 109.

23 Dragan Bożič, "Kritisches zu der «Hebelstangentrense» von Sotin-Zmajevac (Slawonien) und dem «Kampfhorngriff» von Vinji vrh bei Bela cerkev (Slowenien)," *Arheološki Vestnik* 34 (1983), pp. 421–30.

24 See in particular the images of these horns in: Trésors des Princes Celtes*, Galeries Nationales du Grand Palais 20 octobre 1987–15 février 1988* (Paris: Editions de la Réunion des musées nationaux, 1988), p. 177.

25 See in particular the images of these horns in: Trésors des Princes Celtes*, Galeries Nationales,* p. 261.

26 Quentin Sueur, *La vaisselle métallique de Gaule septentrionale à la veille de la conquête: typologie, fonction et diffusion* (Drémil-Lafage: Éditions Mergoil, 2018), pp. 196–207.

27 Clara Redlich, "Zur Trinkhornsittebei den Germanen der älteren Kaiserzeit," *Prähistorische Zeitschrift* 52 (1977), pp. 61–120; Jacek Andrzejowski, «rogów do picia z młodszego okresu przedrzymskiego i okresu wpływów rzymskich w Europie Środkowej i Północnej. Próba klasyfikacji i analizy chronologiczno-terytorialnej» [Mountings for drinking-horns from the late pre-Roman and Roman periods in Central and Northern Europe], *Materiały starożytne I wczeznośredniowieczne* 6 (1991), pp. 7–120; Sueur, *La vaisselle métallique.*

28 Christophe Maniquet *et al.*, "Le carnyx et le casque-oiseau celtiques".

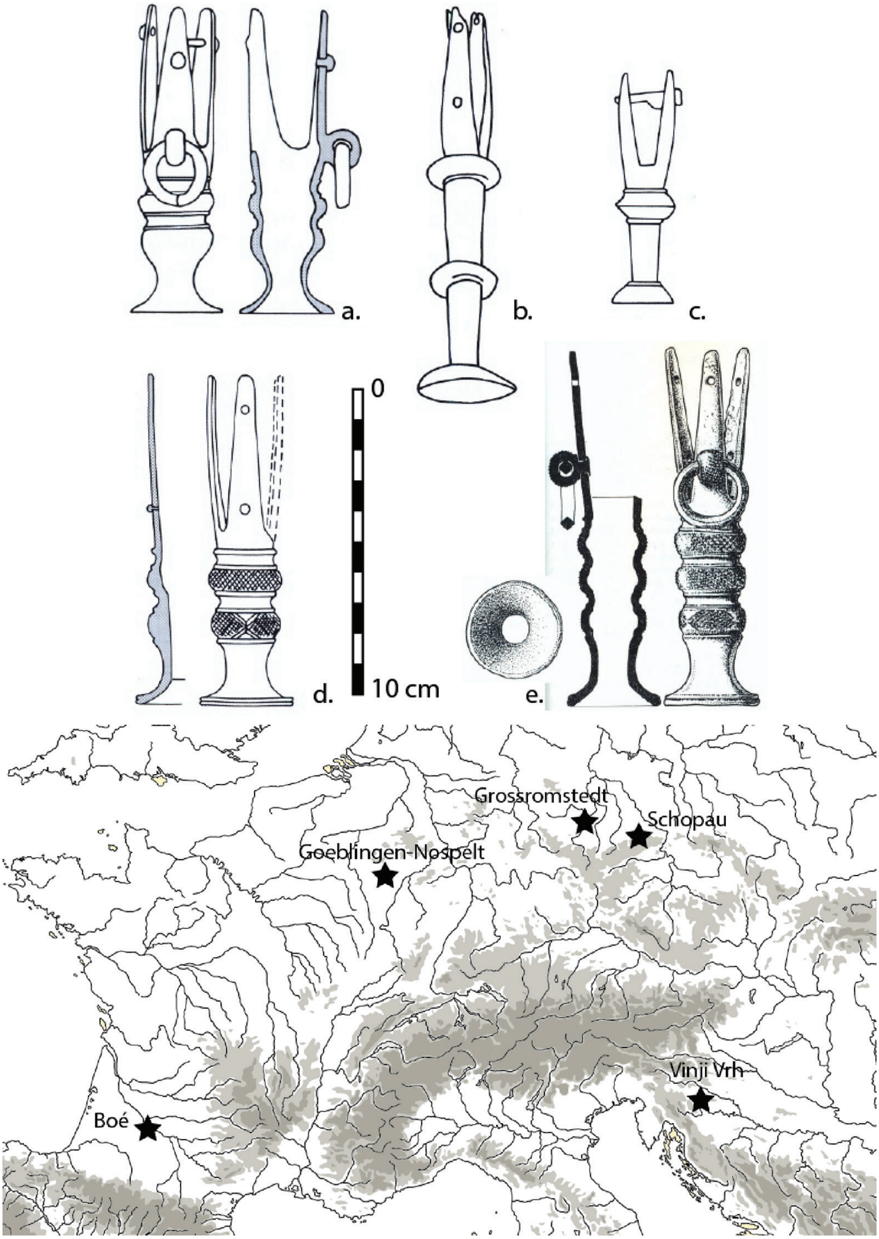

FIGURE 3.3 Bronze mouth-pieces from composite horns: a. Boé, b. Grossromstedt, c. Schkopau, d. Goeblingen-Nospelt, e. Vijni Vrh ; and localisation map. (a : Schönfelder 2002: 83, b, c and d : Bockius and Luczkiewiez 2004: 106, e : Božič 1983: 423).

materials, affixed to it with nails (or rivets in the case of Boé (Figure 3.3a)), or perhaps by inserting the elements into each other. None of these organic elements survive, so it is difficult to appreciate the internal arrangement and to understand how it was blown. Moreover, we can only reconstruct the end of the mouthpiece, and possibly the diameter of the bell (from the example of Boé, which featured an end decorated with copper-alloy), but the body, its overall size, its volume and composition cannot be ascertained with certainty, so the sound this kind of composite trumpet might have made, remains very speculative.

Iconography furnishes us with information about the shape these composite horns might have taken. The 5th century B.C. Arnoaldi mirror appears to show trumpets (Figure 3.4a),[29] as do situlae of the 4th century B.C. from the northern Adriatic and northern Italy, such as the Arnoaldi situla (Figure 3.4b) recovered from a burial in Bologna (Emilia Romagna, Italy).[30] A martial context is not certain from the depiction on the Arnoaldi mirror, which shows a blowing figure wearing a helmet and perhaps armour, but also flanked by two animals, perhaps suggesting some function related to the control of animals. A clearer martial connection is visible in the Arnoaldi situla, which depicts a fully-equipped trumpeter standing in front of warriors. The stele from Bormio (Lombardy, Italy) (Figure 3.4c), which was found in a church, also seems to be dated to the 4th century B.C. on the basis of depicted weaponry that is similar to northern Alpine grave goods of this date.[31] In the remaining part of the stele, two figures can be seen: one on the left is blowing into a curved musical instrument that rises above his head, the other has weapons and a standard (see below). In the 3rd century B.C. representations of trumpets appear on Iberian painted ceramics, such as that from Sant Miquel de Lliria (Valencia, Spain) (Figure 3.4d).[32] On some wares an almost human-sized trumpet is played in a warlike scene in which warriors confront each other. From the north of the Celtiberian domain, in the territory of the Berones of the upper

29 Anne-Marie Adam, "De l'imagerie hallstattienne aux décors laténiens: quelles filiations?," in *Décors, images et signes de l'âge du Fer européen, Actes du XXVIe Colloque de l'AFEAF, Paris et Saint-Denis 9–12 mai 2002*, eds. Olivier Buchsenschutz, Alain Bulard, Marie-Bernadette Chardenoux and Nathalie Ginoux (Tours, Supplément de la Revue Archéologique du Centre de la France, 2003), pp. 27–36.

30 Peter Stary, "Keltische Waffen auf der Apennin-Halbinsel, "*Germania* 5 (1979), pp. 99–110.

31 Ludwig Pauli, "Per un'interpretazione del rilievo preromano di Bormio (Sondrio)," *Rivista archeologica dell'antica provincia e diocesi di Como* 152 (1973), pp. 91–112.

32 Helena Bonnet Rosado, *El Tossal de Sant Miquel de Llíria. La Antigua Edeta y su territorio* (Valencia: Servicio de Investigación Prehistórica de la Diputación de Valencia, 1995).

FIGURE 3.4 Iconography of musical instruments associated with warfare from Western Europe: a. Arnoaldi miror (from Adam 2003) ; b. Arnoaldi situla (from www.gutenberg.org); c. Bormio stelae (from Pauli 1973: 92); d. Sant Miquel de lliria ware (from Bonnet Rosado 1995: 442); e. coin B23 from Helm (from Prokisch 1993: 39); f. coin marked with LOUTISKOS (from Guadán 1979: 76); g. coin marked with DUBNOREIX (from Goudineau 1990: 93); h. coin with horseman holding a carnyx (from De La Tour 1965: pl. XLIII); i. Gundestrup caldron panel (from Goudineau 2006: 60–61)

Ebro valley, 2nd century B.C. coins marked with the name LOUITISKOS, depict a horseman blowing a horn that rises over his head, in a pose very similar to the Bormio stele (Figure 3.4f).[33] From the 1st century B.C. there are other coins in Europe that show warriors blowing horns, such as the Helm coin B23 in the Linz Museum (Austria) (Figure 3.4e).[34] In contrast to the LOUITISKOS coin this example shows a running infantryman holding a sword in one hand and blowing a horn held in the other.

This short series of examples serves to highlight the recurrence of horns in the iconographic register of late prehistoric western Europe, albeit with chronological differences between areas, and a variety of representations depicting two main types: a curved and an elongated form. At present we cannot directly link the archaeological remains of metal mouthpieces to a particular shape of composite horn. What can be said is that the artefacts unearthed seem to coincide with the last phase of appearance of these instruments in depictions, that is during the 1st century B.C.[35]

The variety of musical instruments associated with Late Iron Age military contexts in western Europe show regional and cultural particularities, but also a common desire to produce effective and identifiable instruments of audible command. Interestingly, these instruments seem to evolve over time with the development of specific objects during the 3rd and 2nd centuries B.C. that used metallic or ceramic materials so to differentiate the individuals who used them. These carnyces and ceramic horns are mostly found in communal structures, settlements and sanctuaries, and while this context does not necessarily mean a collective use, their absence from funerary contexts might suggest that they were not strongly associated with a particular individual. Instead, they may have a symbolic significance, that saw them conserved through the generations in certain houses or ritually deposited in sanctuaries. By contrast, composite horns seem to be more intimately linked to individuals, as they are systematically and almost exclusively deposited in graves. As a corollary we might suggest that changes in their forms correspond to changes in the

33 María Paz Garciá-Bellido and María Cruces Blázquez Cerrato, *Diccionario de cecas y pueblos hispánicos, Introducción a la numismática antigua de la península Ibérica* (Madrid: Instituto de Historia, CSIC, 2001), pp. 272–73.

34 Bernhard Prokisch, *Keltische Fundmünzen aus Oberösterreich: die römischen Münzen des Stadtmuseums Nordico in Linz* (Linzer archäologische Forschungen) 10 (Linz: Stadtmuseum-Nordico 1993), p. 39.

35 Schönfelder, *Das Spätkeltische Wagengrab* for Boé; Boźič, "Kritisches" for the others.

representation of military elites and their command tools, as well as in military equipment across the 1st century B.C.[36]

2 Visual Communication

The transmission of visual information involves different aspects of both body and gesture. Of course, the transmitter needs to be seen to be understood, so tools that enhance communication are important, especially during battle.

Carnyces were not just musical instruments, they also communicated visually: the length of the horn and its elaborate bell extended well above the height of the trumpeter forming a highly visible signal. Metal ears attached to the bell accentuated its visibility (Figure 3.2). The latter are removable, probably for signalling purposes; the addition or removal of one or both ears act as a kind of semaphore that supplements the sound information. Thus, the carnyx can communicate both visually and audibly: it is a complete tool for transmitting information. This use of ears as a semaphore may also explain why these objects are found in some sanctuaries without the other parts of the carnyx. The ears may be deposited as a *pars pro toto* of the whole musical instrument,[37] but also as a symbol of visual communication.

Few Iron Age standards are preserved in the archaeological record of western Europe. The most readily identifiable are zoomorphic elements of about 40 cm length, made of—usually, copper-alloy—metal sheet. A good example of this type is the boar discovered at Soulac-sur-Mer (Gironde) (Figure 3.5a).[38] The boar is fitted with a band holding a board of perishable material as well as a half-sphere for the wooden shaft, which leaves little doubt that this object was mounted and raised above head height. Other standards of this type have been found, significantly at Tintignac, where one was found in the same pit as carnyx elements.[39] This type of standard also seems to be depicted on Gaulish iconographic coinage of the DUMNORIX type (Figure 3.4g).

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36 Alexandre Bertaud, *Des guerriers au contact: De la place du fait militaire aux interactions guerrières dans les sociétés d'Europe occidentale du III*^{e} *au I*^{er} *s. a.C,* (Bordeaux: editions Ausonius, 2022).

37 Fraser Hunter, "Une Oreille de carnyx".

38 Jacques Moreau, Dietrich Anker, Richard Boudet, Michel Dhénin and M. Fecht, *Le sanglier-enseigne gaulois de Soulac-sur-Mer* (*Gironde*)*. Etude de l'emblématique du sanglier dans le monde celtique* (Soulac-sur-Mer: Association Médullienne, Archéologie et Histoire du Médoc, 1995).

39 Christophe Maniquet, "Le dépôt du sanctuaire," pp. 25–26.

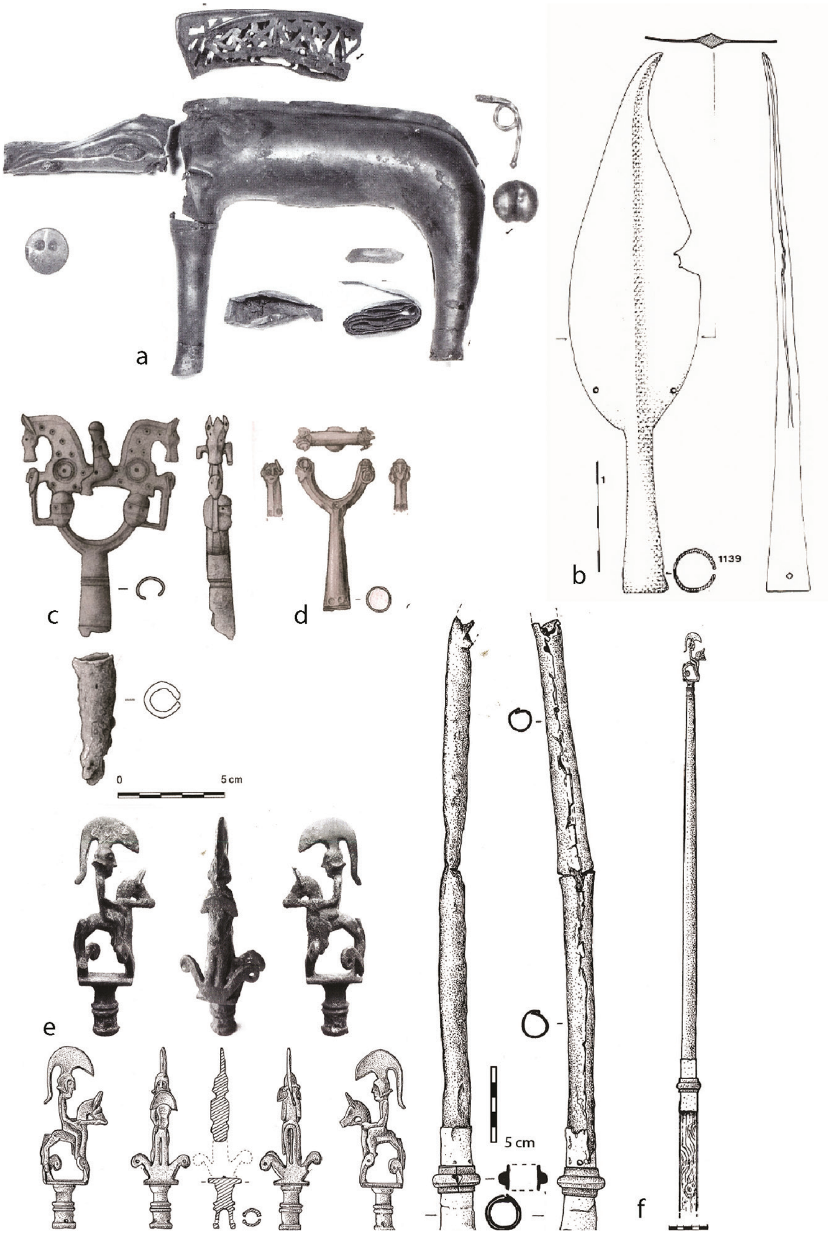

FIGURE 3.5 Visual instruments of communication: a. boar sign from Soulac-sur-Mer (from Moreau *et al.*, 1995: 11); b. spearhead GSA1139 from Gournay-sur-Aronde with holes (from Brunaux and Rapin 1988: 226); c. standard end from grave 38 and d. from grave 106 in Numancia necropolis (from Jimeno *et al.,* 2004: 85, 131); e. standard end from Cuenca museum and f. its restitution with bronze sheet socket (from Lorrio and Almagro-Gorbea 2005: 41, 57)
ILLUSTRATION: A. BERTAUD

In the Celtiberian area we know small objects made of copper alloys (rarely iron) of about 15 cm length that have a socket decorated on the upper part (Figure 3.5c, d).[40] The general shape of these objects is similar, however, the decorative motifs vary, with representations of riders, horses and other motifs that are difficult to interpret. It is probable that these objects, even though they are relatively small, were intended to be raised high to be seen. The kinds of messages they conveyed is difficult to know. Even if they are made from copper alloy that can easily reflect light, their small size probably does not allow them to be distinguished beyond about ten metres. Perhaps the rings found on some of these objects, or the empty spaces, allowed for hanging additional, more visible, information? If so, these objects should more correctly be considered not as standards themselves, but as standard-mounts that formed just one part of a complex system of messaging done through the addition of pennants, flags or other perishable materials hung from the mount. Even without these surviving, one can speculate that the summit motif was designed to symbolise a group or an individual, on the grounds that these objects are often recovered from graves, such as at Numance.[41]

From Iberia we know of similar objects that are small figurines of equipped horsemen (Figure 3.5e).[42] These objects are fragmentary, but one example shows that they were associated with a long copper-alloy sheet socket, which suggests it was mounted on a wooden shaft and positioned at a certain height (Figure 3.5f).[43] As with the Celtiberian standards, we cannot assume a direct visibility of the figurine beyond more than a short distance. Again, it is possible to hang pennants of perishable material from the object; however, in this case there are no attachment rings, so any fabric would need to be tied between the legs of the animal. As in some Celtiberian cases, it is the shape of the object itself that facilitates the insertion of a staff and the attachment of pennants.

Another example of a somewhat different type of standard-mount, has been recovered from the sanctuary of Gournay-sur-Aronde, in Gaul. The object is a spearhead (GSA 1139; Figure 3.5b) of similar morphology to the others, but with

40 Alberto José Lorrio Alvarado and Raimon Graells Fabregat, "Nuevo signum equitum celtibérico," *BSAA Arqueología* 127–128 (2011–2012), pp. 203–18.

41 See Alfredo Jimeno Martínez, José Ignacio de la Torre, Ricardo Berzosa and Juan Pablo Martínez, *La Necrópolis Celtibérica de Numancia* (Arqueología en Castilla y León 12. Soria: Junta de Castilla y León, 2004), p. 121.

42 Fernando Quesada Sanz, *Estandartes militares en el mundo antiguo, Aquila Legionis Monografía 8* (Madrid: Signifer Libros, 2007).

43 Alfredo José Lorrio Alvarado and Martin Almagro-Gorbea, "War and society in the celtiberian world," *e-Keltoi: Journal of Interdisciplinary Celtic Studies* 6 (2005), pp. 56–8.

perforations on each side of the spear-tail.[44] The purpose of these perforations is unknown. It is possible that they were produced when the object was broken up; in a sanctuary context objects are often found deliberately twisted, crushed and broken,[45] and indeed the spearhead is twisted in a way that is quite common in these settings. By contrast, the careful placement of the circular perforations on each side of the spearhead suggests a more deliberate modification done at the time of the object's elaboration, or before its deposition. These perforations seem to be used to hold links from which perishable materials could be hung. It follows that any spearhead with openwork parts might have been a standard-mount, though in these cases, the system for suspending and holding the perishable materials, would have been to attach them to the wooden shaft rather than to the metal part.

Standard-mounts seem to appear in various western European Iron Age contexts, mainly between the 3rd and 2nd centuries B.C. They have several complementary functions: as symbols of elite or group distinction, with a characteristic representation using mainly copper-alloys; as a frame for displaying perishable materials, or at least elements that can be attached and removed as needed. In this way we can envisage them as types of banners that carried identity information or communicated to a group, including to manoeuvre military contingents.

3 Passive Transmission of Information

Visual information is transmitted both actively and passively. Passive transmission occurs to distinguish a status, a function, membership of a group, or to claim elite status through the wearing and use of certain equipment and objects, especially those with specific material or high know-how to produce.[46] The distinction of certain individuals by their clothing and equipment is evident in the military domain. Because armour has a large surface area and is highly visible it can carry visual information that distinguishes an individual or a group.

Metal helmets are elements of warrior distinction because only some had access to this type of protection. They are objects that grow around the head

44 Jean-Louis Brunaux and André Rapin, *Gournay II: Boucliers et lances, dépôts et trophées* (Paris: Revue Archéologique de Picardie, Errance, 1988), p. 226.

45 Jean-Louis Brunaux and André Rapin, *Gournay II*.

46 Ian Hodder, *Studies in Human-Thing entanglement* (Publisher: self publishing online, 2016), pp. 13–15.

or even above it, which make them highly visible. Moreover, the metal helmets that were used between the 4th and 2nd centuries display decorations and ornaments; for example those from Agris[47] and Amfreville-sous-les-Monts[48] in Gaul, and the Hispano-Chalcidian helmets of the Celtiberian domain.[49] Iconographic depictions of the latter suggest these helmets were also further enhanced with perishable materials. These helmets were therefore markers of high military status, but also symbols of economic power through their use of precious raw materials and specific know-how, even if their ornamental elements had little impact on their protective efficiency. The entanglement of martial symbolism, the craft specialisation to make these objects, and the economic ability to procure the necessary raw materials, all established the position of the wearers as aristocratic warlords. Furthermore, the symbols deployed on each helmet made it possible to distinguish each wearer through distinctive decoration or personalised crests. In this way helmets expressed the identity of the individual. These functions also played a major role in warfare, making leaders clearly recognisable both to their own warrior followers and to enemy warriors and their leaders. Changes that occurred in metal helmets at the end of the 2nd century and in the 1st century B.C. with the simplification of the shape and the disappearance of the decorations (through the rather important adoption of Celto-Italian helmets in the Iberian Peninsula,[50] as well as through the development of Alesia-type helmets in Gaul[51]) mark a deep change in the systems of representation of these military elites. Indeed, during this turning point, the mobilisation of economic capacities is no longer mandatory for the function of military leader. However, it may continue to be associated as can be seen with the issue of Gaulish coins by individuals who claim a status of war leader as in the coinage of DUMNORIX (Figure 3.4g).

47 José Gomez de Soto and Stéphane Verger, «Le casque d'Agris, chef d'œuvre de l'art celtique occidental,» *L'archéologue* 106 (2010), pp. 56–9.

48 Alain Duval and José Gomez de Soto, «Quelques considérations sur les casques celtiques d'Amfreville (Eure) et d'Agris (Charente),» in *Aquitania supplément, 1. Actes du VIIe colloque sur les Ages du Fer en France non méditerranéenne, Angoulême, 1819–20 mai 1984* (Bordeaux: Aquitania 1986), pp. 240–41.

49 Raimon Graells Fabregat, Alberto José Lorrio Alvarado and Fernando Quesada Sanz, *Cascos hispano-calcídicos. Símbolo de las élites guerreras celtibéricas* (Mainz: Verlag des Römisch-Germanischen Zentralmuseums, 2014).

50 see Fernando Quesada Sanz, *El armamento ibérico. Estudio tipológico, geográfico, funcional, social y simbólico de las armas en la Cultura ibérica* (*siglos VI-I a.C.*) (Montagnac: ed. Monique Mergoil, 1997), pp. 570–71.

51 See Michel Feugère, *Les casques antiques. Visages de la guerre de Mycènes à l'Antiquité tardive,* 2nd *édition* (Paris: Errance, 2011), pp. 75–77.

Armour may also display symbols of distinction. Although little is known about Late Iron Age armour from material remains, we can mobilise different evidence to understand it. The statues that developed in different regions from the 5th century B.C. show decoration on armour made of perishable materials. The motifs represented seem to differ between the front and back; thereby potentially signalling different information: the front part is intended for the enemy while the back part is intended for allies. Representations of armour bearing elements of distinction are rare in the Iberian Peninsula. The warrior bust from La Alcudia in Elche in south-east Spain is a notable exception.[52] The bust represents a warrior's torso wearing a cardiophylax, a typical armour, depicting a wolf's head in relief. The usually realistic representations of weapons in Iberian sculpture, as well as the ability to produce relief representations of this animal's head in Tivissa patera,[53] suggest that the cardiophylax on the Elche bust is a realistic representation of military equipment: the wolf's head is therefore a prophylactic symbol as much as an element to frighten enemies.

Because of their size, shields were important media for iconographic representations and visual information. However, the perishable nature of shields means there are few archaeological examples. The Witham shield (United Kingdom) in copper alloy with the representation of a boar is an outstanding example of decoration on the latenian shields.[54] Nevertheless, we can assume that most of the shields were painted, as they are depicted on Iberian ceramics (Figure 3.4d) and bas-reliefs, such as that from Bormio (Italy) (Figure 3.4c).[55]

In sum, the media of visual transmission would seem to have been varied and responsive to different needs. The distinction of certain individuals through specific military equipment indicates a will or a need to highlight leaders within a warrior group. This principle makes it possible to clearly establish the hierarchical organisation of the group in arms. It allows the first link in the chain of command to be quickly identified and able to give orders more easily that conduct to tactical organisation during battle.

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52 Alejandro Ramos Folques, "Hallazgos escultóricos en La Alcudia de Elche" *Archivo Español de Arqueología 81* (1950), pp. 353–59.

53 Alexis Gorgues, "Les armes et les hommes. La mobilité des guerriers et ses enjeux dans le nord-est du domaine ibérique au IIIe s. a.C.," in *L'âge du Fer en Aquitaine et sur ses marges. Mobilité des hommes, diffusion des idées, circulation des biens dans l'espace européen à l'âge du Fer, Actes du 35e Colloque internationale de l'AFEAF* (*Bordeaux, 2-5 juin 2011*), eds. Anne Colin and Florence Verdin (Bordeaux: ed. Aquitania Supplément 30, 2013), p. 550.

54 Edward Martyn Jope, "The Witham Shield," *The British Museum Quarterly* 35 (1971), pp. 61–69.

55 Ludwig Pauli, "Per un'interpretazione".

4 Conclusions

This survey of different objects from Iron Age western Europe shows us that they were used to transmit several types of information. They were used to give orders, to signal hierarchy, and they allowed for the easy identification of elites. The main purpose of these objects was to communicate information from a person to another; in the context of warfare, allowing commanders to organize combatants on the battlefield. But these tools also asserted hierarchy between warriors. Thus, we can infer that late prehistoric warrior groups of western Europe were highly organized depending on context and necessity. Finally, I have argued here that these objects also played a central role in communicating between elites. Similarities between objects in a given area signalled community membership; whereas the individualisation of objects allowed for the differentiation of people who carried or used these tools. Thus, certain élites can be recognised through their specific command tools, together with specific equipment, such as decorated helmets or armour (Figure 3.4). To completely understand these objects, we have to mobilise an agency approach: élites can emphasise different aspects of their command tools to assert specific claims, such as those relating to hierarchy or membership. Alternatively, they could be used by a small group of warriors to assert affiliation to communities or peoples.

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CHAPTER 4

Topographies of Viewing and Interpretation in Ancient Greece: a Case-Study from the Territory of Ancient Tegea

Jørgen Bakke

1 Introduction

Long-distance surveillance and communication with signal fires have a long history in ancient Greece and is mentioned already in the early Greek epic poem the *Iliad*.[1] In this chapter, I propose to approach surveillance and long-distance communication in ancient Greece as forms of material agency. I use the term material agency here in a manner like how anthropologists like Bruno Latour and archaeologists like Ian Hodder argue, namely that material objects and physical environments have a form of agency that is symmetrical to human agency.[2]

The remains that I take as my starting point are situated in the elevated outskirts of the main territory of the ancient city-state (*polis*) Tegea on a mountain plain in the inner Peloponnesian peninsula in southern Greece. The Agios Athanasios tower east of the Tegean Plain serves as the main case study (Figure 4.1).[3] For comparison I will also refer to similar monuments from Tegea's neighbouring city-state Mantinea, just to the north of the Tegean plain.

1 Homer, *Iliad*, 18.206–214, II, trans. Augustus Taber Murray (Cambridge, Massachusetts: Harvard University Press, 1925), pp. 302–03.

2 Bruno Latour and Steve Woolgar, *Laboratory Life: The Social Construction of Scientific Facts* (Los Angeles: Sage Publications, 1979); Ian Hodder, *Entangled: An Archaeology of the Relationships between Humans and Things* (Chichester, West Sussex: Wiley-Blackwell, 2012).

3 The Agios Athanasios tower was documented during an archaeological surface survey between 2009 and 2012 that was co-directed by the Norwegian archaeologist Hege Bakke-Alisøy and me, under the auspices of the Norwegian Institute at Athens and sponsored by the University of Bergen and the Meltzer Research Fund. See Jørgen Bakke, "Den greske bystatens geohistoriske marginer. Om videreføring av norsk landskapsarkeologi i Tegea 2008–2012." *Klassisk forum* 1 (2010), pp. 47–60; Jørgen Bakke and Hege A. Bakke-Alisøy, "How to survey a road and what might come out of it if you happen to do it in the Arcadian mountains," in *Methods and models in ancient history. Essays in honour of Jørgen Christian Meyer. Papers and Monographs from the Norwegian Institute at Athens*, 9, eds. Ingvar Brandvik Mæhle, Per

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FIGURE 4.1 Stone foundation of rural watchtower at Agios Athanasios, a mountain peak south-east of the plain of ancient Tegea
PHOTO: JØRGEN BAKKE

2 Rural Defence and Surveillance in Ancient Greece: Sources and Studies

Military architecture in Ancient Greece is primarily associated with the fortified urban centres of cities like Athens.[4] Fortified towns, villages, farms, or palaces, like the famous citadel at Mycenae appear already in the Greek Bronze Age.[5] In archaic and classical Greece (mid-7th to late 4th century B.C.) Greek city-states typically consisted of an urbanised centre (*asty*) and a rural agricultural territory (*khora*).[6] By the classical period many city-state urban centres

Bjarne Ravnå and Eivind Heldaas Seland (Athens: The Norwegian Institute at Athens, 2020), pp. 35–52.

4 Arnold Walter Lawrence, *Greek Aims in Fortification* (Oxford: Clarendon Press, 1979), p. 115.

5 Lawrence, *Greek Aims*, p. 115.

6 All Greek words are transliterated according to Modern English Transcription without diacritical marks.

were also fortified.[7] The story is a little bit more complicated when it comes to rural military architecture.[8]

Greek literary sources sometimes describe rural observation posts embellished with tower-like structures. The Greek historian Thucydides (late 5th century B.C.) mentions that a tower (*pyrgon*) built on an island off Megara on the mainland between Athens and Corinth was used for observation (*phrourio*) of approaching enemies.[9] In the late 4th century B.C., according to Aristotle, the responsibility for such fortified guarded posts (*phylakteria*) together with their adjacent mess-rooms (*syssitia*) was assigned to local magistrates called *agronomoi* (keepers of the land) or sometimes *hyloroi* (foresters).[10] Guarded posts (*phylakteria*) are called *skopia* or *skope* that can refer to both watchtowers or simply a high place in the landscape from where one can visually observe what is going on. A famous ancient example from our area is *Skope* on the western side of the gateway between the territories of Mantinea and Tegea. Mantinean *Skope* is well known in ancient history because supposedly it was the place where the famous Theban general Epaminondas died overlooking the Battle of Mantinea in 362 B.C. where his army defeated the Mantineans and their allies.[11]

The terminology associated with watchtowers in ancient Greece is primarily associated with a form of activity, keen and attentive visual observation designated by the verb *phroureo*, that does not necessarily involve any form of architecture. It is accordingly the physical environment rather than the architecture that makes up the material agency of this activity. The terminology of

7 Mantinea's classical city wall is well known from historical sources and well documented. For Tegea historical sources clearly indicate a city wall by the classical period, but its material remains are not as well documented. Bakke, *Forty Rivers*, pp. 151–62; Jørgen Bakke, "Sikkerhet, overvåking og undertrykkelse. Tusen år med festningsanlegg i Tegea," *Klassisk forum* 2 (2013), pp. 53–72; Knut Ødegård, "Urban planning in the Greek Motherland: Late Archaic Tegea," *Acta ad archaeologiam et artium historiam pertinentia* 23 (2010), pp. 9–22; Knut Ødegård, "State formation and urbanization at Tegea," in *Arkadien im Altertum. Geschichte und Kultur einer antiken Gebirgslandschaft*, ed. Klaus Tausend (Graz: Unipress, 2018), pp. 273–88.

8 Lawrence, *Greek Aims*, pp. 159–200.

9 Thucydides, *History of the Peloponnesian War* 3.51.1, trans. Charles Forster Smith, vol. II (Cambridge, Massachusetts: Harvard University Press, 1920), pp. 88–89.

10 Aristotle, *Politics* 1331b11.4, trans. Harris Rackham (Cambridge, Massachusetts: Harvard University Press, 1932), pp. 594–95; Lawrence, *Greek Aims*, p. 188.

11 Pausanias, *Description of Greece*, 8.11.7-8, III, trans. William Henry Samuel Jones (Cambridge, Massachusetts: Harvard University Press, 1933), pp. 400–01. For recent discussion about remains of ancient watchtower at *Skope* see Matthew Maher, and Alistair Mowat, "The defence network in the chora of Mantineia," *Hesperia* 87 (2018), pp. 462–64.

signalling refers primarily to fire-signals, but sound signals were probably also used from a very early stage.[12] The verb *phryktoreo* refers to the act of making fire-signals, and the substantive *phryktoria* refers to the discipline or art (*tekhne*) of making fire-signals. The *phryktorion* is the signal-station or the beacon-tower, and the *phryktoros* is the specialist who watches on a hight to make fire-signals.

Documented material remains of rural defensive architecture from ancient Greece are stone structures (Figure 4.1) and fragments of ceramic roof tiles (Figure 4.2). Watchtowers are typically, but not always, located on elevated features in the landscape, where they have been exposed to harsh weather for two millennia. Less durable materials like wood and unbaked mudbricks have thus completely perished. This means that the archaeological remains can only help us to document that historical phase where watchtowers were built on

FIGURE 4.2 Fragments of red-glazed ancient ceramic roof tiles at Agios Athanasios, south-east of the plain of ancient Tegea
PHOTO: JØRGEN BAKKE

12 Homer, *Iliad*, 18.219, II: 302–3.

solid stone foundations. In Greece this limits the archaeological sources to the classical and Hellenistic periods (5th to 1st century B.C.).

Modern studies of signalling—and watchtowers in ancient Greece started with 19th century western European topographers.[13] They have also been included in 20th century studies of Greek masonry and military architecture.[14] Inspired by the regional turn in Greek archaeology since the 1970s, the study of rural military architecture in ancient Greece underwent something of a renaissance in the mid-1980s. Josiah Ober's work on the defence of the Athenian border remains the most important from this period,[15] and has been followed by other regional studies.[16] Regional archaeological surveys have also inspired studies of the place of rural fortifications in social history,[17] public security,[18] and historiography.[19] The work of Yannis Pikoulas on ancient road networks and territorial defence paved the way for studies of rural military architecture and communication in Arcadia.[20] Matthew P. Maher and Alistair Mowat's work on the rural defensive network at Mantinea just north of Tegea is the most important comprehensive study of the type of monuments discussed here.[21] They documented a total of nine tower-like structures, all situated in elevated positions neatly surrounding the plain of Mantinea.[22] These structures are square in shape, and were designed with almost identical

13 William Loring, "Some Ancient Routes in the Peloponnese," *The Journal of Hellenic Studies* 15 (1895), p. 83.

14 Robert Lorentz Scranton, *Greek Walls* (Cambridge, Massachusetts: Harvard University Press, 1941); Lawrence, *Greek Aims*; Fredrick E. Winter, *Greek Fortifications* (London: Routledge, 1971).

15 Josiah Ober, *Fortress Attica: Defence of the Athenian Land Frontier 404–322 B.C* (Leiden: Brill, 1985).

16 John McKellen Camp, "Notes on the Towers and Borders of Classical Boiotia," *American Journal of Archaeology* 85 (1991), pp. 193–202; Sarah P. Morris, "The Towers of Ancient Leukas: Results of a Topographic Survey, 1991–1992," *The Journal of the American School of Classical Studies at Athens* 70 (2001), pp. 285–347; Maher and Mowat, "The defence," pp. 451–95; Anna Magdalena Blomley, *A Landscape of Conflict. Rural Fortification in the Argolid (400–146 BC)* (Oxford: Archaeopress, 2022).

17 Sarah P. Morris and John K. Papadopoulos, "Greek Towers and Slaves: An Archaeology of Exploitation," *American Journal of Archaeology* 109 (2005), pp. 155–225.

18 Cedric Brélaz and Pierre Ducrey, eds. *Sécurité collective et ordre public dans les sociétés anciennes* (Genève: Fondation Hardt, 2008).

19 Sylvien Fachard, "A decade of research on Greek fortifications," *Archaeological Reports* 62 (2016), pp. 77–88.

20 Yannis Pikoulas, *Odiko diktuo kai amuna apo tin Korintho sto Argos kai tin Arkadia* [Road Networks and Defence from Corinth to Argos and Arcadia] (Athens: Horos, 1995). Pikoulas was also the first to document one of the two Tegean watchtowers discussed here. Pikoulas, *Odiko diktuo*, pp. 252–53.

21 Maher and Mowat, "The defence network".

22 Maher and Mowat, "The defence network," p. 462.

dimensions, with length of sides varying from 4.5 to 4.8 m, and with a wall thickness ranging from 0.4 to 0.7 m.[23] Maher and Mowat estimated that the towers rose to a height of between 8 and 10 m.[24]

3 Remains and Locations of Rural Watchtowers at Tegea

The remains of the Agios Athanasios tower can be found at the highest point (820 m) of a peak on the south-eastern edge of the Tegean plain (Figure 4.3)

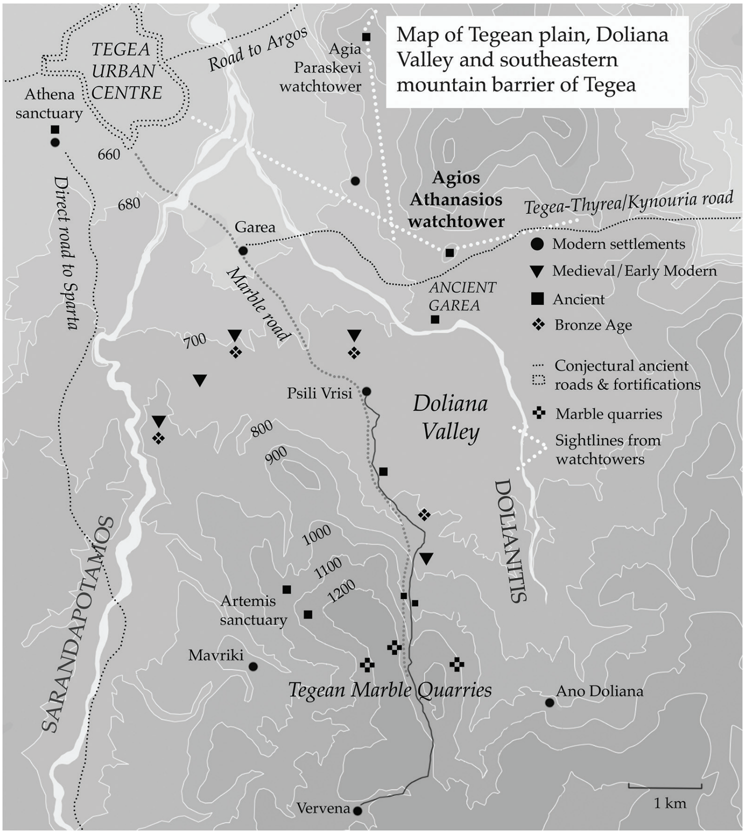

FIGURE 4.3 Map of Tegean plain, Doliana Valley and the mountain barrier between Tegean territory and Sparta (to the South) and Thyrea/Argos to the east
PRODUCED IN ADOBE PHOTOSHOP 2024 BY JØRGEN BAKKE

23 Maher and Mowat, "The defence network," pp. 462 and 480.
24 Maher and Mowat, "The defence network," p. 482.

– a location that would have been ideal to visually control the central territory of Tegea (Figures 4.3 and 4.4) as well as the Doliana Valley, a side-valley to the south-east of Tegea (Figures 4.3 and 4.5). The remains make up the outline of a square building of limestone blocks set without mortar (Figure 4.1). No precise

FIGURE 4.4 View of Tegean plain from the Agios Athanasios *skope*
PHOTO: JØRGEN BAKKE

FIGURE 4.5 View of Doliana Valley from the Agios Athanasios *skope*
PHOTO: JØRGEN BAKKE

measurements were made during the survey, but we estimated the structure to be approximately 5.8 × 5.8 m, with walls 0.7–0.8 m thick.[25] The walls are best preserved on the south-western and north-western sides. Three rows of polygonal limestone blocks are set in courses rising to a height of approximately 1.5 m. The polygonal blocks have been perfectly set to join each other. In the eastern corner of the structure the original blocks have been replaced down to the lowest visible course with small and uneven blocks stacked on top of each-other (Figure 4.6). Some tile fragments have been inserted in a joint between two stone blocks. Since no preserved lime mortar is visible in the joints, it is impossible to suggest a date for this repair. A qualified guess is that it is early modern rather than ancient or medieval. Near the eastern edge of the south-eastern side of the structure that has been repaired there is a gap of some 0.9 m in the original facing—as low as can be observed on the surface—which might suggest an original doorway but would require an excavation to demonstrate unequivocally. The facing of the preserved polygonal blocks is rough and should be characterized as quarry-faced or hammer-faced. In addition to

FIGURE 4.6 South-eastern side of the watchtower at Agios Athanasios, where original blocks have been replaced with smaller blocks and tile fragments. A possible doorway can be seen in the eastern corner.
PHOTO: JØRGEN BAKKE

25 The survey was undertaken by Jonatan Krzywinsky, Nils Ole Sundet and me in 2014.

the preserved limestone blocks, the only remains that were observed on the surface near the structure were shards of red-glazed roof-tiles of a type dated from the archaic to the Hellenistic periods (Figure 4.2).[26]

It is difficult to provide a more precise date of the preserved ancient walls at Agios Athanasios based on style alone. Polygonal walls are usually dated to the 5th century B.C., but examples of coursed polygonal work can be found as late as the early 3rd century B.C.[27] The masonry at Agios Athaniasios can be compared with some sections of the urban fortifications at Mantinea.[28] Robert L. Scranton connected this section of the wall with the urban fortification that was flooded as part of a siege operation by the Spartan army in 385 B.C.,[29] and therefore potentially as early as the time of the first consolidation of Mantinea in the early 5th century B.C.[30]

If, stylistically, the early 5th century sections of urban fortifications at Mantinea provide the most important comparator to the Agios Athanasios tower, the best functional parallels are similar structures on mountain peaks surrounding the central territory of ancient Mantinea like the already mentioned tower at *Skope*, as well as the remains of another Tegean tower at Agia Paraskevi (Figure 4.3) 3.3 km north-north-west of Agios Athanasios.[31] Like the Agios Athanasios tower, the Mantinean towers are set in dry masonry in a coursed polygonal style.[32] All are square in shape, but they are somewhat smaller than the Agios Athanasios tower, ranging between 4.5 × 4.5 and 4.7 × 4.8 m. None of the Mantinean towers are preserved above the third course, as is also the case at Agios Athanasios. Maher and Mowat's stylistic argument also compare with the coursed polygonal sections of the Mantinean city walls, and so they do not exclude the possibility of an early 5th century B.C. origin.[33] Potentially important in this regard are historical accounts of increased conflict during the years 421–18 B.C., when Mantinea left the alliance with Sparta in favour of Argos and

26 Aristotelis Koskinas, "Roof Tiles," in *Land of Sikyon: Archaeology and History of a Greek City-State,* ed. Y.A. Lolos (Princeton: The American School of Classical Studie, 2011), p. 555.

27 Scranton, *Greek Walls*, p. 55.

28 Scranton, *Greek Walls*, pp. 57–59.

29 Xenophon, *Hellenica*, 5.2.1-7, trans. Charleton Lewis Brownson, II (Cambridge, Massachusetts: Harvard University Press 1921), pp. 24–31.

30 Scranton, *Greek Walls*, p. 59; Terry Buckley, *Aspects of Greek History 750–323. A Source-based Approach* (London: Routledge, 1996), p. 234.

31 Maher and Mowat, "The defence network," p. 462.

32 Maher and Mowat, "The defence network," p. 479.

33 Scranton, *Greek Walls*, p. 59; Maher and Mowat, "The defence network," p. 490.

Elis and Athens on the mainland. Taking the evidence together, they argue that the Mantinean signal towers were constructed later in the 5th century.[34]

Because the second Tegean tower at Agia Paraskevi (Figure 4.3) is partially reused in the church of Agia Paraskevi, it is not possible to determine whether it was originally square or rectangular in shape.[35] One preserved length and two corners of the wall were measured by Pikoulas to 5.15 m, and with a wall thickness of 1.16 m. This makes it slightly larger than the Mantinean examples and slightly smaller than the tower at Agios Athanasios. The style is referred to by Pikoulas as 'trapezoidal',[36] and indeed, a couple of blocks in the best-preserved corner can be described as such, but like the examples at Agios Athanasios and Mantinea the masonry style is best characterized as coursed polygonal.

4 Views of the Dancing-Floor of Tegea

During the historical window of the early 5th to early 3rd centuries B.C. suggested by the masonry style of the Agios Athanasios tower foundations, the territory of Tegea formed a battleground for many regional conflicts. One should also be open to the possibility that the Agios Athanasios *skope* had a strategic position at a much earlier stage of Tegean history. Although they apparently had no ships of their own, Tegean armed forces are mentioned in the earliest military record from ancient Greece, the so-called Homeric catalogue of ships.[37] It is noteworthy that the earliest mention of the use of signal-fires to transmit warnings about an invading enemy can be found in the *Iliad*.[38] Although it is difficult to assign any precise date to the events of the Trojan War described in the *Iliad*, we know that stories about this conflict circulated already in the earliest phase of Greek alphabetic writing in the 8th century B.C.[39]

34 Thucydides, *History of the Peloponnesian War* 5.29.1, trans. Charles Forster Smith, vol. III (Cambridge, Massachusetts: Harvard University Press, 1921), pp. 54–5; Maher and Mowat, "The defence network," pp. 490–91.

35 Pikoulas, *Odiko diktuo*, pp. 252–53.

36 Pikoulas, *Odiko diktuo*, p. 253.

37 Homer, *Iliad*, 2.607–14, trans. Augustus Taber Murray, vol. I (Cambridge, Massachusetts: Harvard University Press, 1924), pp. 106–7.

38 Homer, *Iliad*, 18.206–214, II, pp. 302–03.

39 Martin West, "The Homeric Question Today," *Proceedings of the American Philosophical Society* 155 (2011), pp. 391–93.

According to classical literary accounts the powerful Spartans in the southern Peloponnese stepped up their involvement in Tegean territory from the early 6th century B.C.[40] This was, no doubt, connected with the potentially rich agricultural resources of Tegea. The Greek historian Herodotus (484–25 B.C.) described how the early 6th century B.C. campaigns by the Spartans failed to conquer Tegean territory. He also relates the story about the Delphic oracle who told the Spartans that their desire for the territory of Tegea would only be fulfilled if they came into possession of the bones of the hero Orestes that were supposed to be buried at Tegea.[41] What is interesting with the Delphic oracle in our context is that she described Tegean territory as a "well-ordered plain" (*kalon pedion*) suited for "dancing" (*possikroton orkhesasthai*) and where "measuring distances with precise survey techniques" (*skhoivo diametresasthai*) had been undertaken.[42] The comparison of central polis territory with the "round stage floor" (*orkhestra*) of the theatre is also found in the characterisation of the Boeotian plain on the Greek mainland as "the dancing floor of Ares" (*pedion Areos orkhestran*) attributed to the Theban general Epaminondas.[43] The literary image of Tegean *khora* as a flat dancing-floor presupposes a view of the territory of Tegea from a vantage point high above the Tegean plain; exactly the kind of view afforded from the *skope* at Agios Athanasios (Figure 4.4). Even though no documented archaeological remains can testify that the Agios Athanasios *skope* was used as an observation—and signalling post at this early date, this Pythian topography of viewing and interpretation presupposes that places like it played a role in the cultural appropriation of communal polis territory at Tegea already in the 6th century B.C. *Skopai* like Agios Athanasios are thus a constituting material agents of the cultural appropriation of Tegean territory (*khora*). Interestingly, the agency of this *skope* does not only materialise as a literary image in the poetic Delphic oracle, but also as a precise geometric projection (*skhoivo diametresasthai*) of Tegean city-state territory (*khora*).

Observation—and signalling posts like the Agios Athanasios *skope* hardly played a role in the territorial defence of the city-state because the actual battles took place down on the plain. At the same time the very cultural concept of city-state territory (*khora*) down to its geometrically quantifiable units materialised in the topography of viewing and interpretation that unfolded

40 Paul Cartledge, *Sparta and Laconia. A Regional History 1300–362 BC* (London: Routledge, 1979), p. 118.

41 Herodotus, *The Persian Wars*, 1.66-69, I, trans. Alfred Denis Godley (Cambridge, Massachusetts: Harvard University Press, 1920), pp. 76–85.

42 Herodotus, *The Persian Wars*, 1.66, I, pp. 78–79.

43 Plutarch *Marcellus*, 21.2, trans. Bernadotte Perrin (Lives) V (Cambridge, Massachusetts: Harvard University Press, 1917), pp. 492–93.

in such places. This may be why the narrative about the death of the Theban general Epaminindas unfolds from such a place, wherefrom he could view and appreciate the topography of the battle he had fought and won at Mantinea in 362 B.C.[44]

5 Viewing Military Agents from the 6th to the 2nd Century B.C.

In addition to the main Tegean plain, the Agios Athanasios *skope* also provides a commanding view of the Doliana Valley (figures 3 and 5) that opens towards the main Tegean Plain from the south-east. In his *Tour of Greece*, a travel description from the 2nd century A.D., Pausanias mentioned one road leading into the central Tegean plain, and that probably passed through this valley. This was the eastern route to Kynouria and Thyrea, that also interconnected with Sparta in the south and Argos in the north-eastern Peloponnese (Figure 4.3).[45] The most important military conflict routes that were visible from the Agios Athanasios tower would have been the southern and south-western routes to Sparta. The main military route to Sparta entered the Tegean plain via Megalopolis and the Asea Valley from the south-west.[46] The Vigla Pass where this road entered the Tegean Plain is 12 km from the Agios Athanasios tower, and so the Tegeans probably had observation posts closer to it.[47] Pausanias also mentions another route out of Tegea directly to Sparta. It is uncertain exactly where this so-called direct route passed, but it would have been much closer to the Agios Athanasios watchtower. One possibility is that it passed through the Sarandapotamos Valley (Figure 4.3).[48]

The mountain slopes most clearly visible to the south of Agios Athanasios connected with the immediate border zone between Tegea and Sparta. In Antiquity this area was probably occupied by two communities, the *Oiatai*

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44 Pausanias, 8.11.7–8, III, pp. 400–1.

45 Pausanias, *Description of Greece*, 8.54.4, IV, trans. William Henry Samuel Jones (Cambridge, Massachusetts: Harvard University Press, 1935), pp. 166–67; William Kendrick Pritchett, *Studies in ancient Greek topography. Part IV* (*Passes*) (Berkeley and Los Angeles: University of California Press, 1982), pp. 64–73; Panagiotis B. Phaklaris, *Arkhaia Kunouria. Anthropini drastiriotita kai periballon* [Ancient Kynouria. Human Activity and Environment] (Athens: Greek Ministry of Culture, 1990), pp. 209–16; Bakke and Bakke-Alisøy, "How to survey a road," p. 37.

46 Pausanias, *Description of Greece*, 3.20.8–21.3, IV, pp. 129–33; Pritchett, *Studies in ancient Greek IV*, pp. 1–28.

47 Pausanias, *Description of Greece*, 8.44.4–8, IV, pp. 122–25.

48 Pausanias, *Description of Greece*, 8.53.11, IV, pp. 164–65.

and the *Karyatai*.[49] This area is mountainous, and has always had a primarily pastoral economy.[50] It has been argued that the *Karyatai* had their main settlement at modern *Analipsis*, and that the *Oiatai* were settled at *Oion*, near the modern village *Arvanitokerasia*.[51] In ancient sources the *Oiatai* are also referred to as the *Skiritai*, and the district that they inhabited, the Skiritis.[52] At some point this region was probably controlled by Tegea, but the *Skiritai* also played an important role in early Spartan expansion towards Tegea.[53] Unlike in the western peninsula where the Spartans in the 7th century B.C. had practically enslaved the Messenian population, the *Skiritai* were awarded a more respectable role as dependant allies, or *perioikoi* ('those who dwell around'). The *Skiritai* also held a prominent place in the Spartan army—a battalion of about 600 men, that on occasion occupied the extreme-left wing of the Spartan hoplite phalanx, indeed the most demanding, dangerous, and honourable position in the army.[54]

The early expansion of Sparta from the south into Tegean territory was probably accompanied by the introduction of the Persian system of military carriage roads, perhaps as early as the 6th century B.C.[55] Little remains of this Spartan military road-network in this area, but two stretches of carriage road have been documented in the Skiritis and one near *Analipsis*, probably identical with ancient *Karyai*.[56] In reference to military campaigns in the territory of Tegea in 370 B.C., the Greek historian Xenophon states that there were two military routes from Tegea into the Skiritis and Karyatis respectively. In alliance with the Arcadians the Theban army in 370 B.C. organised a campaign into the territory of Sparta from Tegea in the north. Xenophon said that the Thebans entered via *Karyai*, whereas the Arcadians entered via *Oion* in Skiritis.[57]

Pikoulas has argued that there was a network of interconnecting roads between Skiritis and *Karyai*, and also that there were two roads into this area

49 Pausanias, *Description of Greece*, 8.45.1, IV, pp. 126–27.
50 Jørgen Bakke, *Forty Rivers. Landscape and Memory in the District of Ancient Tegea* (Bergen: Bora, 2008), p. 107.
51 Bakke, *Forty Rivers*, p. 107.
52 Thucydides, *History,* 5.67, II, pp. 128–29.
53 Cartledge, *Sparta and Laconia*, pp. 6 and 109.
54 Thucydides, *History*, 5.67, II, pp. 128–29; Cartledge, *Sparta and Laconia*, pp. 210–20.
55 William Kendrick Pritchett, *Studies in ancient Greek topography. Part III* (*Roads*) (Berkeley and Los Angeles: University of California Press, 1980), pp. 143–96; Yannis Pikoulas, "The Road-Network of Arcadia," in *Defining Ancient Arcadia*, eds. Thomas Heine Nielsen and James Roy (Copenhagen: The Royal Danish Academy of Sciences and Letters, 1999), pp. 250–55; Bakke, *Forty Rivers*, pp. 90–94.
56 Pikoulas, "The Road-Network," pp. 258 and 299; Bakke, *Forty Rivers*, pp. 99 and 109.
57 Xenophon, *Hellenica*, 6.5.26, II, pp. 206–07.

from Tegea.[58] Documentation from the recent survey of the Doliana Valley supports Pikoulas's argument about a route from *Karyai* to Tegea via the Doliana Valley that dates back to the Bronze Age.[59] At an altitude of between 1200 and 1100 m we also documented the remains of the marble quarries of ancient Tegea.[60] We also believe that the route between Sparta and Tegea via *Karyai* that was used by the Theban army in 370 B.C. passed close by the Tegean marble quarries (Figure 4.3). Marble from these quarries was used on the Tegean Plain from around 600 B.C.,[61] at which time the tension between Tegea and Sparta was building up. There are no documented remains of an architectural installation at Agios Athanasios at this early stage, but its *skope* would already have constituted an important topography of viewing and interpretation that visually controlled potential troop movements from Sparta via the Karyatis, as well as the important early industrial activity in the Tegean marble quarries.

We have already seen how the intensive diplomatic, and military activity on the border between Tegea and Sparta was given cultural expression in the story about the bones of Orestes reported by Herodotus.[62] Since the Spartans had been unable to conquer Tegean territory in the early 6th century B.C., they sent agents to Tegea in search after his grave. At some point in the early 6th century according to Herodotus a man at Tegea made a chance discovery of large bones in his garden. A Spartan agent named Lichas who had picked up this information, excavated the bones and brought them to Sparta. After having obtained the bones, *c.*550 B.C., the Spartans gained control of Tegean territory and formed an alliance with Tegea. The relationship between Tegea and Sparta remained tense, but the alliance helped to consolidate the most important military cooperation in the Peloponnese from the 6th to the 4th century B.C., the Peloponnesian League.[63]

58 Pikoulas, "The Road-Network," pp. 258 and 299.

59 Hege A. Bakke-Alisøy, "Communication and Trade at Tegea in the Bronze Age," in *Local and Global Perspectives on Mobility in the Eastern Mediterranean*, ed. Ole Christian Aslaksen (Athens: The Norwegian Institute at Athens, 2016), pp. 135–58; Bakke and Bakke-Alisøy, "*How to survey*".

60 Jørgen Bakke, "The Life of the Marble Mountain: Agency and Ecology in the Marble Quarries of Ancient Tegea," in *Shaping Cultural Landscapes: Connecting Agriculture, Crafts, Construction, Transport, and Resilience Strategies,* eds. Ann Brysbaert, Jari Pakkanen and Irene Vikatou (Leiden: Sidestone Press, 2022), pp. 21–38.

61 Erik *Østby*, "The Sanctuary of Athena Alea at Tegea in the Pre-Classical Period," in *Tegea I. Investigations in the Temple of Athena Alea 1991–1994*, ed. Erik *Østby* (Papers and Monographs from the Norwegian Institute at Athens) 3 (Athens: The Norwegian Institute at Athens, 2014), pp. 11–56.

62 Herodotus, *The Persian Wars*, 1.66–69, I, pp. 76–85.

63 Buckley, *Aspects of Greek,* pp. 80–82.

After the culmination of conflict between Greeks and Persians in the early 5th century B.C., the Tegeans distanced themselves from Sparta.[64] An attempt to form an alliance with Argos in 475 led to military conflict and defeat for Tegea and Argos. In 469 there was new military conflict with Sparta and a coalition of Arcadian city-states. Tegea and the other Arcadians lost the battle, and Tegea was forced to re-enter the Peloponnesian League. After the defeat of the Arcadians in 469 Tegea's immediate neighbour Mantinea received support from Argos and established itself as a major force in the central peninsula. In this period there was also growing tension between Tegea and Mantinea. During the Peloponnesian War (431–404) between the Peloponnesian League and the Delian League led by Athens the conflict between Tegea and Mantinea culminated in the monumental battle of Mantinea in 418.

The existence of similar coursed polygonal masonry as in the Mantinean city wall makes it a possible scenario that the Agios Athanasios and Agia Paraskevi towers were constructed already in the years after the second Persian invasion of Greece (480–79) when Tegea was distancing herself from Sparta. In these specific historical circumstances, the primary military intelligence value of the Agios Athanasios *skope* would have been to control movement of troops from Sparta via the routes that passed close to the Tegean marble quarries. The most frequent military spectacle from the Agios Athanasios *skope* in this period would have been the movements of the battalion of the 600 *Skiritai*. Its secondary intelligence value would have been observations on the road from Kynouria on the south-eastern Tegean border (Figure 4.3).[65] At this point Kynouria was controlled by Argos (Figure 4.2), the one powerful Peloponnesian polis that never supported the Peloponnesian League.

If the *skope* on Agios Athanasios was reinforced with a stone-built structure at a later stage in the 5th century, which is the date suggested by Maher and Mowat for the similar towers at Mantinea,[66] the tables of military strategy would have become completely turned. Once again in alliance with Sparta, Argos and Mantinea were now enemies of Tegea. During the Battle of Mantinea in 418 the Spartan army probably approached the battlefield via the traditional indirect route of the Asea Valley via the Vigla Pass, and met up with their Arcadian allies, presumably also the *Skiritai*, at Tegea.[67] The *Skiritai* would have approached Tegea directly from *Oion*, and probably entered the Tegean plain via the Sarandapotamos Valley (Figure 4.3) well within viewing distance

64 Buckley, *Aspects of Greek*, pp. 233–35.
65 Pausanias, *Description of Greece*, 8.54.4, IV, pp. 166–67.
66 Maher and Mowat, "The defence network".
67 Thucydides, *History*, 5.64, trans. Smith, III, pp. 138–39.

of the *skope* at Agios Athanasios. According to Thucydides the Spartan army this time numbered some 2500 infantry troops from Sparta, including the battalion of 600 *Skiritai*.[68]

Even though the towers with stone foundations at Agios Athanasios and Agia Paraskevi were most likely built in the 5th century, they were probably still in use in the 4th, 3rd and 2nd century B.C. until the Romans conquered Greece in 146 B.C. and demanded that the Greek city-states demolished their fortifications.[69] New alliances were formed, and new military agents like the Macedonians also found their way within viewing distance of the Agios Athanasios *skope* in the 4th century B.C. The old nemesis of Tegea, Sparta was temporarily weakened by the Macedonian dominance in the Peloponnese in the mid-4th century, but even in the 3rd century Sparta still made frequent military advances towards Tegea (e.g. in 228, 227, 218, and 210 B.C.). Although alliances may have shifted and new military agents appeared on the dancing-floor of Tegea, many of the same agents and their movements would have appeared similar in size as well as in trajectory from the *skope* of the Agios Athanasios watchtower from the 6th through to the 2nd centuries B.C.

6 Technological Agents of Signalling and Interpretation

For most of its ancient history the specialists that manned the observation and signalling tower at Agios Athanasios probably used a communication technology where simple signal-fires or torches (*pyrsoi*) triggered prearranged messages in intermediary posts in a signal-network or were read directly by guards (*phylakteria*) posted on the Tegean city wall (Figure 4.3). Sound signals were perhaps also used. The *salpinx*, a long bronze trumpet, is mentioned as a military signalling instrument already in the *Iliad*.[70] Although there is no intervisibility between them the two Tegean *skopiai* at Agios Athanasios and Agia Paraskevi, they probably played their role as intermediary posts in a communication network centuries before the stone foundations for high, multi-storey watchtowers were built there.

The 5th century date of the structure that is only preserved up to the third course to a height of approximately 1.5 m at Agios Athanasios (Figures 4.1 and 4.6), probably indicates that the tower was stone-built only in its substructure.

68 Thucydides, *History*, 5.68.1–3, trans. Smith, IV, pp. 128–31; John Francis Lazenby, *The Peloponnesian War. A Military Study* (London: Routledge, 2003), pp. 121–22.

69 Pausanias, *Description of Greece*, 7.16.9, III, pp. 258–61.

70 Homer, *Iliad*, 18.219, II, pp. 302–03.

For the similar structures at Mantinea, Maher and Mowat suggest a reconstruction of a stone foundation with a maximum height of up to 2 m, and a mudbrick superstructure of two or three floors adding 6–8 m to the height of the tower.[71] The surface finds of red-glazed tile fragments at Agios Athanasios (Figure 4.2) indicate that the building had a tiled roof.[72] Maher and Mowat also suggested that the Mantinean towers were crowned with a wooden shed with a tiled roof.[73] This shed had an important function since this was where the signal—and observation specialists (*phryktoroi*) were posted when they performed their most important duty, the attentive visual observation (*phroureo*) of troop movements. If we are to judge from Aristotles' description the purpose of the lower floors would have been to accommodate the team of specialists with mess-rooms (*syssitia*) and sleeping arrangements. In addition to military guards (*phryktoroi*) that were responsible for observation and making fire-signals this team would often have included specialists that supervised agricultural production (*agronomoi*) and natural resources (*hyloroi*) like the Tegean marble quarries.[74]

The *phryktoroi* who manned the tower at Agios Athanasios in Antiquity did not, of course, have modern optical instruments, but they probably had a simple kind of sighting tube, known as a *dioptra*. This instrument was probably also used to focus the view (*phroureo*) of lookouts (*skopiai*).[75] In the late 4th century B.C., Aristotle described how the sighting tube focused and enhanced the vision of the observer.[76] In the 4th century a simple semaphore system that used matching sets of vessels filled with water where a limited number of messages were marked on different levels on the matching vessels was described by the military engineer Aeneas Tacitus.[77] A more advanced semaphore system that could be used to transmit alphabetic messages is described in the 2nd century B.C. The Greek historian Polybius attributes the invention of this system to Cleoxenus and Democleitus.[78]

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71 Maher and Mowat, "The defence network," pp. 482–84.

72 Lawrence, *Greek Aims*, p. 190. Similar tile fragments were also found near some of the Mantinean towers. See Maher and Mowat, "The defence network," p. 483.

73 Maher and Mowat, "The defence network," p. 483.

74 Aristotle, *Politics*, 1331b11.4, pp. 594–95.

75 Michael Jonathan Taunton Lewis, *Surveying Instruments of Greece and Rome* (Cambridge: Cambridge University Press, 2004), p. 37.

76 Aristotle, *Generation of Animals,* 780b18–23, trans. Arthur Leslie Peck (Cambridge, Massachusetts: Harvard University Press, 1942) pp. 502–03.

77 Polybius, *The Histories*, 10.44.2, IV, trans. William Roger Paton, rev. Frank William Walbank and Christian Habicht (Cambridge, Massachusetts: Harvard University Press, 2011 [1925]), pp. 234–35.

78 Polybius, *The Histories*, 10.45.6–47.11, IV*,* pp. 238–45.

The so-called Polybius square is based on the laying out of the 24 letters of the Greek alphabet in a numbered grid from one to five along both axes. The 25th box in the square would be left blank to signify the hiatus between words. Two teams of five torchbearers would stand at one tower, and display numbers from 1 to 5 on the left and right side simultaneously, and the interpreter in the other tower could read each set of signals as a letter in the Greek alphabet. Polybius also describes a technique whereby the reading could be undertaken by one man using a double set of *dioptra* so that it was possible to distinguish and decipher almost simultaneously the signals of the first and second team.[79]

The historian Polybius that described and allegedly himself improved this semaphore system was from the Arcadian city Megalopolis founded by a confederation of Arcadian city states (the Arcadian League) in the early 4th century. Before moving on to a career as political adviser, teacher, and author for the Roman elite in the capital, Polybius had followed his father who became a commanding general of the Achaean League.[80] Around 170 B.C. Polybius became cavalry commander. If Polybius contributed to the application of the alphabetic semaphore system in regional networks of observation—and signalling towers in Arcadia, it would have been during his 10–15 years involvement, after 183 B.C., with the military affairs of Megalopolis and the Achaean League. In that case, the Polybius square semaphore system may have been in use during the final couple of decades when the Tegean and Mantinean networks of rural watchtowers were still in use. After the sack of Corinth by the Roman general Lucius Mummius in 146 B.C., the Romans demanded that all fortifications in the Peloponnese be demolished.[81] If all Arcadian watchtowers were destroyed at that time is, of course, difficult to say without better stratified and dated contexts from watchtower sites like at Agios Athanasios, but it is possible that they were never used again in their original function after the Roman conquest.

7 Concluding Remarks

The remains of the ancient watchtower at Agios Athanasios on the southeastern edge of the territory of ancient Tegea is perhaps not the most impressive monument of classical Greece. When its *skope* is related to ancient regional

79 Polybius, *The Histories,* 10.46.1, IV, pp. 240–41.
80 Susan Sorek, *Ancient Historians. A Student Handbook* (London: Continuum, 2012), pp. 76–83.
81 Pausanias, *Description of Greece*, 7.16.9, III, pp. 258–61.

conflicts and technologies of observation and long-distance communication, it does, however, allow us to reconstruct the material agency of ancient topographies of viewing and interpretation. As we have seen this *skope* is much more than an incidental *belvedere*, a good and beautiful view. It is rather an example of a landscape from which the very notion of city-state territory (*khora*) is visualised. The agency of this *skope* can be regarded as a machine where some parts are made up of the human agents that collect information and pass it on, and some of material agents like sighting tubes, alphabetic grids, fire-signals, and sightlines in the landscape. In combination with what we can reconstruct of military, agricultural, and economic activity within the grasp of the viewing and interpretation technology of this *skope* in Antiquity, we can trace glimpses of its material agency. When we apply the sighting tubes of the watchmen of classical Antiquity, we can reconstruct the outline of how, when, and where military, agricultural, and economic historical agents were visualised from this machine of visual observation and signalling.

As far as we can document with material and literary sources the topographies of viewing and interpretation of the Agios Athanasios *skope* unfolded within a limited historical window. Tegea had perhaps established some form of observation and long-distance communication already in the 'Homeric age' as is indicated in the *Iliad*, whatever that means in historical terms, and the classical Greek historian Herodotus indicated with his report about the Spartan search for the bones of Orestes that the districts of the *Oiatai* and *Karyatai* as well as the *Skiritis* would have been of great strategic interest for Tegea and Sparta already in the 6th century B.C. It is, however, first in the 5th century B.C. that we can argue that a watchtower was built at the Agios Athanasios *skope*. After the Roman conquest of Greece in the 2nd century B.C., military installations like the one at Agios Athanasios were probably demolished, or at least no longer served their original purpose.

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CHAPTER 5

Signalling and Surveillance Towers in the Western Roman Empire: 1st Century B.C. to 3rd Century A.D.

Joey Williams

1 Towers in the Defence and Administration of Roman Imperial Provinces

In the Western Roman Empire, towers provided a means of both surveillance and communication along borders and within provinces. Their utility was compounded by the threat of violence that a surveilled, colonial population would understand came with the presence of a tower in their territory. The use of simple fire signalling, such as that depicted among the towers on the Column of Trajan (Figures 5.1 and 5.2),[1] made real the possibility of a quick reprisal from the Roman army against any restive indigenous population. The archaeological remains of Roman towers, and their surveillance and signalling systems, have received significant scholarly interest over the last two decades, and this chapter outlines these recent developments in their study and the potential for future directions. This chapter does not, however, aim to provide a comprehensive catalogue of Roman towers. Instead, a representative sample of towers used for internal security and military signalling are discussed below.

Around the Mediterranean, towers have been identified in a variety of archaeological contexts far distant from Rome's imperial frontiers. Greek towers were constructed as part of rural farmsteads and were likely used to house and surveil groups of enslaved laborers.[2] Towers identified at Roman villas likely had the same purpose, although Roman authors like Pliny the Younger suggest that their towers were simply to provide the wealthy owner of an estate with spectacular vistas.[3] Elsewhere, carceral labourers were observed from

1 For a discussion of the Column of Trajan and Roman signalling, see also Thiel this volume.
2 Sarah P Morris and John K. Papadopoulos, "Greek Towers and Slaves: An Archaeology of Exploitation," *American Journal of Archaeology* 109, no. 2 (2005), pp. 155–225; for Greek signalling systems see also Bakke this volume.
3 Pliny the Younger, *Letters, Volume I: Books 1–7*, trans. Betty Radice (Loeb Classical Library) 55 (Cambridge, MA: Harvard University Press, 1969), 2.17.12-3.

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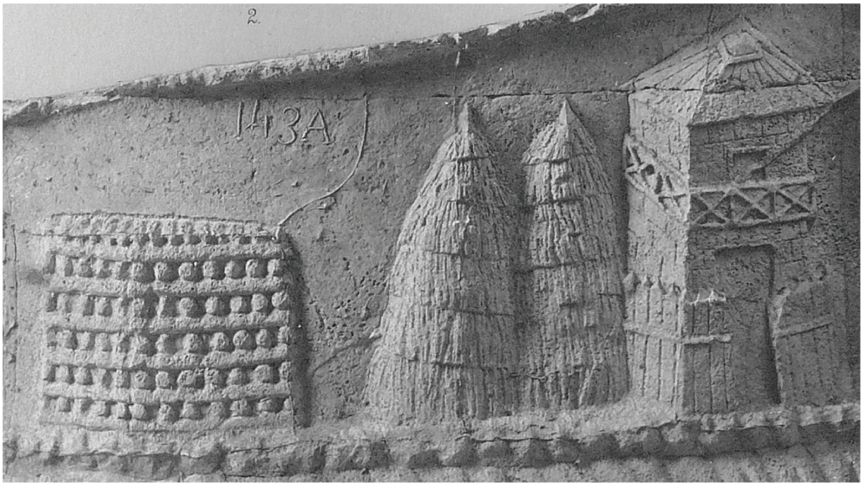

FIGURE 5.1 Watchtower with firewood and hay from the Column of Trajan. After Cichorius 1896: pl. IV

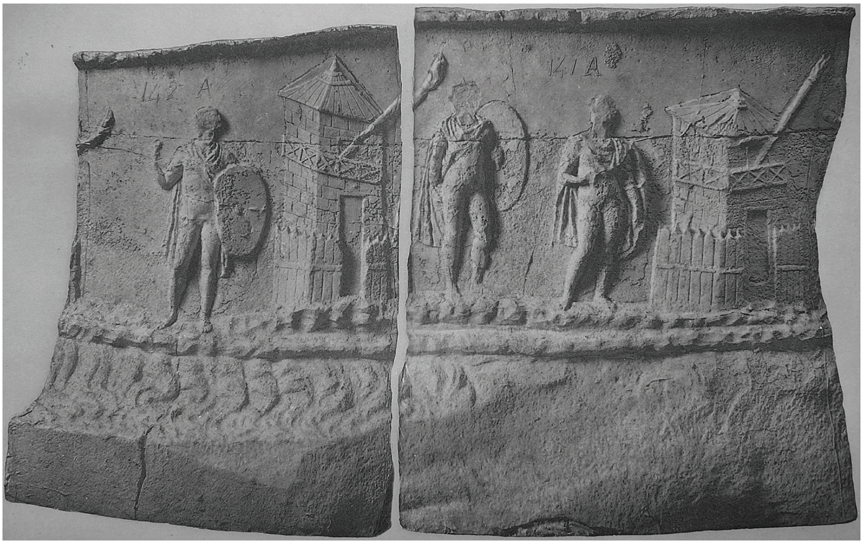

FIGURE 5.2 Watchtowers with signaling fires from the Column of Trajan. After Cichorius 1896: pl. V

watchtowers around Roman mines in Jordan, the southern Judaean desert, and imperial quarries in Egypt.[4] While these watchtowers and their surveillance

4 Hannah Friedman, "Imperial Industry and Observational Control in the Faynan Region, Southern Jordan." *Internet Archaeology* no. 27 (2009). http://intarch.ac.uk/journal/issue27

system were directed at overseeing forced labor in Roman extractive industry, their design and implementation was likely inspired by the towers situated on the colonial frontier. In Roman Egypt, the connection between a tower used to observe carceral labor and the Roman military are clear. Evidence from *ostraka*, for example, indicate that simple observation posts around the quarries of Mons Claudianus, Egypt were manned by locals who reported to a Roman military officer.[5] The system of watchtowers, and the communication it engendered, around these mines and quarries was instituted by the Roman army, although its purpose was far removed from the towers found on the Empire's borders.

Roman city walls also possessed towers, although these were likely more for defensive purposes than surveillance and signalling. Nevertheless, the presence of towers on city walls would have provided an early warning system in the event of an attack, especially if those defensive towers were connected to signalling posts in the city's hinterland. Despite these differences, towers on city walls can provide insight into the design of towers elsewhere. The tower from the walls of Ammaia, Portugal is preserved up to the height of the second floor (Figure 5.3), and an extant window suggests that its inhabitants could keep watch over the territory outside the city even in inclement weather. Similarly, anyone approaching the city, or traveling through its immediate vicinity, would know that their movements were observed, and communicated to the city's defenders.

Scholars have often noted the importance of towers on Roman frontiers, particularly along Hadrian's Wall and the German-Rhaetian *limes*. These structures provided both secure defences as well as observation points along static borders. In addition, as David J. Woolliscroft demonstrated in his *Roman Military Signalling,*[6] the towers beyond the linear borders provided an early warning system through a complex system of intervisibility that allowed the towers to communicate via semaphore and fire or smoke signals. An even larger

/4/index.html; Yuval Yekutieli, "Is somebody watching you? Ancient surveillance systems in the southern Judean Desert," *Journal of Mediterranean Archaeology* 19, no. 1 (2006), pp. 65–89.; Roger S. Bagnall, "Army and Police in Roman Upper Egypt." *Journal of the American Research Center in Egypt* 14 (1977), pp. 69–71.

5 Jean Bingen, Adam Bülow-Jacobsen, Walter E.H. Cockle, Hélène Cuvigny, Lene Rubinstein and Wilfried Van Rengen, *Mons Claudianus. Ostraca Graeca et Latina* I. (O. Claud. 1 à 190) (Documents de fouilles, XXIX, 1992), pp. 175–6; Valérie A. Maxfield and David P.S. Peacock. 1997. *Survey and Excavation: Mons Claudianus 1987–1993. Volume 1: Topography and Quarries* (Fouilles de l'IFAO) 37 (Cairo: Institut Français d'Archéologie Orientale), pp. 254–55.

6 David J. Woolliscroft, *Roman Military Signalling* (Stroud and Charleston: Tempus Books, 2001).

FIGURE 5.3 Extant tower from the fortification walls of Ammaia, Portugal
PHOTO: JOEY WILLIAMS

defence system was constructed along Rome's borders with Germania, and the many fortlets, outposts, and towers along it were first recorded between 1894 and 1937 in *Der obergermanisch-raetische Limes des Roemerreiches*.[7] These outposts provided both an early warning via surveillance and a network of signalling that promised a swift military response to any that would cross the border under arms.

Towers were also constructed in the interior of provinces, particularly in inland Iberia, before Roman hegemony in the province was certain. Although not all these towers possessed an intervisible signalling network, their presence provided local Roman commanders some degree of control over important territories, natural resources, and routes through the landscape. By placing these restive provinces under observation, the Romans also provided indigenous population with a ready reminder that violent reprisals awaited any rebellion. That these towers were an effective part of Rome's strategy of claiming territory and reorganizing it to serve their nascent empire is evident

7 ORL, *Der obergermanisch-raetische Limes des Roemerreiches,* eds. Ernst Fabricius, Felix Hettner and Oscar von Sarwey, 15 vols. Heidelberg: Otto Petters, 1894–1937.

in the coincidence of their abandonment with the establishment of colonial villas and settlements.

Small fortifications and towers represent a significant element of the Roman strategy for managing—and protecting—the territories captured by their empire. They oversaw natural resource extraction, guarded borders, surveilled frontiers, and policed colonial landscapes. The use of signalling networks along and beyond borders magnified the power of their surveillance by hastening a response where enslaved peoples might escape, borders and frontiers were violated, or nascent rebellions were formed. Towers and signalling provided a means by which the territory could be defended even from small scale, cross-border raiding, but these towers also aided in the repression of internal dissent against the Roman Empire through the surveillance of colonized landscapes.

2 Literary and Epigraphic References to Towers

The use of watchtowers as a means of passing signals is mentioned several times by the Roman historian Livy. In his description of the Third Macedonian War (171–168 B.C.), watchtowers (*specula*) are used by Macedonian lookouts on the Greek island of Delos to spot passing shipping that they might raid.[8] The lookouts on the towers made signals to the Macedonian naval forces off Delos whenever a ship was spotted, but Livy tells us that these raids were sometimes opposed by Roman warships operating in the same area. Whether this was possible because the Roman ships saw the Macedonian's signals is not mentioned by Livy, but we might suspect the signals were visible over a wide area of the sea. Even if the Romans could not understand the signals, they would quickly ascertain that the signals meant that a shipping raid would soon happen. A similar use of signalling towers is mentioned in Livy's discussion of the siege of Locri, a Greek colony in southern Italy, in 208 B.C.[9] In this passage, watchtowers provide Carthage's forces in Locri with knowledge that Hannibal's army, and especially his Numidian cavalry, are approaching to lift the Roman siege. The Carthaginian's sally out of the city and drive the Romans back to their ships. A third mention of signalling from watchtowers comes in Livy's description of the Carthaginian defence of Iberia during the middle of

8 Livy, *History of Rome, Volume XIII: Books 43–45,* trans. Alfred C. Schlesinger (Loeb Classical Library) 396 (Cambridge, MA: Harvard University Press, 1951), 44.29.3.

9 Livy, *History of Rome, Volume VII: Books 26–27.*, ed. and trans. J.C. Yardley (Loeb Classical Library) 367 (Cambridge, MA: Harvard University Press, 2020), 27.28.16.

the Second Punic War, around 210 B.C.[10] In this passage, pre-existing towers positioned to provide surveillance against bandits are able to spot a Roman fleet before it can surprise the Carthaginian fleet at port. Finally, Livy mentions the Carthaginian use of watchtowers as part of the defence of Africa from imminent Roman invasion in 202–201 B.C.[11] Towers and signals were, according to Livy, an important part of Carthage's defensive strategy, and it may have been this war that instructed the Romans in their value.

Other authors make mention of watchtowers as signalling stations used by the Romans rather than only their enemies. Cicero, in his prosecution of Verres (70 B.C.), mentions the failure of signalling towers to warn of an attack by pirates on the port of Syracuse.[12] The signal fires, which were usually lit when pirates were seen from the watchtowers, remained dark thanks to Verres' incompetence. As a result, the first signal of the pirate's attack on the port was the burning of a Roman fleet. Latin epic poetry also sometimes invokes watchtowers either signalling or failing to signal dramatic events. In Vergil's *Aeneid,* the trumpeter Misenus spots an invading army and signals Aeneas from atop a *specula*.[13] Another example appears in Lucan's *Pharsalia* where Julius Caesar, despite being in a watchtower, fails to see the events of a battle.[14]

An account of the Roman civil war in Iberia, fought primarily in 49 B.C., is recorded in the *Bellum Hispaniense* (a text likely written by one of Julius Caesar's lieutenants rather than Caesar himself). Here towers for surveillance and signalling are mentioned as playing a significant role for both sides. The author comments on the prevalence of towers in the peninsula as a guard against banditry, and notes that the Roman armies fighting in the region adopted a similar tactic by occupying high points in the rugged landscape to watch for raids and assaults.[15] Later, the author reports that the forces

10 Livy, *History of Rome, Volume V: Books 21–22,* trans. B.O. Foster (Loeb Classical Library) 233 (Cambridge, MA: Harvard University Press, 1929), 22.19.6–7.

11 Livy, *History of Rome, Volume VIII: Books 28–30*, ed. and trans. J.C. Yardley (Loeb Classical Library) 381 (Cambridge, MA: Harvard University Press, 2021), 29.23.1.

12 Cicero, *The Verrine Orations, Volume I: Against Caecilius. Against Verres,* Part 1; Part 2, Books 1–2, trans. L.H.G. Greenwood (Loeb Classical Library) 221 (Cambridge, MA: Harvard University Press, 1928), 2.5.93.

13 Virgil, *Eclogues. Georgics. Aeneid: Books 1–6*, trans. H. Rushton Fairclough, rev. G.P. Goold (Loeb Classical Library) 63 (Cambridge, MA: Harvard University Press, 1916), *Aen*. 3.239.

14 Lucan, *The Civil War* (*Pharsalia*), trans. J.D. Duff (Loeb Classical Library) 220 (Cambridge, MA: Harvard University Press, 1928), 6.279.

15 Caesar, *Alexandrian War. African War. Spanish War*, trans. A.G. Way (Loeb Classical Library) 402 (Cambridge, MA: Harvard University Press, 1955), *B. Hisp.* 8.

of Caesar's rivals used civilian lookouts to warn of the approach of Caesar's forces against the city of Ategua.[16]

The presence of so many references to towers and signalling in these Roman authors suggests that this was both a common and well understood practice. Yet all of these texts indicate a surveillance and signalling system that protected only a single point, usually a city, port or military encampment, rather than a linear border on a frontier or a borderless colonial landscape. For textual references to surveillance and signalling towers in these more complex situations we must look to Latin inscriptions. Two epigraphic texts in particular may help to guide our understanding of the purpose of watchtowers, and though neither mentions signalling we may infer its use from context.

The first of these inscriptions comes from the interior of Roman North Africa, and likely references a tower (perhaps one of a network of towers) that overlooked a road. It reads,

> With the emperor Caesar Marcus Aurelius Commodus Antoninus Pius Felix Augustus Germanicus Sarmaticus Britannicus, father of the fatherland, with tribunician power for the twelfth time, as consul for the fifth time. Tiberius Claudius Gordianus, *vir clarissimus*, legate *pro praetore cura agente* of Augustus, ordered that a Commodian surveillance tower be erected between the two roads as a new protection for the safety of travelers.[17]

The second inscription describes both the placement of towers and fortlets along the German *limes* and their intended function as a deterrent against border crossings by raiding bands. It reads,

> The emperor Caesar Marcus Aurelius Commodus Antoninus Augustus Pius Sarmaticus Germanicus Britannicus, *pontifex maximus*, with tribunician power for the sixth time, *imperator* for the fourth time, consul for the fourth time, father of the fatherland, secured the entire riverbank with watchtowers constructed from the ground up as well as guardhouses

16 Caesar, *Alexandrian War. African War. Spanish War*, trans. A.G. Way (Loeb Classical Library) 402 (Cambridge, MA: Harvard University Press, 1955), *B. Hisp.* 13.

17 CIL VIII.2495: Imp(eratore) Caes(are) [M(arco)] Au[relio]/[[[C]ommo[d]o]] Antoni/no Pio Felice Aug(usto) [G]erm(anico)/Sarm(atico) Britannic[o] p(atre) p(atriae)/trib(unicia) p[ot]e(state) XII co(n)s(ule) V/burgum [[Commodi]]/[[anum]] s[p]eculato/rium inter duas vi/as ad salutem comme/antium nova tute/[l]a c[o]nstitui iussit [Ti(berius)]/[Claudi]us [G]ordia[nus]/v(ir) [c(larissimus)] leg(atus) Aug(usti) pr(o) pr(aetore)/[cur]a agen[te ---.

> placed throughout areas exposed to covert incursions of raiders through Lucius Cornelius Felix Plotianus legate *pro praetore*.[18]

These inscriptions both name watchtowers as *burgi speculatorii*, a name for them that does not appear elsewhere in the Latin corpus. It may be that this term refers to particularly fortified towers along the *limes*. Regardless of what they are called, the function of these towers is clearly defined in the inscriptions. In either case, they are intended as defensive measures against banditry and raiding. The first refers to a tower that guarded a crossroads while the second served as a border security measure. These two purposes mirror the archaeological remains of towers that are positioned both on linear borders and within the interiors of provinces.

3 Frontier Watchtowers along the Imperial *Limes*

The defences that stretch along Rome's German and Rhaetian frontier represent one of the largest and most complex pieces of imperial infrastructure. It stretched from the North Sea coast of the Netherlands, along the Rhine and across Germany to the Taunus Mountains, then along the River Main to the Danube. In total, the course of these defences is 568 km. It incorporates both turf walls topped with palisades, infrequent courses of stone walls, dozens of forts, and over 900 watchtowers.[19] The development of this defensive system is complex, and its study is ongoing, but it remains one of the most comprehensively studied frontiers of the Roman Empire.[20] Sommer has recently argued that the German-Rhaetian *Limes* was "a series of individual, relatively short-term systems that were maintained at the frontier, with occasional phases of

18 ILS 8913: Imp(erator) Caes(ar) M(arcus) Aur(elius) [[Commodus]] Antoninus/Aug(ustus) Pius Sarm(aticus) Germ(anicus) Brit(annicus) pont(ifex) max(imus) trib(unicia) pot(estate)/VI imp(erator) IIII co(n)sul IIII p(ater) p(atriae) ripam omnem burgis/a solo extructis item praesidiis per lo/ca opportuna ad clandestinos latruncu/lorum transitus oppositis munivit/per L(ucium) Cornelium Felicem/Plotianum leg(atum) pr(o) pr(aetore).

19 Deutsche Limeskommission 2020, 22 November. The website of the German *Limes* Commission contains an interactive map and detailed discussion of each major section of the German-Rhaetian Limes. The website is the continuation of the work first attempted in *Der Obergermanisch-raetische Limes des Roemerreiches*.

20 Klaus Kortüm, "Zur Datierung der römischen Militäranlagen im obergermanisch-raetischen Limesgebiet. Chronologische Untersuchungen anhand der Münzfunde." *Saalburg-Jahrbuch* (1998), no. 49, pp. 5–65.

neglect in between."[21] The majority of the towers are positioned behind the *limes*, and situated so that they can observe the especially vulnerable sections of the border in depth. This suggests that the fortification of this border was responsive to perceived threats, and the towers occupied intermittently during the long period of Roman control over the region. Old towers could be re-occupied or new towers built when the Roman garrisons perceived a threat. And, as Michael Symonds has recently argued, building these networks of towers allowed for the Romans to slowly expand their claims to territory on and beyond these borders.[22] The towers built under Commodus, mentioned in the inscription above, were perhaps a reaction to the simmering threat left after Commodus' predecessor, Marcus Aurelius, defeated an invading Germanic and Sarmatian force in the Marcomannic Wars (A.D. 166–180). Knowledge of the surveillance provided by the towers may have been the first deterrent against attack, a service perhaps just as valuable as the early warning their ability to signal provided.

Woolliscroft's pioneering study of Roman signalling examined the ability of towers along different sections of the German-Rhaetian *Limes* to communicate.[23] He argues that the Roman garrison along the frontier could communicate via fire signals passed from towers in series along the border. These towers, several of which have been reconstructed in modern times as educational attractions, were likely of the design illustrated on the Column of Trajan in Rome (see Figures 5.1 and 5.2). The Column is a victory monument meant to commemorate Trajan's victory over the Dacians. It depicts the Roman army on the march, in battle, and often the infrastructure that supported its conquest. At the bottom of the column, the story of Trajan's war against the Dacians opens with the image of three watchtowers separated by heroically nude Roman soldiers. The first tower stands next to winter supplies for the inhabitants: a large rack of firewood and two piles of hay. From the upper floor of each tower a pole bearing a torch is extended. This likely represents the fire signal used to communicate between the towers in this network.

If each of the towers along the German-Rhaetian *Limes* could communicate via these beacons, simple binary messages could be passed quickly from the border to the military units stationed in the larger forts. These towers provided

21 C. Sebastian Sommer, "Trajan, Hadrian, Antoninus Pius, Marc Aurel …? – Zur Datierung der Anlagen des Raetischen Limes." *Bericht der Bayerischen Bodendenkmalpleg* 52 (2011), p. 175.

22 Matthew Symonds, *Protecting the Roman Empire: Fortlets, Frontiers, and the Quest for Post-conquest Security* (Cambridge: Cambridge University Press, 2018).

23 Woolliscroft, *Roman Military Signalling,* pp. 110–19. See also Eric Birley, *Research on Hadrian's Wall* (Kendal: Titus Wilson & Son, 1961), pp. 88–99, 103–10 and 116–25.

defence-in-depth, and where one might miss a band of marauders or even an invading army, others in the network might succeed and raise the alarm. It is possible, however, that the fire signals used in the towers were more complex than the simple binary available to a beacon. The 2nd century B.C. author Polybius and the 3rd century A.D. author Julius Africanus both describe systems of communication using different combinations of three torches to send complex messages across long distances.[24] This method of signalling combined a set of three torches in different positions and combinations to form different letters. By changing the position and combination of the torches, complex, lengthy messages could be passed with relative alacrity. Although the towers on the Column of Trajan are shown with only one torch, this may be because of the license of the artist. Additional torches would have occluded some of the other features of the towers and taken up space unnecessarily in what is a relatively cramped area of the relief. Nevertheless, no evidence for any beacon or triple-torch signal has yet been confirmed in the towers excavated on the German-Rhaetian *Limes*.[25]

Elsewhere, the Romans erected another fortified border defence with Hadrian's Wall in the north of England.[26] Beginning in the early 2nd century B.C., Roman legions built a stone and concrete wall (some sections in the western third were built from turf) across the breadth of Britain, dividing their territory in the south from that still held by indigenous Britons in the north. Although smaller than the German-Rhaetian *Limes*, Hadrian's Wall was a permanently garrisoned, well-provisioned military frontier. While the wall itself provided a defensive measure against invasion, it was also useful as a border control station, levying taxes on any that passed through its many gates.[27] Additionally, its presence was likely, as with the defences on the German-Rhaetian *limes*, an intimidating deterrent against any that might be within the view of the garrison on the walls and in the towers.

Along the course of Hadrian's Wall eighty small forts called 'milecastles' were constructed attached to the fortification. The milecastles each housed a small garrison of approximately twenty soldiers who guarded a gate that

24 Polybius, *The Histories,* Volume IV: Books 9–15, trans. W.R. Paton, rev. F.W. Walbank and Christian Habicht (Loeb Classical Library) 159 (Cambridge, MA: Harvard University Press, 2011), X, 45.6–47.4; Iulius Africanus. *Cesti: The Extant Fragments* (*Die griechischen christlichen Schriftsteller der ersten Jahrhunderte, N.F. 18*), trans. William Adler, eds. Martin Walldraff, Carlo Scardino, Christophe Guignard and Laura Mecella (Berlin: Walter de Gruyter, 2012), *Kestoi* 77.

25 Woolliscroft, *Roman Military Signalling*, p. 30.

26 For a discussion of watchtowers and signalling systems in England, see White this volume.

27 Symonds, *Protecting the Roman Empire*, pp. 126–32.

offered access beyond the Wall. In this way the Wall controlled passage of people, livestock, and goods moving into and out of the borders of the Roman Empire. The milecastles provided a ready way to levy taxes on any passing through the gate. Two towers were erected on the Wall on both sides of each milecastle such that someone walking down the wall would encounter either a tower or a milecastle approximately every third of a Roman mile (500 m). This arrangement provided for a security system enforced through surveillance from the towers and milecastles, backed up by the promise of reprisal from the much larger garrisons of the larger forts positioned along or just behind Hadrian's Wall.

The early warning provided by this surveillance system along Rome's northernmost border relied, like that on the German-Rhaetian *limes*, on the presence of signalling towers established at a remove from the border fortification itself. Yet unlike the watchtowers built behind the German border, Hadrian's Wall was served with towers that were established to the north, beyond the wall, with some few exceptions. Woolliscroft's work on signalling has demonstrated that these towers were especially positioned to allow for messages to be sent from the furthest outpost to the Wall's garrison through what he calls 'series' towers. These towers, while they may not have particularly great surveillance potential of their own, serve to repeat and pass on signals from other, more isolated locations. In this way, the surveillance system along and beyond Hadrian's Wall is made all the more effective as it is organized in such a way that even the most remote watchtowers can easily pass an alert to a milecastle or fort garrison.

The surveillance and signalling systems used on both the German-Rhaetian *limes* and the Hadrianic frontier of England guarded against invasion less, perhaps, than they did illegal border crossings by small groups, whether raiding bands or merchants reluctant to pay a customs duty. In this way, their function as a border defence was made manifest to the population living beyond the Roman Empire's borders. Everyone traveling within the borderland guarded by these defences was potentially visible, and the presence of the Roman military promised a swift, armed response to whomever violated those borders. For the towers to function, however, their warnings had to be passed via signal from one point to the next, and this required that each tower possess intervisibility with at least two other signalling stations, or else directly to the nearest visible fort (the exception being those towers at the extreme ends of the *limes* that might possess communication only with one other tower along the border).[28]

28 Woolliscroft, *Roman Military Signalling*, pp. 109–11.

The necessity of line-of-sight signalling multiplied the number of towers and other fortifications required on these frontiers. Yet the extraordinary outlay of men and material necessary to build and maintain these systems over several centuries indicates their effectiveness at monitoring the Roman Empire's borders. It is likely that it was not only the surveillance itself that provided a deterrent, but the knowledge of it amid the local population.

4 Colonial Watchtowers in Portugal and Spain

In Spain and Portugal, however, the colonial frontiers of the Roman Empire were quite different. The interior of the Iberian Peninsula was conquered and colonized by the Romans over a century before the establishment of Hadrian's Wall or the German-Rhaetian *limes*. It was also a borderless region by contrast, with Roman roads running next to indigenous settlements and imperial garrisons established inside local communities. By the 2nd and 1st centuries B.C., Iberia was also known to the Romans as a place prone to banditry and guerilla war.[29] Unlike the banks of the Rhine and Danube or the fields beyond Hadrian's Wall, much of the Iberian interior is mountainous, rocky, and filled with places for a hidden indigenous resistance to take root. By the end of the 1st century B.C., the Romans had established a system of watchtowers that claimed territory through the act of surveillance. This system, in some places, utilized line-of-sight signalling much like that present in the later border

29 For descriptions of banditry in ancient Iberia, see Livy 28.32.9; Appian, *Roman History,* Volume I, ed. and trans. Brian McGing (Loeb Classical Library) 2 (Cambridge, MA: Harvard University Press, 2019), *Hisp*. 71; Cato, Varro, *On Agriculture*, trans. W.D. Hooper, Harrison Boyd Ash (Loeb Classical Library) 283 (Cambridge, MA: Harvard University Press, 1934), Varro *Rust.* 1.16.2; Dio Cassius, *Roman History,* Volume I: Books 1–11*,* trans. Earnest Cary and Herbert B. Foster (Loeb Classical Library) 32 (Cambridge, MA: Harvard University Press, 1914), 37.52.1–4; Florus, *Epitome of Roman History*, trans. E.S. Forster (Loeb Classical Library) 231 (Cambridge, MA: Harvard University Press, 1929), 1.33.15–17; Plutarch, *Lives, Volume IX: Demetrius and Antony. Pyrrhus and Gaius Marius,* trans. Bernadotte Perrin (Loeb Classical Library) 101 (Cambridge, MA: Harvard University Press, 1920), *Mar*. 6.1; Plutarch, *Lives, Volume VIII: Sertorius and Eumenes. Phocion and Cato the Younger*, trans. Bernadotte Perrin (Loeb Classical Library) 100 (Cambridge, MA: Harvard University Press, 1919), *Sert*. 14.1; Strabo, *Geography,* Volume II: Books 3–5, trans. Horace Leonard Jones (Loeb Classical Library) 50 (Cambridge, MA: Harvard University Press, 1923), 3.3.8; Valerius Maximus, *Memorable Doings and Sayings,* Volume II: Books 6–9, ed. and trans. D.R. Shackleton Bailey (Loeb Classical Library) 493 (Cambridge, MA: Harvard University Press, 2000), 9.1.5.

fortifications of the northern frontier. In other regions, the towers possessed no intervisibility and thus likely no signalling.

Victorino Mayoral Herrera's recent work on the small forts and towers in the south-west of Extremadura, Spain, describes one such system of surveillance in this colonial landscape.[30] This system is made up of 68 individual structures each situated in the region of La Serena.[31] These towers are situated around mountain passes and rivers that serve as the routes of movement and transport and likely served to surveil and control what would otherwise be an isolated, easily defended area where bandits, guerilla fighters, and resistance to Roman imperial control could grow. The high degree of intervisibility between the towers located on high ridges and those located in valleys suggests that these structures communicated via signalling (Figure 5.4). It is likely, as Mayoral Herrera suggests, that this surveillance system served to keep watch over indigenous towns at Magacela and La Coronada as well as the mines, roads, and settlement of the Roman colony of Medellín, ancient *Metellinum*.[32] These towers served as a method of claiming and controlling a valuable territory that was rich in metals. Surveillance of the indigenous hill towns, only 20 km west of Medellín, reminded the locals that they were being watched, and the network of towers likewise guarded the new colonial infrastructure that was extracting resources from the new Roman province.

Nearby, in Alentejo, Portugal, a similar system of small, fortified towers was established around routes of transport, important natural resources, indigenous settlements, and new Roman colonies in the middle of the 1st *c*.[33] Unlike the towers in La Serena, however, these do not appear to possess a high degree of intervisibility. Instead, they are positioned so that each complements the surveillance potential of the other, and in doing so they together provide an ample observational control over the routes of trade, natural resources, and

30 Victorino Mayoral Herrera. *Fortificaciones, recintos ciclópeos y proceso de romanización en la comarca natural de La Serena* (*Siglos II A.C al I D.C.*). Mérida: Instituto de Arqueología 2018.

31 For a full catalogue of the fortified towers in La Serena, see Mayoral Herrera, *Fortificaciones, recintos ciclópeos*, pp. 78–243.

32 Mayoral Herrera, *Fortificaciones, recintos ciclópeos*, pp. 304–07.

33 Joey Williams and Rui Mataloto, "Caladinho 2010: A Preliminary Report on the Excavation of a 1st century B.C.E. Tower in Alto Alentejo, Portugal." *Chronika* 1 (2011), pp. 22–26; Rui Mataloto and Joey Williams, "Terra Sigillata Italica from Caladinho (Redondo, Portugal)," in *Contextos Estratigráficos na Lusitania* (*do Alto Império à Antiguidade Tardia*), eds. José Carlos da Costa Quaresma and João António Marquez (Monografias AAP 1) (Associação dos Arqueólogos Portugueses, 2015), 13–24; Joey Williams, *The Archaeology of Roman Surveillance in the Central Alentejo, Portugal* (Berkley: California Classical Studies 5, 2017), pp. 85–88.

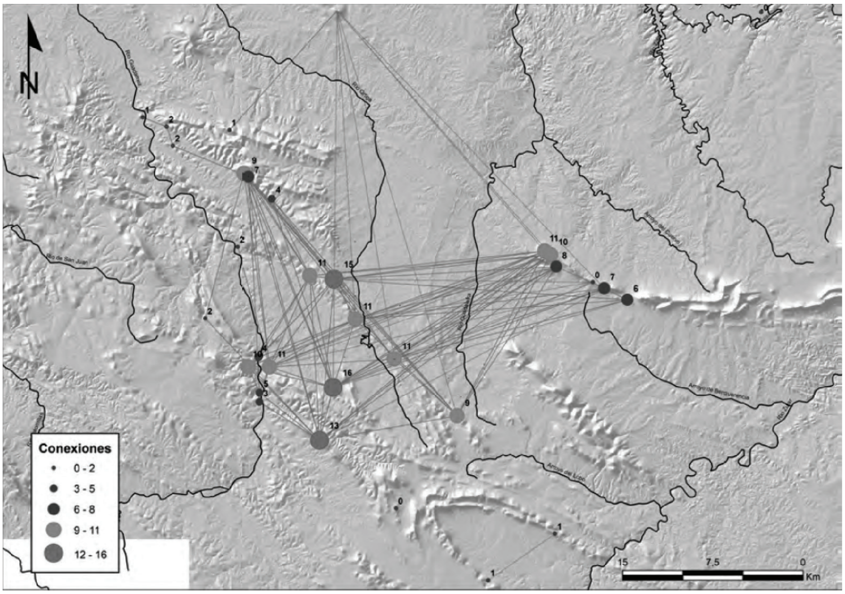

FIGURE 5.4 Intervisibility network of fortified towers in La Serena, Extremadura, Spain. After Mayoral Herrera 2018: fig. 203

indigenous settlements. The analysis of the surveillance offered by these structures was undertaken as part of the excavation of a tower called Caladinho (F9). It was accomplished through the computational projection of intervisibility, a viewshed analysis, from the estimated heights of these towers on a high-definition digital elevation model of the terrain. This model of intervisibility assumes an average height of the observer of 1.5 m as well as perfect environmental conditions. Darkness, poor weather, thick vegetation, or even bad eyesight could impact the total visibility offered by the towers over their local landscape. Nevertheless, the projection of surveillance offered by the towers in Alentejo suggests that they were integral to the security of the region for its new Roman occupiers.

One group of four Alentejan towers, located south of the Serra d'Ossa, provides an excellent example of this system of surveillance in action (Figure 5.5). These towers watch over a road that runs from the Roman colony of Évora to the west toward the provincial capital at Mérida to the east (towers F8 and F9, a pass through the Serra d'Ossa (tower F5), and a canyon that would otherwise be invisible (tower F10). One large indigenous settlement at Monte do Outerio also lies within the viewshed of the towers, while the small (and probably abandoned by this phase) indigenous settlement at Rocha da Mina escapes notice.

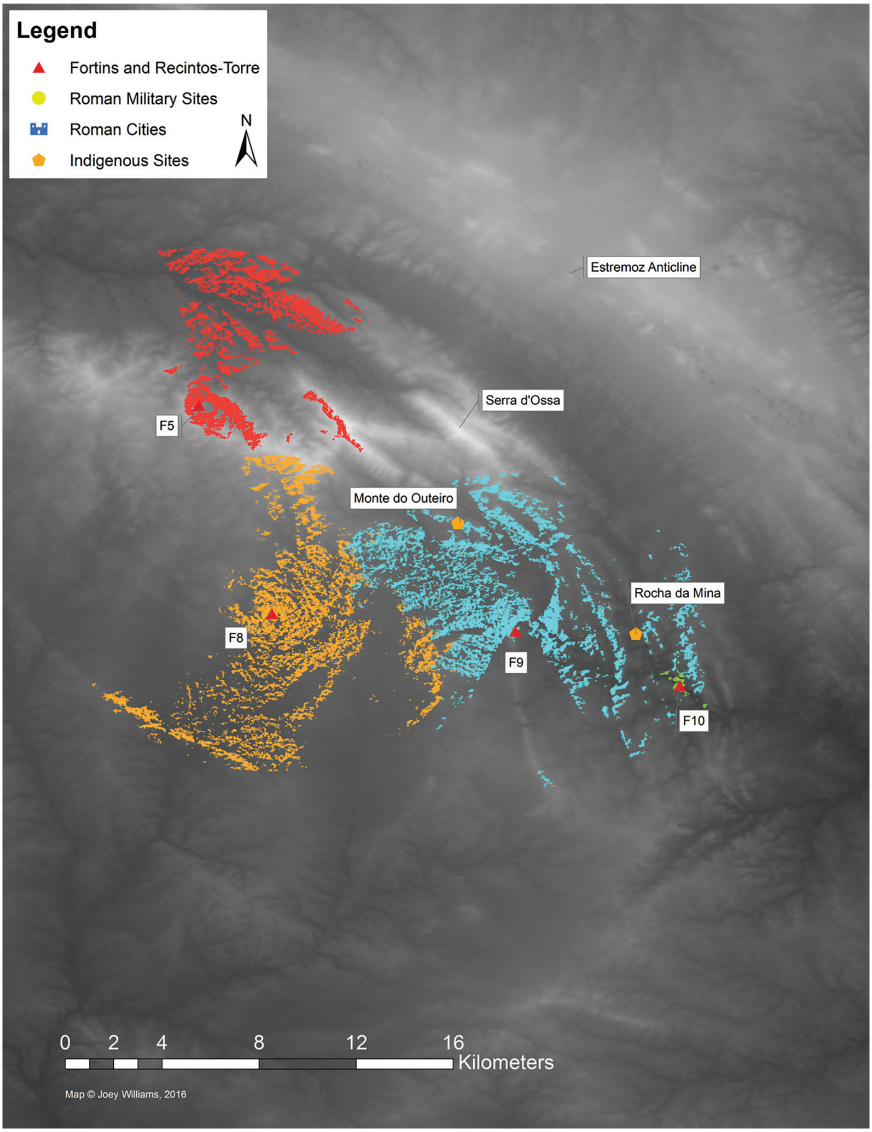

FIGURE 5.5 Cumulative viewshed of towers south of the Serra d'Ossa in Alentejo, Portugal. After Williams 2017: fig. 6.13

The viewshed of these four towers indicates that these structures did not possess any intervisibility, so direct line-of-sight signalling like that discovered by Woolliscroft and Mayoral Herrera is unlikely. Careful excavation of towers in both regions has not revealed any evidence for the type of bonfires needed for smoke signalling, although such evidence would be archaeologically

FIGURE 5.6 Aerial photograph of Caladinho after the 2017 season
PHOTO: JOEY WILLIAMS

ephemeral. The tower called Caladinho (F9 in Figure 5.5; aerial photograph of the excavated remains in Figure 5.6) does possess a hearth in a domestic space outside of the tower, but its ability to provide enough smoke for signalling was, perhaps, constrained since it is located indoors. It may be inferred, then, that signalling was not necessary here. The mere presence of the towers and their potential for surveillance was perhaps enough to dampen hopes of resistance and claim the region for Roman exploitation.

5 Conclusions: Towers, Signalling and Roman Imperialism

The installation of surveillance and signalling systems both along borders and within the interior of frontier provinces appears to have been an integral part of Roman imperial strategy. They provided, as along the German-Rhaetian *limes*, a practical system for the prevention of border raids and other illegal crossings. In the north of England, surveillance and signalling allowed a relatively small garrison to keep watch over a static defensive wall and to deter those wishing to escape Roman taxation from doing so. In La Serena, watchtowers guarded the resources of a landscape prone to indigenous resistance, and intervisibility between those towers promoted their ability to defend each other, the colonized landscape, and the movement of civilians in the area. And, finally, in Alentejo, Portugal, while the watchtowers may not have possessed a means of direct signalling, knowledge of their presence and their potential to see and pass on what they had seen helped to wrest control over the territory from bandits and guerillas.

The model of surveillance used here derives from the complementary theories of Michel Foucault and Janna Malamud Smith. Foucault's theory of the panopticon, where the mere presence of surveillance serves to control the behavior of the surveilled, is an attractive explanation for the use of towers in colonial and imperial contexts.[34] Yet it is also an imperfect one given the incomplete nature of surveillance in any landscape. No system of towers and forts could promise total observation of the borders of the Roman Empire (let alone the interior of far-flung provinces); there were gaps, and in those gaps raids and resistance could ferment. Such a system could never offer Bentham's perfect panopticon. Yet as Smith notes, surveillance does not need to be perfect to be effective. In the eyes of a totalitarian, imperialist power, an unobserved populace, especially one made of subjugated peoples, is a threat to the political and social order. Surveillance, and the threat of surveillance, disempowers any that would oppose colonial power.[35] Watchtowers, signalling stations, border forts—these expressions of Rome's military power promised that not only was someone watching, but that reprisals would be swift. The effectiveness of this threat may be inferred from the widespread use of surveillance throughout the Western Empire.

In the Western Roman Empire, surveillance and signalling from towers represent a performative sort of imperial control. Locals could see the towers and know that they themselves were seen by them. Towers could communicate along border defences and with provincial interiors the actions, movements, and perceived intentions of indigenous peoples within their viewshed. Violent reprisal, from military forces larger rather than the small garrisons within the towers, was the promise of surveillance. Trapped in this panopticon, resistance to Roman imperial control could be diminished, deterred, and pushed back away from borders and natural resources. These systems of surveillance thus provided a ready means of claiming territory for the Roman Empire in addition to guarding its borders.

34 Michel Foucault, *Discipline and Punish: The Birth of the Prison* (London: Penguin, 1977), p. 144.

35 Janna Malamud Smith, *Private Matters: In Defense of the Personal Life* (Boston: Addison Wesley, 1997), pp. 29–30.

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CHAPTER 6

From Tower to Tower—Signalling along the Roman Frontiers

Andreas Thiel

1 Introduction

There is no doubt in scholarship that the Roman army, as a well-drilled professional organisation, mastered signalling communication.[1] This included both communication in the field and communication at stationary units at the frontiers. The former is referred to as tactical level communication, the latter as strategic level. Tactical communication is understood as short range signalling, for combat or simply for 'contact' situations with an enemy, whereas strategic communication implies an exchange of "high grade, complicated, and frequently enciphered messages"[2] between commanders/units even over long distances.

Despite this general consensus, as we shall see researchers are divided on the quality, extent, and possible uses of signalling communication in the Roman army, due to the fact that specific written as well as archaeological sources are scare. While there is sufficient evidence in the sources for the use of sophisticated techniques on the battlefield, there is only sparse evidence to indicate the nature and extent of strategic communication at the frontiers. The use of sophisticated signalling methods in everyday military life is therefore discussed controversially. Webster summarizes the situation: "This is such a basic need in any well-organized army that one must expect Roman staff officers to have given it their serious attention, yet there is very little mention of any systems in literature. On the other hand, the whole arrangement of the frontiers was based on information concerning enemy forces being passed to rearward areas to enable major troop concentrations at threatened points.

1 See also Williams this volume, and White this volume.

2 J.H. Donaldson, "Signalling Communications and the Roman Imperial Army," *Britannia* 19 (1988), p. 349.

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Such movements could only have been effected by a system of signals passing along main lines of communication".[3]

In the following paper, the known possibilities of Roman signal transmission will be addressed, as far as they can be reconstructed from the existing sources. Since we assume that the Roman army of the imperial period was uniformly equipped and trained throughout the empire, evidence from the entire imperial territory during the Principate period from the 1st to the 3rd century A.D. shall be used here. But with some restrictions, even examples from Late Antiquity still allow conclusions to be drawn about the Middle Imperial period.

2 Couriers/Dispatch Riders

Writing was an integral part of the imperial army's toolkit for accomplishing operational and logistical tasks.[4] Written reports formed the foundation of the entire military organization for all administrative and personnel matters, such as payouts of soldiers, sick call, recording of weapons inventories, or deliveries of supplies. Legionaries had to be able to read, which was already a prerequisite at muster.[5] Inscriptions of *legio III Augusta* from *Lambaesis* alone name 22 *librarii* 'book-keepers' who were assisted by 21 *exacti* 'archivists'.[6] Apart from the officers, whose writing skills we may take for granted, there were also special 'writing soldiers' within the ranks of the so-called auxiliary troops. Important instructions or orders to the troops had been delivered by couriers since the end of the Republic.[7] Thus strategic communication between high command as well as between singular units of the Roman army has been seen in the form of written communication. However, archaeological evidence of such communication is rare. But from Roman Egypt "There is clear evidence in the

3 Graham Webster, *The Roman Imperial Army of the First and Second Centuries A.D*, 3rd ed. (Oklahoma: University of Oklahoma Press, 1998), p. 254.

4 Roy William Davies, "The daily life of the Roman Soldier under the Principate," in *Aufstieg und Niedergang der Römischen Welt* (*ANRW*) II, 1, ed. Hildegard Temporini (Berlin and New York: Walter de Gruyter, 1974), pp. 299–338; George Ronald Watson, "Documentation in the Roman Army," in *Aufstieg und Niedergang der Römischen Welt* (ANRW) II, 1, ed. Hildegard Temporini (Berlin and New York: Walter de Gruyter, 1974), pp. 493–507.

5 Publius Flavius Vegetius Renatus, *Epitoma rei militaris*, ed. Michael D. Reeve (Oxford Medieval Texts. Oxford: Clarendon, 2004), 2,19.

6 Corpus Inscriptionum Latinarum. Consilio et auctoritate Academiae Litterarum Regiae Borussicae editum VIII: Inscriptiones Africae Latinae, collected Gustav Wilmanns and ed. Theodor Mommsen (Berlin: Reimer/de Gruyter 1881–1959), pp. 2560 and 2629.

7 Johannes Kromayer and Georg Veit, "*Heerwesen und Kriegführung,*" in Handbuch der klassischen Altertumswissenschaften IV, 3, 2, ed. I. Müller (Munich: C.H. Beck-Verlag, 1928), p. 439.

documentation for regular communication being maintained between commanders of the various desert stations so that they could, as necessary, offer support and act in consort".[8] We may therefore assume that a major part of communication took place in writing—both at the tactical and at the strategic level. In the military sphere, special designations or ranks for such couriers are not recognizable. Caesar uses the term *equites dispositi* for his mounted relay posts for message transmission. In a civilian context, *tabellarii* are known. Specially trained *tabellarii* are encountered later in the state post service, the famous *cursus publicus*. This was established as a permanent institution most probably under Emperor Augustus. At first, it served solely for the transmission of state news within the empire. Its 'stations' along the main trunk roads were intended to ensure the rapid and undisturbed transportation of persons carrying the actual messages.[9] Authorization for its use was evidenced by a written certificate a so called *diploma*.[10] Although there is hardly any concrete evidence due to the lack of tradition, the use of written communication can also be proven at least indirectly in the surveillance of frontiers. The system of military supervision based on passes existed at the Red Sea, where the army monitored all movement along an important route from the Sea into the province. Military respectively in general administrative communication there is recorded on written pottery sherds (*ostraca*). These gave authorization "to travellers who are sometimes named … more often simply enumerated, the passes are commonly dated to a day and month". Thus "travellers carried a pass authorizing them to move around the area … They are addressed either to *stationarii* or to the curators of the *praesidia* (fortlets) along the route in question".[11]

3 Acoustic Signals

Based on written sources, epigraphic evidence, and archaeological finds, we are well informed about the application of acoustic signals at a tactical level.[12]

8 Valerie Maxfield, "Ostraca and the Roman army in the Eastern Desert," *Bull. Inst. Class. Studies* (2011), p. 166.

9 Wolfgang Riepl, *Beiträge zur Geschichte des Nachrichtenwesens bei den Römern*. Inaugural-Dissertation Friedrich-Alexander-Universität Erlangen (Leipzig: Teubner, 1911), p. 82; Anne Kolb, "*Transport und Nachrichtentransfer im Römischen Reich,*" (Klio Beihefte) 2. (Berlin: De Gruyter, 2000), p. 60.

10 Kolb, "*Transport und Nachrichtentransfer*," p. 109.

11 Maxfield, "Ostraca and the Roman army," p. 165.

12 See also Bertaud this volume.

They were used wherever "in the din of a melee" command words are no longer intelligible.[13] To direct larger army units in an orderly manner, the Roman army employed a special class of buglers (*aenatores*). Depending on the instrument used, the names *tubicines* and *cornicines* or *bucinatores* have been handed down for these signallers. Occasionally, one of these terms is used as a collective term to describe different types of winds.[14] The *tuba* and the *cornu* were both instruments for tactical signalling. These two instruments blow in battle and through their signals they direct the movements of the field signs (*signa*) and thus of the troop unit.[15] Apparently, the main tactical signal of the *tubae* applies first to the whole troop,[16] the sound of which is amplified in the noise of battle by that of the *cornua*. The *bucina*, apparently a kind of trombone, is occasionally regarded as an instrument of the cavalry troops, but in any case it seems to have been used in the organisation of camp life, especially for the regulation of night guard duty.[17]

Comparable to the scribal soldiers, a high level of training is also generally assumed for *aenatores*.[18] We also know that acoustic signalling was essential in the military training of all soldiers. In Vegetius[19] we find that "The signals are observed in all exercises and marches, so that soldiers may obey more readily in actual battle, if ordered by the leaders to fight, stand their ground, pursue or retreat. For it is obviously a sound principle that they always ought to be doing in peacetime what it is deemed necessary to do in battle." In the battle of Thapsus in 46 B.C., Caesar hesitates to give the signal to attack, but a *tubicen* sounds his instrument ("*tubicen canere coepit*"), whereupon all the cohorts begin to advance, although their centurions try to stop them.[20] Researchers are certainly right in concluding from this that the mere acoustic signal is sufficient to command troops,[21] i.e. that the officers do not need to

13 Fragmenta Historicorum Graecorum, ed. Karl Müller (Paris: Editore Ambrosio Firmin Didot, 1841–1872), 262a.

14 Friedrich Behn, „Die Musik im römischen Heere," *Mainzer Zeitschrift* 7 (1912), pp. 36–47.

15 Alfred von Domaszewski, *Die Fahnen im römischen Heere,* (Abhandlungen des archäologisch-epigraphischen Seminars der Universität Wien) 5, eds. Otto Benndorf, and Otto Hirschfeld (Wien: Carl Gerol's Sohn, 1885), p. 6; Riepl, "*Beiträge zur Geschichte*," p. 26.

16 Cristina-Georgeta Alexandrescu, *Blasmusiker und Standartenträger im Römischen Heer. Untersuchungen zur Benennung, Funktion und Ikonographie* (Cluj-Napoca: Phoibos, 2010), p. 36.

17 Behn, „Musik," p. 44.

18 Alexandrescu, *Blasmusiker und Standartenträger*, p. 68.

19 Publius Flavius Vegetius Renatus, *Epitoma rei militaris*, 2, 22.

20 Gaius Iulius Caesar, *Bellum Africanum,* ed. Robert Schneider (Berlin: Weidmann 1962), 82,3.

21 von Domaszewski, "*Fahnen*," p. 8.

give any further verbal orders. The tuba also gives the signal to retreat.[22] Caesar also tells us that special acoustic signals were sometimes agreed upon, which the soldiers had to hear and carry out in battle.[23] In accordance with the written sources, the depictions on the well-known Trajan column from the Dacian Wars of A.D. 101–2 show *aenatores* on the march at the head of the troops next to the field signs,[24] as well as during the battle next to the emperor.[25] The *cornicines* are mostly dressed in animal skins and carry a sword and a round shield in addition to their instrument, which identifies them as members of the fighting troops.[26] Finally, it should be noted that *aenatores* could also play longer sequences of notes in addition to simple signals, for example the "*classicum*", in essence a signal to gather that in later times became a kind of ceremonial 'great evening signal'. It was played by all brass instruments for the summoning of a formal coming together of the soldiers.[27] All in all, one may assume that the Roman soldiers were familiar with a repertoire of different acoustic signals that dictated their actions. "So when the soldiers go out to perform night watch duties and outpost duties, to do some work, or drill in the parade-ground, they start work at the call of the trumpeter, and stop again at the signal from the trumpeter."[28] *Cornicines* call the night guards from their posts. The "wake-up call" of the *cornua* is also common as a symbolic image in visual art (Figure 6.1).[29]

We are not fully informed about the number and type of *aenatores* in a unit. Apparently, 37 *tubicines* and 35 *cornices* served in legio III Augusta,[30] although these do not necessarily have to have been in active service at the same time. It is undisputed that both infantry and cavalry units had brass players, as gravestones of *aenatores* from all troop categories demonstrate.[31] It is also worth mentioning the frequent occurrence of parts of Roman brass instruments in archaeological contexts. In her latest compilation, Alexandrescu noted more

22 Gaius Iulius Caesar, *Der Bürgerkrieg/De bello civili*, ed. Otto Schönberger (Berlin: Tusculum 2012), 7, 47,1.
23 Gaius Iulius Caesar. *Bellum Africanum,* 80.
24 Alexandre Simon Stefan, *Die Trajanssäule* (Darmstadt: wbg Philipp von Zabern, 2020), scene 5, image field 16 and scene 26, image field 66; for a discussion of the Trajan column, see also Williams this volume.
25 Stefan, *Trajanssäule*, scene 40, image fields 103/104.
26 Stefan, *Trajanssäule*, p. 72.
27 von Domaszewski, "*Fahnen*," p. 9; Riepl, "*Beiträge zur Geschichte*," p. 28.
28 Publius Flavius Vegetius Renatus, *Epitoma rei militaris*, 2, 22.
29 Alfons Kolling, "Ein römisches Wandbild mit musizierendem Hahn," *Germania* 53 (1975), pp. 174–76. Werner Oenbrink, „Musizierende Tiere," *Kölner Jahrbuch* 28 (1995), pp. 635–41.
30 Corpus Inscriptionum Latinarum VIII: Inscriptiones Africae Latinae, p. 2557.
31 Alexandrescu, *Blasmusiker und Standartenträger*, p. 68.

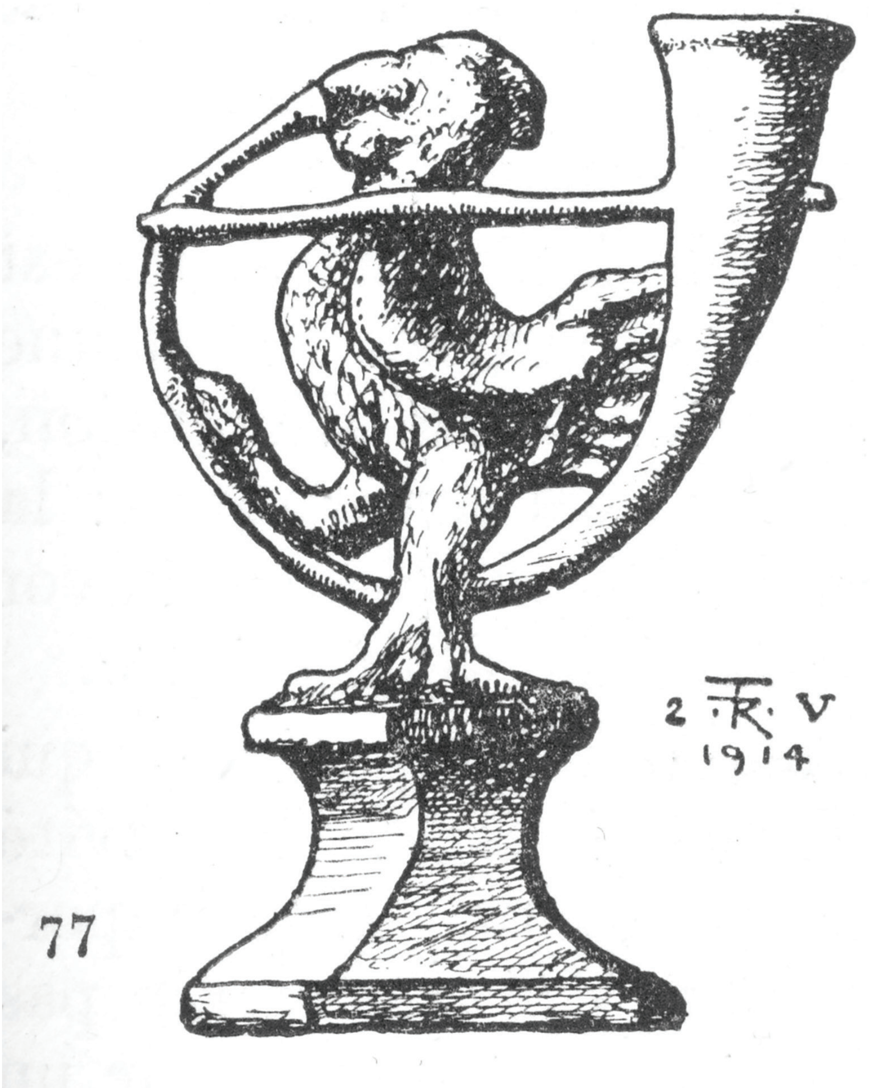

FIGURE 6.1 Small bronze in the shape of a *cornu* blowing cock from Argentorate. After Forrer 1919: fig. 77

than 40 instrument parts and over 60 mouthpieces throughout the empire. Not all, but many of these finds were found in a secure military context, including smaller military posts. From the cohort fort of Murrhardt on the Upper Germanic Limes come the two cross-handle supports of a *cornu*[32] and from a

32 Alexandrescu, *Blasmusiker und Standartenträger;* no. MI 25 and MI 26.

watchtower site on the Upper Germanic Limes in the Taunus region[33] comes the mouthpiece presumably of a *cornu*.[34] The discovery of a mouthpiece on one of the watchtowers of the Upper Germanic Limes in particular might therefore indicate the presence of an *aenato*r there! Even without corresponding written sources coming down to us, this proves the use of brass players directly along the frontiers.

4 Visual Signals

Although there can be no doubt that the Roman army possessed special units for enemy reconnaissance as well as extensive technical and operational possibilities, remarkably there is almost no evidence of optical signal transmission.[35] In contrast to Greek or Byzantine sources, the surviving written sources of the imperial period are almost completely silent about the use of such methods and techniques.[36] One of the few occasions in which the use of visual signals has been handed down to us is the siege of Numantia by Scipio in 133 B.C.: According to the account, towers built into the cordon besieging Numanita used red flags in the daytime and torches by night to send signals.[37] However, this system does not seem to have gone beyond simple alerting. The lightning of a beacon or the hoisting of a flag or a beam can only convey a single piece of information; they have "more in common with an intruder alarm system than with a communications network."[38] Threatened units from Scipio's army apparently only sent warning signals. This was probably sufficient, as the guard teams had been precisely briefed and the overall tactical situation remained manageable. The excavations in Numantia show that the furthest distance that had to be bridged in this way between a watchtower and one of the two main camps was a maximum of 1,300 m. This means that the signal distance is within the range of about 1,500 m over which optical signals could be effectively used, i.e. still visible to the naked eye. Interestingly, however, additional call relays are mentioned on the Roman side, which apparently

33 ORL, *Der obergermanisch-raetische Limes des Roemerreiches*, ed. E. Fabricius (Abt. A, Bd. 2, Strecke 4 u. 5) (Heidelberg: Petters, 1936), 200 with fig. 19.

34 Alexandrescu, *Blasmusiker und Standartenträger;* no. MS 22.

35 Wolfgang Leiner, *Die Signaltechnik der Antike* (Stuttgart: Leiner, 1982), p. 114; Riepl, "*Beiträge zur Geschichte*," p. 74.

36 Riepl, "*Beiträge zur Geschichte*," p. 43.

37 Appiani Historia Romana, Vol 1, *Prooemium, Iberica, Annibaica, Libyca, Illyrica, Syriaca, Mithridatica fragmenta*, eds. Paul Viereck, J.E. van Niejenhuis, Emilio Gabba (Leipzig: Bibliotheca Teubneriana 1905–1962. Ed. stereotypa correctior, Leipzig 1962), 6.90.

38 Donaldson, "Signalling Communications," p. 350.

served to transmit details.[39] Caesar mentions optical signals in the form of smoke signals that were passed from camp to camp (siege of Dyrrhachium 48 B.C.) but at the same time he says that such a system was actually no longer common in his lifetime.[40]

4.1 *Along the Frontiers*

A strategic situation comparable to these famous sieges, in which Roman soldiers had to guard a static, only weakly manned line, existed in the 2nd and 3rd centuries A.D. on almost all the empire's frontiers. However, ancient written sources that tell us about the use of beacons, fire signals, smoke signals (panels, flags, lights, etc.) have not come to us. Apart from historical reports on the use of optical signal transmission, there is a dearth of indicative military terminology. No terms for (optical) signallers have survived from Latin[41] which suggests that there were no soldiers specialised in this field in the army of the middle imperial period; only the Greek term *semeiophoroi* ('signal-bearers')[42] is found in Late Antiquity. Should situations have required it signalling seems to have been part of the general tasks of the crew of a guard post or similar. It should also be mentioned that there is no reliable archaeological evidence for beacons, but this is perhaps explicable by the extremely ruinous state of preservation of possible watchtowers.

For a long time, the pictorial representations of watchtowers on Trajan's Column were regarded as evidence of a "system" for transmitting messages, but today this interpretation is accessed more critically.[43] The beginning of the relief of the First Dacian War (A.D. 101) at the foot of the column shaft depicts three towers with pyramidical roofs next to each other, each surrounded by palisades (Figure 6.2). Between them stand auxiliary soldiers.[44] Apparently these towers formed a chain of posts along the Danube: the initial frontier with the Dacians. The towers have a gallery running around the upper storey. A long flaming torch protrudes from a high window or door leading to this gallery. Since there are similarities with archaeological features identified along many sections of the imperial frontier, this scene is one of the most discussed

39 Riepl, "*Beiträge zur Geschichte*," p. 80; Leiner, *Signaltechnik*, p. 119.

40 Gaius Iulius Caesar: *Commentarii de bello Gallico, e*d. Heinrich Meusel (Berlin: Tusculum 1960), 3,65,3.

41 Donaldson, "Signalling Communications," p. 351.

42 *Syrianus Magister: De Re Strategica*, trans. George T. Dennis, Three Byzantine military treaties (Corpus fontium historiae Byzantinae) 25 (Washington: Dumbarton Oaks, 1985), p. 17.

43 Dietwulf Baatz, *Die Wachttürme am Limes* (Kleine Schriften zur Kenntnis der römischen Besetzungsgeschichte Südwestdeutschlands) 15 (Stuttgart: Kärcher, 1976).

44 Stefan, *Trajanssäule*, p. 118–89, scene I.

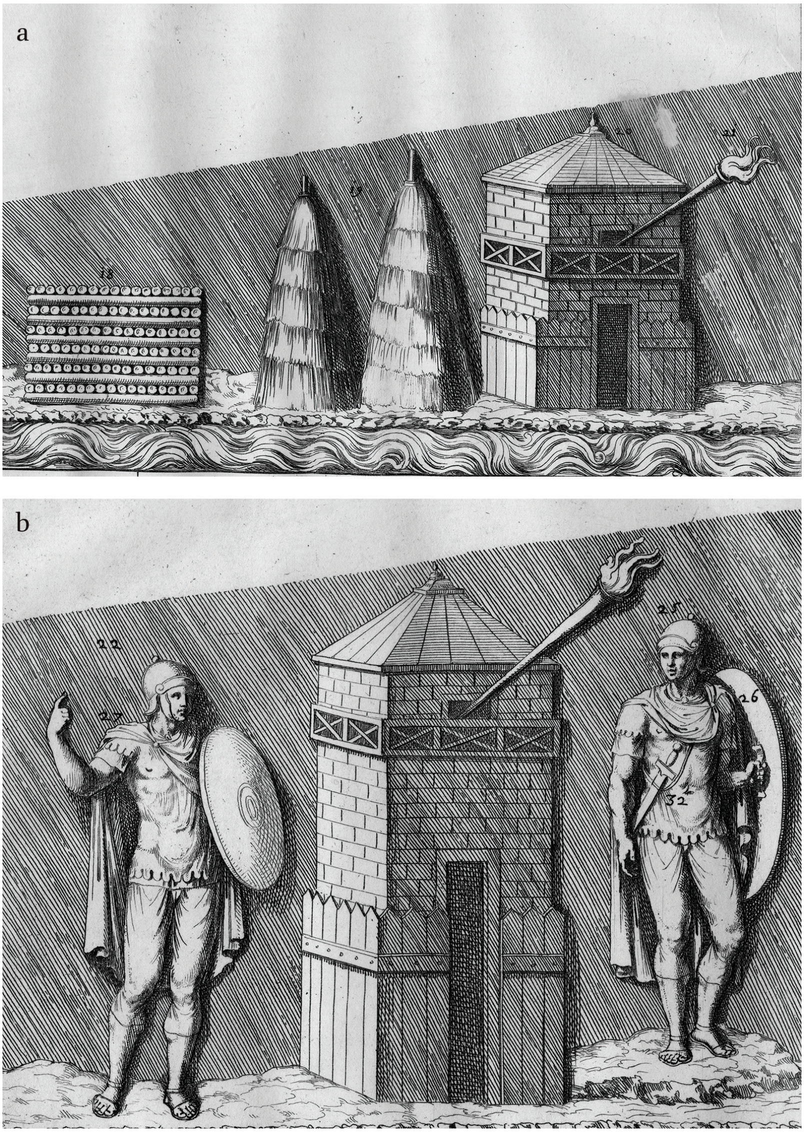

FIGURE 6.2 Trajan's Column, Rome: Chain of posts along the Danube. After von Cohausen 1884: Taf. 3,5

of Trajan's Column. The elaborate galleries in particular have served as models for reconstructions elsewhere.[45] The function of the gallery remains unclear, however, since they hardly improve the views gained from windows. What are

45 Thomas Becker and Jürgen Obmann, "Neubauten am Limes," *Bericht der Bayerischen Bodendenkmalpflege* 56 (2015), pp. 409–43.

noteworthy about the depictions of Trajan's Column are the overlong, burning torches, in most of which beacons can be recognised, without, however, wanting to assign them to a system of communication.[46] For the Trajan Danube frontier, it is also uncertain whether the towers relayed a signal along the river to a neighbouring larger military post or alerted inland, i.e. into the Roman province.[47] Since we do not know the precise locations of the towers for this section of the Roman frontier, this question cannot at present be answered.

In the following, case-studies will show which systems of message transmission were probable in the Roman period. It should be noted that examples can only be found along the frontiers; archaeological evidence for possible signalling stations within the Roman Empire are lacking.[48]

Isolated fortlets from the 4th century are known from the Yorkshire coast (England).[49] These structures, consist of square stone towers with sides 13 m or 14 m long, surrounded by a defensive wall at least 12 m high.[50] References in the literature to this combination of tower and small fort describe them alternatively as early warning systems against sea-borne enemies to lighthouses for all coastal shipping. It is clear that these stations have no "partner" to communicate with because of the great distances between them and other military installations. Neither are neighbouring signalling stations known, nor were the military sites located far inland accessible without relay stations. According to current research, messengers were the only way to transmit messages to other Roman garrisons.[51] The signal stations along the coast, which were located at a great distance from each other, are therefore interpreted as refuges where the population of the surrounding countryside within sight could gather in case of danger.[52] Depending on the threat situation, people either sought the protection of the fortification or gathered forces to act against the threat. In such a scenario, the towers "functioned" in isolation. Their signal transmission was limited to the surrounding intervisible area. Fire or smoke signals were probably

46 Riepl, "*Beiträge zur Geschichte*," p. 90.

47 Webster, *Roman Imperial Army*; Pat Southern, "Signals versus illumination on Roman frontiers," *Britannia* 21 (1990), p. 238.

48 Riepl, "*Beiträge zur Geschichte*," p. 85.

49 See also White this volume.

50 White, "Watching, Guarding or Signalling? Late Roman Coastal Fortlets in Britain," this volume.

51 Riepl, "*Beiträge zur Geschichte*," p. 85.

52 Southern, "Signals versus illumination," p. 235; P.R. Wilson, "Aspects of the Yorkshire signal stations," in *Roman Frontier Studies 1989,* eds. Valerie A. Maxfield and Michael J. Dobson, Proc. (Internat. Congress Roman Frontier Studies 1989) (Exeter: University of Exeter Press, 1991), pp. 142–7; White, this volume.

used as a means of signalling, for which a specially prepared object was lit. Late Antique sources recommend brightly blazing materials for "*fana*"—fires,[53] beacons, made of materials that either could ignite very quickly or burn produce strong smoke, such as brushwood, cane, tree branches or hay.

Dual systems, in which the interaction between a signal station and an associated second facility were important, and are well attested. An example from Upper Germany will serve here. On the Kapellenberg near Hofheim am Taunus, the remains of an isolated wooden tower with sides lengths of 3.5 m were found. It stood within a ring of fortifications, 35 m in diameter, consisting of a plank wall or a massive fence with two defensive ditches in front of it. The archaeological evidence allows us to reconstruct the height of the tower to 10 m (Figures 6.3 and 6.4). The site of the tower is in a direct line of sight

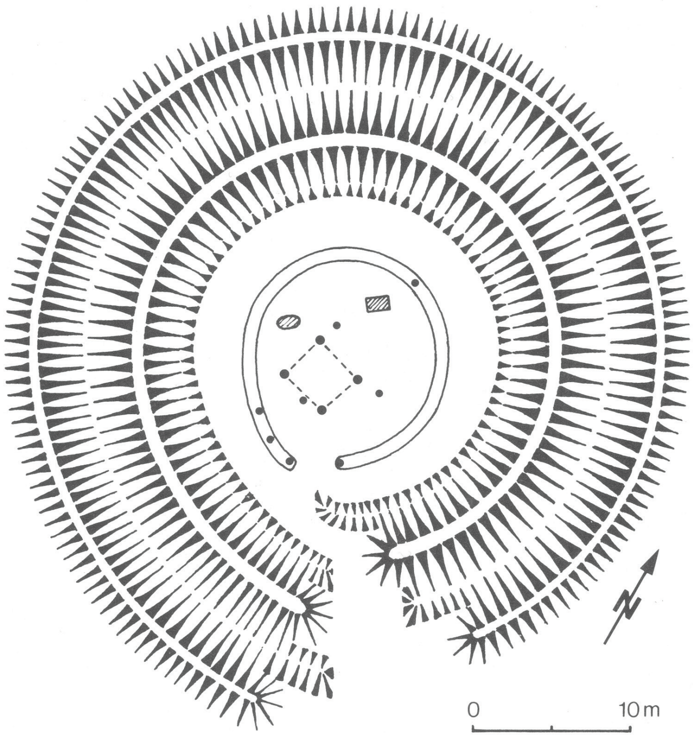

FIGURE 6.3 Ground plan of the watchtower on the Salisberg, Hofheim am Taunus. After Herrmann 1983

53 *Syrianus Magister, De Re Strategica* 8,1, "Signal fires and their management." For the Greek term "fanos", see Latin: "fanarium", Italian "fanale", Arab "fanâr" or German "Fanal".

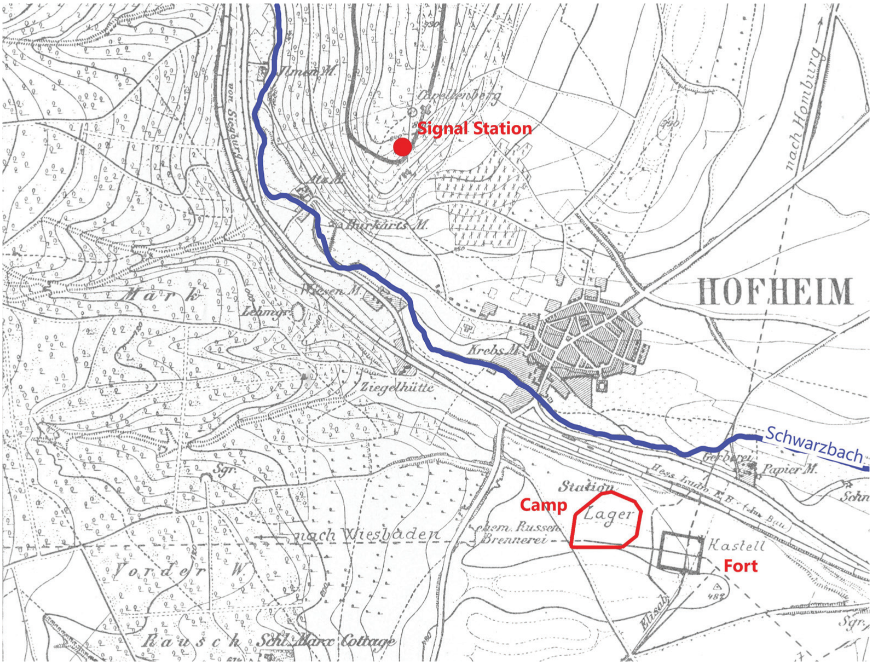

FIGURE 6.4 Site plan of the Roman military installations in Hofheim am Taunus. From ORL B 29 Hofheim 1897: Tafel 1 with modifications by the author

with the so-called "earth camp" of Hofheim, some 1,600 m away as the crow flies. This camp, which was built around A.D. 40, functioned at that time as the easternmost outpost of the Mainz double legion fortress and controlled the conveniently located lowland between the foothills of the Taunus in the north and the Main valley to the south. In Flavian times (A.D. 69–96), this important route was further developed through the construction of the "Elisabethen-Straße". The Hofheim earth camp, occupied by a (partially) mounted unit, was probably occupied until the beginning of Emperor Domitian's Chattian campaigns (after A.D. 81/82). Whether the tower on the Kapellenberg was used during the campaigns and also in later times is not certain. Hofheim remained a military site until A.D. *c.*110/15, but it became a staging post. The tower itself stands at 260 m above sea level on the slope of the mountain, which rises to over 290 m. A view to the north was thus blocked by higher ground and apparently unimportant, otherwise the tower could have been built some 300 m further north on the highest point of the flat ridge. However, its location did allow a view of an incision in the Taunus Mountains, which provided a connection to the residences of the Chatti and allowed a signal to the Hofheim camp that was still visible to the naked eye. Horsemen stationed there could theoretically reach the Kapellenberg in a few minutes. Remarkable, therefore, is the massive fortification around the tower, which was evidently intended to protect its crew from surprise attacks or to hold off attackers until a message could be sent to the troops in the valley. It is conceivable that other signal stations of this kind existed elsewhere, but because of their wooden construction they can only be found through archaeological means.

4.2 *Direct or Lateral Signalling?*

One of the key questions in assessing the signal transmission capabilities of the Roman army is the extent to which signals could be transmitted across several stations. Theoretically, it is possible to transmit messages at any distance; the only prerequisite is a chain of stations at suitable distances. Thus, at the artificial Roman land frontiers such as the Upper Germanic Limes, it is generally assumed that signals were passed along the existing chain of towers. The Limes towers are likely to have looked like those illustrated on Trajan's Column, and, in contrast to those on river boundaries, their locations are known almost without gaps. In Upper Germany, towers are among the earliest elements of frontier defence. They were initially made of wood, often surrounded by palisades, and stood in a line along the frontier. Additional elements of the frontier, such as a palisade, rampart ditch or frontier wall were only added later. In the most recent expansion phases of the Upper German Limes, towers are spaced 400 to 600 m apart and are all positioned in such a way that at least their immediate neighbours are visible from each tower, and at the same time, complete surveillance of the entire course of the Limes was possible. A view into "enemy territory", on the other hand, was not always possible. From this it was concluded—certainly rightly so—that the core task of the tower crews was to look along the frontier fortifications and to watch out for incursions. However, there is some debate about the kinds of reactions dangers might have elicited. Generally, scholarship assumes that tower crews passed on their observations to the nearest Limes forts by means of signals.[54] It can also be assumed that their locations were chosen with strategic requirements in mind. The question of whether this was done by direct signalling or lateral signalling has been investigated in various studies.[55] One result is that already during the alignment of the Upper Germanic Limes, the aim was to position all watchtowers and small fortlets with a direct line of sight to the nearest larger fort.[56] Tower crews could therefore usually transmit their signals

54 Baatz, Wachttürme.

55 David John Woolliscroft, *Roman Military Signalling* (Stroud and Charleston: Tempus, 2001).

56 David John Woolliscroft, and Brigitta Hofmann, "Zum Signalsystem und Aufbau des Wetterau-Limes." *Fundberichte Baden-Württemberg* 16 (1991), pp. 531–43.

directly to the next fort. For this purpose, the course of the frontier defences was modified wherever possible or the position of the towers or small forts was shifted. Only where direct signalling was not possible due to topographical restrictions, were additional relay stations or lateral signalling used as a second-best solution (Figure 6.5). Overall, these field studies have modified

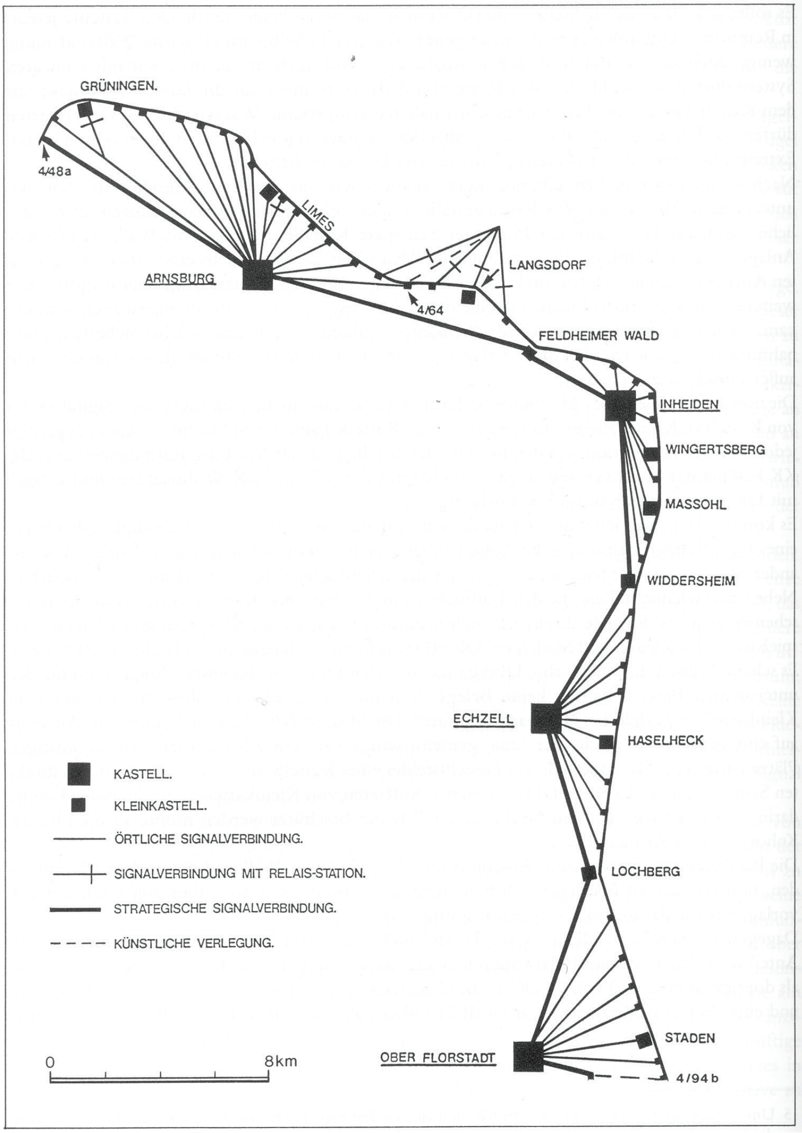

FIGURE 6.5 Schematic representation of the signal system along the Limes in the northern Wetterau, Hesse. After Woolliscroft and Hofmann 1991: abb. 2

the rather negative opinion of lateral signalling, which is considered to be time-consuming in training and education, as well as susceptible to interference. In addition, the triggering guard post (i.e. the origin of the signal), is unclear.[57] Woolliscroft also agreed with the prevailing research opinion that only extremely simple messages, such as: "Alarm", could be transmitted.[58] "Any complex message about the strength of an enemy or his direction of attack would have been best transmitted by a man on horseback."[59]

The observation that direct signalling was used as far as possible even on well-developed frontiers such as the Upper Germanic Limes confirms the prevailing opinion in modern literature that the Roman army generally did not use sophisticated signalling techniques. The reasons for this can only be speculated at; possibly the fact mattered that signalmen could always be sent quickly via the road network, which was also well developed.[60] As a further case study, three sites are presented here whose function as relay stations is probable, or rather, their use in long-distance communication. These are the massive and therefore presumably unusually high stone towers on the Upper Germanic Limes section in the Wetterau (Germany) at Bad Nauheim, Obermörlen and Wölfersheim-Wohnbach. Two of the towers appear to have been identical in construction: they are square in plan, with 5.7 m (20 Roman feet) long walls up to 1.8 m thick; thereby significantly more massive than average Limes towers. One of these is the tower on the Johannisberg in Bad Nauheim, which was uncovered in 1909.[61] A cistern in front of the tower could indicate that horses were stabled there.

The tower lies in the hinterland of the Limes, so it is generally believed that it functioned as a relay station between the fort at Friedberg, a good 3 km away, and the section of the frontier in the north-western Wetterau region. A second tower in Wölfersheim, 10 km further away, seems to have had the same function. It stood a little way off the Roman roads that lead through Wetterau and was protected by a pointed ditch or palisade. In the literature it is referred to

57 Donaldson, "Signalling Communications"; Woolliscroft, *Roman Military Signalling*, p. 15.

58 Woolliscroft, *Roman Military Signalling*, p. 64; Southern, "Signals versus illumination," p. 237.

59 Donaldson, "Signalling Communications," p. 356.

60 Leiner, *Signaltechnik*, p. 113.

61 Stephan Bender, "Rom kontrolliert den Raum. Die Turmruine auf dem Johannisberg und das Projekt Weltkulturerbe Limes," in *Sole und Salz schreiben Geschichte*, ed. Landesamt für Denkmalpflege Hessen (Mainz: Philipp von Zabern, 2003), pp. 294–98; Fritz-Rudolf Herrmann, "*Der Kapellenberg bei Hofheim am Taunus, Main-Taunus-Kreis,*" (Führungsblatt zu den vorgeschichtlichen Grabhügeln, dem römischen Wachtturm und dem frühmittelalterlichen Ringwall) 30 (Wiesbaden: Archäologische Denkmäler in Hessen, 1983).

as a "road tower" or "observation post", since it provided a view of large parts of Wetterau as well as several kilometers of the central trunk road.[62] From North Africa, inscriptions name *burgi speculatorum* (watchtowers) "*inter duas vias ad salutem commeantium nova tutela*", which thus served to protect travellers. At the same time, however, we can recognise them as parts of a network of posts controlling movement and communication.[63] These two towers in the centre of Wetterau complemented each other in that each of them could overlook sections of the Limes that could not be seen from the other or from the central fort site at Friedberg. This enabled them to transmit signals from the frontier line to the garrison. Due to the great distances, however, only optical signals such as fire or smoke signals come into consideration. The third tower to be presented was erected directly on the Limes line in the middle of the 2nd century. It is the somewhat smaller tower WP 4/16 on the "Gaulskopf", an eminence 6 km east of the aforementioned Johannisberg in Bad Nauheim. It has a side length of approximately 8 m. The tower, which has been rebuilt today, lies on one of the later sections of the frontier (Figure 6.6). Here, an older Limes line was probably moved forward by up to 250 m in the middle of the 2nd century, so that the Limes now crossed the Gaulskopf, which dominates the landscape at a height of almost 400 m! It can be assumed that this slight correction was made deliberately to erect the stone tower in a dominant position. The reason for this may again have been to afford a distant view: from this position "you can overlook the entire Wetterau area enclosed by the Limes"[64] It stands to reason that the tower on Gaulskopf made the older Bad Nauheim tower superfluous, since it offered an even more comprehensive view and could also overlook a good part of the Limes. In this respect, a "star system" might even be conceivable, as is known from Antiquity,[65] in which signals were collected and forwarded from the central tower on the Gaulskopf. In any case, the older system was improved by the new construction. At the same time, however, the distance to the Friedberg fort increased to 8 km, which may have made the transmission of flag or acoustic signals impossible; even mounted messengers may have needed about an hour—at least at night—to travel between stations. In this case, fire signals may indeed have been the best way of signalling,

62 Friedrich Kofler, "Strassenturm im Wöfersheimer Walde," *Limesblatt. Mitteilungen der Streckenkommissare bei der Reichslimeskommission 27* (1898), sp. 767–69.

63 Corpus Inscriptionum Latinarum VIII: Inscriptiones Africae Latinae, pp. 2494–95, and possibly even p. 2496.

64 ORL 1936, 67.

65 Leiner, *Signaltechnik*, p. 109.

FIGURE 6.6 The signal tower on the Gaulskopf was rebuilt on its original foundations.
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employing some form of communication that allowed the garrison in Friedberg to prepare for the type, extent and—in the wide-ranging arc of frontier installations in the Wetterau—location of the threat.

4.3 *Semaphore Signals?*

At this point, therefore, we should briefly look at ancient written sources that describe methods of transmitting messages by optical means, creating a system of letter-telegraphy. Vegetius[66] describes the possibility of signalling from towers by raising and lowering a beam of wood (*appedunt trabes*). On closer examination of his text, however, this possibility of transmitting messages seems to be limited to only two, at most three, positions of a signal lever, similar to a modern railway signal. This would only allow the transmission of simple messages, for example, "advance", "halt" and "retreat."[67] Much more sophisticated communication seems to be a system described by Polybius,[68] which is based on the conversion of letters into pairs of numbers. In this way, signalling required only two optically distinguishable sources, which could then be counted and transcribed; a system that was possible using torches. An improved system—apparently aware of Polybius' approach—using three signal fires, is described by Sextus Julius Africanus[69] shortly before the middle of the 3rd century.[70] In the latter two examples, "a semaphore for spelling out messages", i.e. a kind of letter-telegraphy, can rightly be recognised.[71] The essential difference to the well-known semaphore systems of modern times, like Claude Chappe's optical telegraph, is that in Antiquity there were no telescopes available that allowed the recognition of detail beyond 30 km. For large distances all that was possible was fire signalling, which according to Polybius[72] could communicate to places "even at a distance of three, four or more day's travel". If, however, "several light sources (torches) are used at the same time, then for the human eye several lights already blur into one at a thousand times their distance from each other."[73] Therefore, the greater the

66 Publius Flavius Vegetius Renatus, *Epitoma rei militaris*, 3,5.

67 Riepl, "*Beiträge zur Geschichte*," p. 88.

68 Polybius. *Geschichte*, 45–7; see also Bakke this volume for a discussion of semaphore signalling.

69 Sextus Iulius Africanus. *Cesti: The Extant Fragments*, trans. William Adler, eds. Martin Wallraff, Carlo Scardino, Laura Mecella and Christophe Jan-Daniel Guignard (Berlin: de Gruyter 2012), 2, 77.

70 Riepl, "*Beiträge zur Geschichte*," p. 106; Woolliscroft, *Roman Military Signalling*, p. 168.

71 Webster, *Roman Imperial Army*, p. 255.

72 Polybios, *Geschichte*, transl. Hans Drexler (Bibliothek der alten Welt. Zürich: Artemis 1961–63), 4, 3.

73 Riepl, "*Beiträge zur Geschichte*," pp. 47 and 106.

distance over which a fire signal is to be sent, the further apart the individual signal lights have to be placed. The size of the tower on the Gaulskopf, or the window opening that can be (hypothetically) reconstructed here, allows a spacing of 6 m between lights, which made signalling, of the type described by Africanus, possible with the tower on the Johannisberg. By protruding torches out of the windows on both sides of the tower, as they are depicted on Trajan's Column, the distance of possible signal transmission is increased. By this simple equation, the other two towers presented above could have sent "readable" fire signals over further distances because of their larger dimensions, that is the putative spacing between torches.

While the aforementioned signal stations in the Wetterau could thus—at least theoretically—have employed semaphore signalling at frontier, it is impossible to know whether this actually occurred in the Middle Imperial period. The practical use of optical signalling over long distances by means of a large number of relay stations is rejected by the majority of researchers of the period.[74] In addition to the lack of strategic necessity in many places, and the high personnel expenditure due to a dense network of necessary signal stations, technical reasons are also cited. In particular, it is argued that there is not enough physical space in the comparatively small Limes towers for the operation of multiple beacons.[75] "The watchtowers and signal towers at the frontiers were … not equipped for telegraphing, … For this, instead of one tower at each station, three were needed at moderate intervals, or at least instead of the one torch at the tower of Trajan's Column, there should have been three at greater intervals".[76]

However, recent literature has argued that the facilities for optical telegraphing did exist in Late Antique small forts, usually called *burgi*, as represented on coinage. Archaeologically, chains of such *burgi* are known from the second half of the 4th century from the Upper Rhine but also from the Middle Danube.[77] With an average width of 12 m, the dimensions of the towers are significantly larger than their earlier counterparts, and afforded substantially more interior space, so that it seems fair to assume a crew of up to 20 soldiers. The *burgi* probably belong primarily to a large-scale building programme of Emperor Valetinian I (A.D. 364–75). From his reign, but also that of other late Roman emperors (Diocletian, A.D. 284–305 to Valentinian III,

74 Riepl, "*Beiträge zur Geschichte*," p. 106.

75 Leiner, *Signaltechnik*, p. 124.

76 Riepl, "*Beiträge zur Geschichte*," p. 110.

77 Walter Drack, "*Die spätrömische Grenzwehr am Hochrhein*," (Zürich: Archäologische Führer der Schweiz 13, 1980), Sándor Soproni, *Der spätrömische Limes zwischen Esztergom und Szentendere* (Budapest: Akadémia Kiadó, 1978), p. 200.

A.D. 425–55), coins were minted with reverse sides depicting the facades of fortified camps or cities (Figure 6.7).[78] Despite their highly reduced representation, on numerous coinages domed structures can be recognised atop

FIGURE 6.7 So-called "Camp gate coins" from Constantine the Great, Licinius and Licinius II, minted between A.D. 317 and the early 320s, with reverse legends PROVIDENTIAE AUGG—"Forsight(!) of the Augusti". Staatliche Münzsammlung *München* (*18*–00257), Münzkabinett der Universität Göttingen (UK-02874 and AS-04175). CC BY 4.0. https://www.kenom.de

78 Nathan T. Elkins, "A note on late Roman art: the provincial origins of camp gate and baldachin iconography on the late imperial coinage." *American Journal Numismatics* 25 (2013), pp. 283–302; David Woods, "The late Roman 'Camp gate' Reverse Type and the Sidus Salutare," *The Numismatic Chronicle* 177 (2017), pp. 159–74.

battlements which represent towers, possibly even beacons.[79] With two or three such towers/beacons shown along one side of the wall, representing a distance of several metres between them in reality, it would have been theoretically possible to send optical signals. Two to three individual signal sources as flags or torches would have been distinguishable to the naked eye even at a greater distance, and therefore could have functioned as a semaphore system. The strategic task of the Valentinian *burgi* was apparently still to pass on observations to larger military garrisons. However, forts were located at a comparatively large distance from each other. Thus, at least for parts of the Late Antique frontier, strategic necessities to communicate detailed information to a recipient, such as which section of the frontier was threatened and in what form, would have been necessary for the first time. Such detailed messaging could not be achieved using the simple alarm system of the 2nd and 3rd centuries. In any case, at least in the late 4th century, both the strategic necessity and the personnel/technical prerequisites for the use of semaphore systems existed. At the very least, we might posit that this precursor to telegraphy has "now emerged from the dusty libraries and the study rooms of learned theorists into practical life."[80]

5 Conclusion

In summary, archaeological evidence suggests that the Roman military of the Imperial period initially used simple optical signals to transmit alarm messages in a direct line. On the other hand, there does not seem to have been a (uniform) system of transmitting messages over long distances.[81] During the middle Imperial period, an intruder alarm system was sufficient for communication in the fortified frontiers of the empire. Beacons, which had the task of directly alerting the nearest military sites, stood along the frontier or in its immediate hinterland in the form of towers or fortlets. Their locations were adapted to changing circumstances; sometimes the system was improved over time by local measures. The distances between neighbouring signal stations along the frontiers were so small that the system probably functioned smoothly under almost all conditions, and complicated signalling was redundant. The density of the chain of posts also made it possible for acoustic signals to supplement or even completely replace the transmission of messages.

79 Murray Dahm, "Campgate Coins and Roman Fire Signalling," *Classicum* 30 (2004), pp. 17–25.

80 Different: Riepl, "*Beiträge zur Geschichte*" p. 122; but Leiner, *Signaltechnik*, p. 133.

81 Leiner, *Signaltechnik,* p. 48.

This is indicated by the comparatively large number of horn blowers that can be identified along the frontiers. It is conceivable that with their help, at least in individual cases or locally, more complex messages could be transmitted or even communicated in ideal conditions. For a two-way exchange of complex information, however, the transmission of situation reports in written form or by messengers remained indispensable everywhere.[82] Individual, archaeologically-conspicuous beacons show that, theoretically at least, more complex systems for the optical transmission of information could also have been used. At least for the operation of individual stations, the units stationed at the frontiers may have had trained personnel at their disposal, so that stations could be operated at particularly suitable, especially topographically prominent locations. Building on the experience gained here a system of long-distance communication by relays between chains of signalling towers—possibly even in the use of semaphoric systems—could have been established on the Late Antique frontiers. At present, however, the sources do not allow any definite statements to be made.

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82 Riepl, "*Beiträge zur Geschichte*," p. 63.

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CHAPTER 7

Watching, Guarding or Signalling? Late Roman Coastal Fortlets in Britain

Andrew White

1 Introduction

At five points along some of the highest cliffs in England, in North and East Yorkshire, have been found the remains of Roman fortlets of a very distinctive kind (Figure 7.1). Of these sites one was found in building work, at Raven Hall above Robin Hood's Bay, and the four others, at Huntcliff near Saltburn, Goldsborough near Lythe, Scarborough Castle and Carr Naze at Filey were excavated, the last-named on three separate occasions. All have produced evidence for a common design, although they vary in details. The dating of finds and their distinctive structures indicate that they were all built on virgin sites in the last quarter of the 4th century, at the very end of Roman centralised rule in Britain. They seem to have a close design connection with towers and *burgi* on the Rhine and Danube frontiers of the same period, that of Valentinian I, a soldier-emperor, who radically altered the defences of the empire. They are also unlike anything else yet found in Britain except for the recently-confirmed site at The Nunnery in Alderney. The situation in Wales, on the west coast of Britain, which one might expect to offer coastal protection parallels in this period, seems oddly to be quite different.

These sites were long known as signal stations but in recent years this description has been abandoned for lack of evidence, and they are usually now called fortlets. The Latin inscription from Ravenscar makes it very clear that these sites consisted of a fort and tower, but this paper will consider what sort of tower this was. With regard to the crucial question of purpose it is suggested that watching, guarding and signalling cannot easily be separated. Consideration is given to methods of signalling, and particularly of distinguishing friend from foe, usable before the invention of optical equipment, and some possible solutions to this question derived from maritime practice from the 18th century onwards.

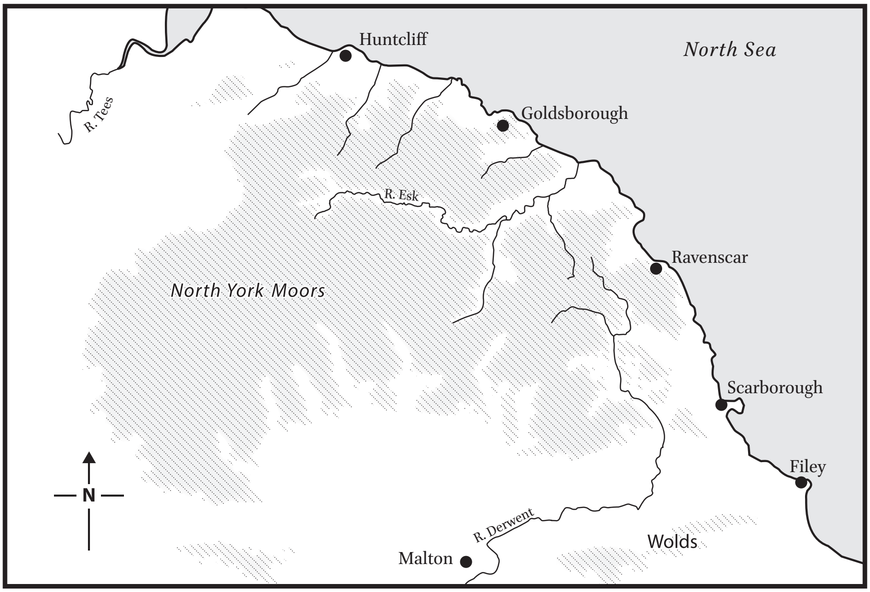

FIGURE 7.1 Map of the Yorkshire coast between the river Tees and Flamborough Head, showing fortlets and other sites mentioned in the text
DRAWING: THE AUTHOR AND I. FRONTANI

2 Yorkshire Sites

The Yorkshire sites have been studied over a long period of time. The earliest discovery was made at Peak or Ravenscar, which overlooks Robin Hood's Bay. Here in 1774 the building of Raven Hall (now part of a large hotel complex) uncovered remains of a Roman structure[1] some 27 m^2 and, more importantly, what is currently the latest Roman inscription in Britain, RIB721 (Figure 7.2).[2]

> IVSTINIANUS PP VINDICIANVS MAGISTER TVRR[e]M [et] CASTRUM FECIT A SO[lo].
>
> 'Justinianus the praepositus and Vindicianus the magister built this tower and fort from the ground up'.

The site has never been properly excavated, and may now represent the best opportunity for further archaeological research. As late as 1817 traces of the fortlet could still be made out on the ground: 'The spot where it [the inscription]

1 Lionel Charlton, *A History of Whitby and of Whitby Abbey* (York: A. Ward, 1779), pp. 42–44.
2 Robin Collingwood and Richard Wright, *The Roman Inscriptions of Britain* I, 721 (Oxford: Clarendon Press 1965), pp. 241–42.

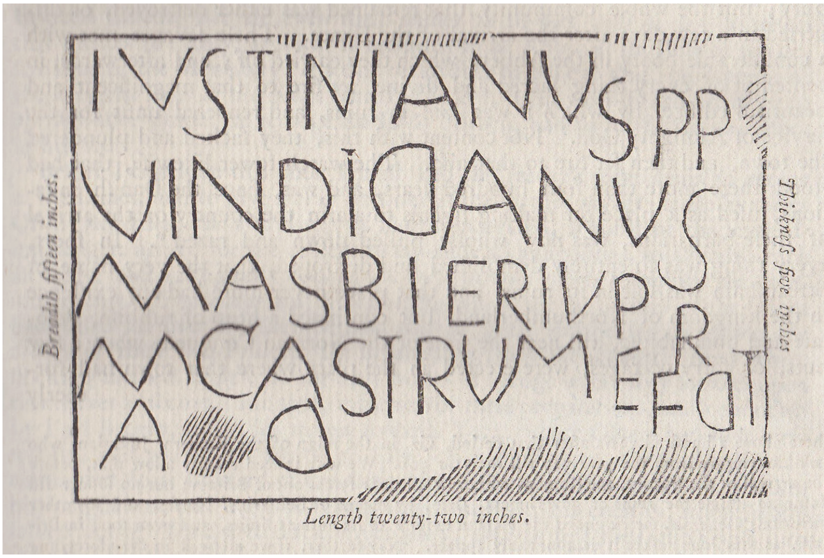

FIGURE 7.2 The earliest drawing of the Ravenscar inscription (RIB 721) by Lionel Charlton
DRAWING: CHARLTON 1779

was found is a few yards from the corner of the hall, on the north-east, where some traces of ruins are yet discernible.'[3]

In 1857 the first excavations took place at Carr Naze, near Filey.[4] In the early 20th century excavations were carried on at Huntcliff,[5] just to the south of Saltburn, at Goldsborough, near Lythe,[6] and at Scarborough Castle.[7] Filey was also reinvestigated at this time. Finally, Filey saw excavations in 1993–4[8] which had to deal with the effects both of heavy erosion and much earlier digging, but had the advantage of being the only one of these excavations carried out

3 George Young, *History of Whitby and Streoneshalh Abbey* 2 (Whitby: Clark and Medd, 1817), pp. 708–09.

4 William Cortis, *Scarborough Philosophical and Archaeological Society* (26th Report) (Scarborough: Scarborough Archaeological and Historical Society, 1858), pp. 18–25.

5 William Hornsby and Richard Stanton, "The Roman Fort at Huntcliff, near Saltburn," *Journal of Roman Studies* 2 (1912), pp. 215–32.

6 William Hornsby and John Laverick, "The Roman Signal Station at Goldsborough, near Whitby," *Archaeological Journal* 89 (1932), pp. 203–19.

7 Robin G. Collingwood, *The Roman Signal Station on Castle Hill, Scarborough* (Scarborough: Scarborough Corporation, 1925), pp. 159–64; Robin G. Collingwood, "The Roman Signal Station," in *History of Scarborough*, ed. A Rowntree (London: J.M. Dent & Sons Ltd., 1931), pp. 40–50.

8 Patrick Ottaway *et al.*, "Excavations on the Site of the Roman Signal Station at Carr Naze, Filey, 1993–4." *Archaeological Journal* 157 (2000), pp. 79–199.

using modern methods and scientific post-excavation research. Since then the last remains of the site at Huntcliff have fallen into the sea, while the site at Scarborough was laid out for display by English Heritage and its predecessors, so the archaeology may no longer be accessible.

Each site consisted of an approximately square enclosure marked by a ditch with curved corners surrounding a thin-walled outer courtyard also having curved corners some 32 metres square and with a roughly circular bastion at each corner and a gateway in one side. Within this lay a smaller stone structure with thicker walls, in the region of 15 metres square, which has traditionally been interpreted as the base of a tower. Inside this, in three cases, at Scarborough, Filey and Goldsborough, were either post-pads or stylobate blocks designed for carrying vertical timbers. At Ravenscar the site was only cursorily dug over while at Huntcliff the inner part of the fortlet, except for one wall of the tower, had already fallen over the cliff, so in neither case were stylobate blocks located.

2.1 *Timber Structures*

The most distinctive feature of these fortlets is the series of post-pads or stylobates set within the central tower, which I believe is evidence not for a high stone tower but for tall timber structures set within a relatively low stone structure. These stylobates were stone blocks with a socket set in the top to retain a large timber. The format varied among the Yorkshire examples, but they may have been designed to carry vertical timbers some 0.5 m square in section. The sockets would retain the ends of the timbers, while the stylobates and their underlying post-pads would keep those ends of the timbers free from rising damp. Only a few survive, as they perhaps had a reuse value. The underlying post-pads are more likely to survive. This feature seems also to be echoed in Valentinianic fortlets on the Rhine and Danube frontiers and the idea was perhaps brought from there A.D. *c.*370 by military engineers, with Theodosius and his field army after the disaster of the so-called 'Barbarian Conspiracy' (*barbarica conspiratio*).[9] Ammianus refers to the policy of building higher on these frontiers, *castra extollens altius et castella, turresque assiduas per habiles locos et opportunos* ('building forts and fortlets higher, as well as towers at frequent intervals and in suitable and convenient places') and *et utrubique Rhenum celsioribus castris munivit atque castellis* ('and he fortified both banks of the Rhine with loftier forts and fortlets').[10]

9 Ammianus Marcellinus, *History*, ed. John C. Rolfe, Loeb edn (London: Heinemann, 1972), 27. 8.

10 Ammianus Marcellinus, *History*, 28. 2.1; 30. 7. 6, my translations.

Evidence for these comes from the Yorkshire sites of Goldsborough, where there were six stylobates, one of which is in Whitby Museum, Filey, where five were found in the 1850s and moved to Crescent Gardens in Filey, and Scarborough, where seven sub-bases were located in the 1920s. The actual stylobates at Scarborough did not survive in situ, but it seems probable that they were reused in buildings of the medieval castle, especially the 'Kyngeshalle'.[11] In 1973 the author photographed what looked like a battered and reused stone stylobate lying on the surface at Scarborough Castle.

Ravenscar has not been excavated, while much of the site at Huntcliff had already fallen over the cliff when excavations took place in the early 20th century. Many sites on the Rhine and Danube frontiers show examples of post-pads, and a very few of stylobates, such as Wallbach-Stelli in Switzerland.[12] None, however, with the exception of the *burgus* at Lauben-Stielings, show more than four post-pads, so the British examples do seem to differ in this respect. The vast and very useful survey of late-Roman military sites in the Balkan-Danubeian area by Băjenaru includes many such sites, classified by him as 'burgus with tetrapylon', from other provinces, which the title of his paper would not lead one to expect.[13]

Good examples of this 'burgus with tetrapylon' design can be found on the Rhine and Danube frontiers at Asperden and Moers-Asberg (Germany), Wallbach-Stelli (Switzerland), Budalász, Leányfalu, Öcsény and Visegrád-Lepence (Hungary) and Bordej (Serbia), as well as Lauben-Stielings (Germany) (Figure 7.3). The latter has a rather curious arrangement of seven post-pads which looks like a modification of the usual four-post structure.[14] The use of the word 'tetrapylon' seems a little misleading, since this is usually used of a four-way ceremonial gate, plainly not the case here.

11 Colin Hayfield and Anthony Pacitto, "Excavation of the Great Hall or 'Kyngeshalle' at Scarborough Castle, North Yorkshire." *Yorkshire Archaeological Journal* 77 (2005), p. 34, fig. 2, and p. 36, fig. 4.

12 Valentin Häseli and Peter-A. Schwarz, "Neue Forschungen zum spätantiken Hochrhein-Limes im Kanton Aargau IV. Die Kleinfestung Wallbach-Stelli und andere spätantike Wehranlagen in Wallbach," *Jarhresbericht der Gesellschaft Pro Vindonissa* 2019 (2020), p. 78.

13 Constantin Băjenaru, *Minor Fortifications in the Balkan-Danubian Area from Diocletian to Justinian* (National Museum of Romanian History. The Centre for Roman Military Studies) 8 (Cluj-Napoca: Editura Mega: 2010), pp. 167–68 and 337–38.

14 Michael Mackensen, "Organisation and Development of the Late Roman Frontier in the Provinces of Raetia prima et secunda (ca. AD 270–300–450)," in *Beiträge zum Welterbe Limes, 23rd International Congress of Roman Studies, Ingolstadt 2015*, eds. C. Sebastian Sommer and Suzana Matešić (Mainz: Nünnerich-Asmus Verlag, 2018), p. 60, fig. 20.

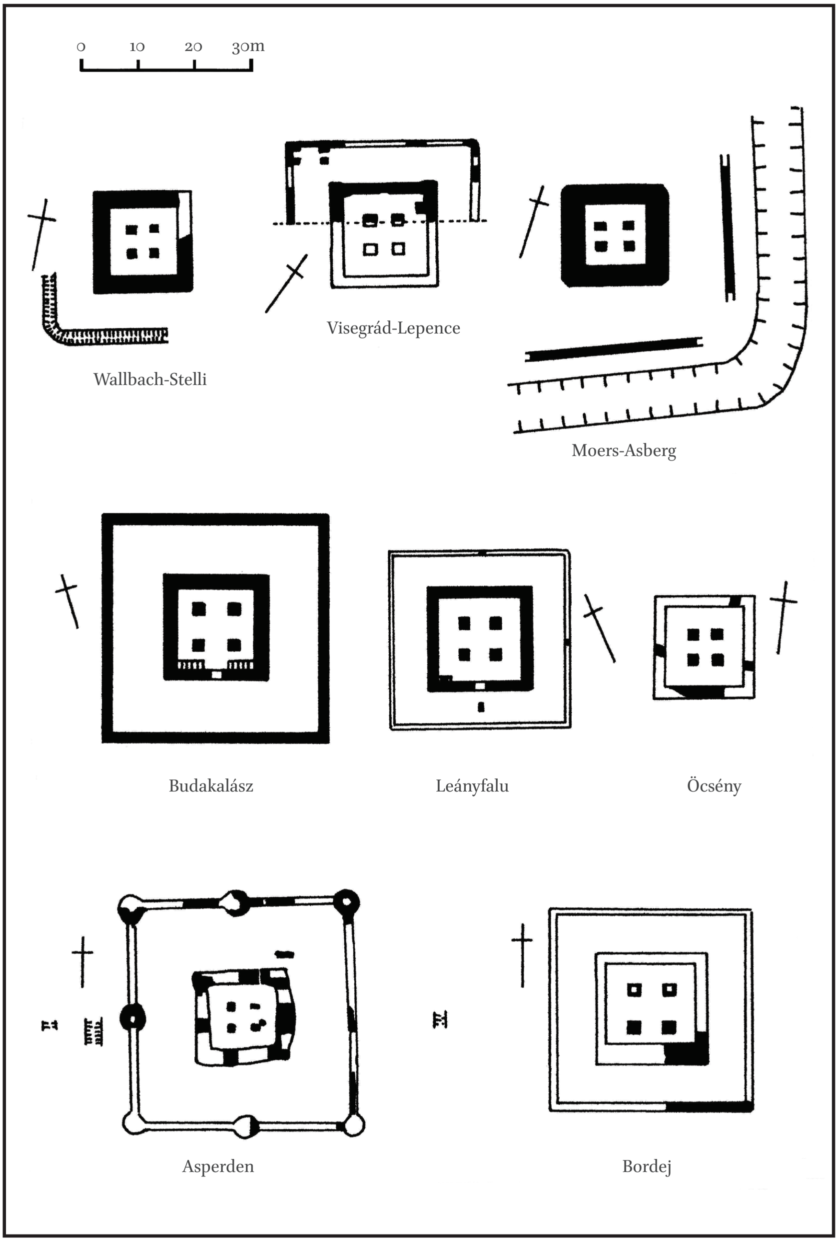

FIGURE 7.3 Comparable fortlet sites of Valentinianic date on the Rhine and Danube frontiers at Asperden and Moers-Asberg (Germany), Wallbach-Stelli (Switzerland), Budalász, Leányfalu, Öcsény and Visegrad-Lepence (Hungary) and Bordej (Serbia), redrawn, simplified and reduced to a common scale after Băjenaru 2010
DRAWING: THE AUTHOR AND I. FRONTANI

It is my contention that for speed and ease of supply openwork structures largely based on vertical timbers some half-metre square in section rather than very tall stone towers were introduced. Their lower end would have been protected and braced by a stone structure, a rather stumpy version of a tower. The difficulty of building high stone structures was that they could take several years in the construction, to allow bonding of the mortar and settling of the very considerable weight. The building season was also comparatively short, and unfinished wall-tops needed to be protected from frost and rain.[15] A timber structure could be raised in a fraction of the time. It is highly probable that large timbers such as these (up to 15 m × 0.5 m) could be obtained in Roman times, but in any case shorter timbers could be scarfed together or cross-braced. What their appearance was we may never know, but I would envisage a tall cross-braced structure topped by a watch-platform reached by ladders and with a roof for shelter, perhaps with equipment for fire or smoke signals but also with a mast or crane for hoisting flags or large cut-out shapes as coded messages, and visible over long distances. Such devices were commonly used in historic times from shore to ship to indicate the state of tides and wind direction in estuaries and harbour entrances.[16]

3 Wales

In Wales another solution seems to have been found in the late 4th century to coastal raiders, this time from Ireland. So far, the evidence only applies to Anglesey and its environs in the north-west of Wales, but if the threat came from Ireland we might expect a more widespread readiness along the Welsh coast. Areas such as the Lleyn Peninsula, Fishguard, Pembroke and Milford Haven all offer good harbours and also project deeply into the Irish Sea.

Where the Yorkshire coast has fortlets for watching the seas, but no obvious fleet bases, Wales has the opposite. The Roman fort on Holyhead at Caer Gybi has long been recognised as having some connection with the fleet. Walled on three sides and open to the harbour on the fourth it has traditionally attracted comparison with bridgehead sites on the Rhine and Danube such as Engers in Germany or Kodenica on the Danube.[17] However it has more recently been

15 Andrew White, "'Turrem et Castrum', some fresh thoughts on the Roman Fortlets of the Yorkshire Coast," *Antiquaries Journal* 102 (2022), p. 59.

16 P. Southern, "Signals versus Illumination on Roman Frontiers," *Britannia* 21 (1990), p. 242.

17 Harald Von Petrikovits, "Fortifications in the North-Western Roman Empire from the Third to the Fifth Centuries AD," *Journal of Roman Studies* LXI (1971), p. 186, fig. 24; David J.P. Mason. *Roman Britain and the Roman Navy* (Stroud: Tempus, 2003), p. 183, fig. 107.

suggested that the open side is not real and this was once a more conventional site, but still probably, given its strategic position, a fleet base.[18]

In Caernarvon stands another site, amazing in its degree of preservation and still largely unknown. It is called Hen Waliau ('Old Walls') and has hitherto occupied a rather lowly position in the hierarchy of Welsh sites, as some sort of anonymous stores base.[19] It too appears to be of late Roman date and, from its location close to the river Seiont, may also have acted as a fleet base at the strategic western end of the Menai Strait.[20] Two isolated towers have also been identified close to Caer Gybi, at Caer y Twr in Holyhead[21] and at Carmel Head, some 8 km to the north of Caer Gybi, in Anglesey.[22] These, it is suggested, offered early warning to the fort from their position, especially the former, which lies upon Holyhead Mountain with very wide views out to sea. The tower is a simple structure without outer defences, much like many of the watchtowers on the Rhine and Danube. The question of intervisibility between these structures has not been discussed, but Caer y Twr has a clear view down to Caer Gybi.

4 Alderney

The size and design of the Yorkshire fortlets can now be matched by the structure known as 'The Nunnery' at Longy Bay in Alderney, very close to the French coast. This has long been suggested as a Roman site[23] but because of its history of reuse at various times of war, and particularly during the German occupation of the Channel Isles during the Second World War, when various concrete structures were built within it, the Roman archaeology has been largely removed or disturbed. Not so the walls, which stand to approximately 5.6 m high. It has a

18 Matthew Symonds, "Fourth-Century Fortlets in Britain; Sophisticated Systems or Desperate Measures?," in *Roman Military Architecture on the Frontiers; Armies and their Architecture in Late Antiquity*, eds. Rob Collins, Matthew Symonds and Meike Weber (Oxford: Oxbow, 2015), pp. 46–61.

19 Stephen D. Boyle, "Excavations at Hen Waliau, Caernarvon 1952–1985," *Bulletin of the Board of Celtic Studies* 38 (1991), pp. 191–212.

20 Symonds, "Fourth-Century Fortlets," pp. 49–53.

21 P. John Casey, "Coin evidence and the end of Roman Wales," *Archaeological Journal* 146 (1989), p. 323.

22 Peter Crew, "Holyhead Mountain (SH 21858295)." *Archaeology in Wales* 21 (1981), pp. 35–36; David Hopewell, "Carmel Head – Pen Bryn-yr-Eglwys SH 29309243," *Archaeology in Wales* 54 (2013), pp. 313–22.

23 David E Johnston, ed. *The Saxon Shore* (CBA Research Report) 18 (York: Council for British Archaeology, 1977), pp. 31–34.

curious shape, now shown to be a response to the erosion which has left one bastion upon the beach. When the outer wall on the seaward side largely collapsed the remainder of the wall was merged with that of the central tower on that side. Now that this is understood we can recognise for the first time a building standing to considerable height which so far seems to match in every way the structures revealed by archaeology in Yorkshire, but here remarkably preserved. When excavations are completed and written up, we may expect to see very many useful comparisons to the Yorkshire sites, but especially the height and construction of the walls, and the details of wall-walks and battlements, which seem to survive in places here. Whether any evidence survives of post-pads or stylobates within the tower remains to be seen, but it appears that the building of the wartime personnel bunker within it has destroyed all earlier evidence in this area. At all events this structure does not seem to form one of a chain, so signalling may not have been its main function. The design was apparently used in many different circumstances across the Roman Empire, here perhaps to guard a useful anchorage, the only one in Alderney.[24]

5 Watching, Guarding or Signalling?

Much ink has been spilt on the possible function of such structures. In fact, there is not necessarily a division or distinction between these functions. In military terms watching is of no use if the watchers can be overwhelmed in a sudden attack without alerting their own side, so guarding the watch-sites and having some form of signalling to other points are required, otherwise the watcher watches in vain, and the loss of one is potentially the loss of all. The main difficulty is in seeing which is the principal function.

A small 20th century example shows up a perpetual problem. A German radar station on the French coast at Bruneval proved vulnerable to attack by a small British commando force in February 1942, allowing the attackers to remove valuable technical evidence for how the new radar worked. Here the site was clearly a watch-site, albeit of a very advanced kind, but was insufficiently guarded and connected by signalling to deal with a sudden and

24 Matthew Symonds, *Protecting the Roman Empire; Fortlets, Frontiers and the Quest for Post-conquest Security* (Cambridge: Cambridge University Press, 2018), p. 206; Nicholas Hogben, "Alderney's 'Shore Fort,'" *Association for Roman Archaeology newsletter* 23, no. 2 (2010); Jason Monaghan, "The Nunnery, Alderney's Roman Fort," *Current Archaeology* 261 (2011), pp. 28–33.

unexpected onslaught, despite the use of radio.[25] Some military problems are perennial.

Watching, especially on the coast, requires a high and unobstructed view over a wide arc of sea. In the absence of optical equipment, and the Romans are not known to have had such aids, the view must be such that two or three men could spot movement, if not detail, a long way out to sea. More than one, because they would need confirmation that what they saw was real. They would also need some protection from the elements, since an onshore wind would make it difficult to see without the eyes watering constantly, and the sites are necessarily exposed. These men would have to change shifts quite frequently, to avoid tiredness leading to lack of observation, and they would have to be guarded so the site could not be taken from the rear by a landing party. Watching, on this coast, would be hampered frequently by sea-frets—thick mist along the coastline—obscuring the view. This problem would, of course, also equally affect the raiders, looking for a landfall but wanting to avoid crashing into the coastal rocks.

Quite apart from whether these sites were mutually intervisible along the coast there is a very large question mark over whether they had the ability to signal back for reinforcements to other military bases, such as the legionary fortress at York, or the little understood fort at Malton, many miles to the west. Such a connection has often been assumed, but the height and ruggedness of the North Yorkshire Moors between, rising to between 300 and 400 metres, would require many intermediate sites to pass on the message, and there is no evidence for this at all. There are several known roads leading from the fort at Malton to the coast, perhaps heading in the general direction of Filey, Scarborough and Whitby, but there is no evidence that any of them are of late Roman date. Quite the contrary. The road known as 'Wade's Causeway', heading towards Whitby, and preserved as an ancient monument, passes through a small 2nd century fort at Lease Rigg, suggesting that it is of similar date. Otherwise, roads are notoriously difficult to date.[26] To put it simply, intelligence gathered on the coast would tend to stay on the coast. Its only function must have been to alert a fleet or at least ships capable of intervening, and here is a huge lacuna in our knowledge, largely because the Romans seem to have regarded their navy with a degree of disdain. The historical evidence just does not exist, after the break-up of the *Classis Britannica* (British Fleet) at some date in the late 3rd century, perhaps as a result of Carausius' rebellion. That is not to say that a fleet or more probably dispersed squadrons did not remain.

25 Richard V. Jones, *Most Secret War* (Ware: Wordsworth, 1998), pp. 233–49.

26 Ivan D. Margary, *Roman Roads in Britain, vol. 2, North of the Foss Way – Bristol Channel* (*including Wales and Scotland*) (London: Phenix House LTD, 1957), pp. 156–58.

The principal of coast-watching without the power to intervene makes no sense. The only piece of evidence which does exist is the reference in the treatise on military science by Vegetius, who comments on the camouflaged scout-ships known as '*pictae*' or '*picati*', which seem from the context to have been particular to Britain.[27] Vegetius is not a very helpful author, as much of his text refers back to earlier times. Even supposing that these ships did operate on the Yorkshire coast it is not clear whether they could engage the enemy at sea, or whether they might shadow hostile ships as far as landing, leaving land troops to bring them to battle.

Guarding might come in two forms. The first would be to protect the watchers from being caught by surprise attack and being unable to either watch or to pass on the intelligence. This would probably require a fairly small body of soldiers patrolling the walls and gates, and in the case of the Yorkshire fortlets, operating light artillery in the form of catapults or *ballistae* set on the tops of the corner bastions, for the existence of which there seems no other obvious reason. It has been pointed out that the positioning of these on curved corners denied them the opportunity for enfilading fire along the walls. This may have been a miscalculation by the military engineers, or else the benefits of curved corners may have outweighed the disadvantages. The troops stationed in these fortlets would no doubt take turns in the various duties, watching, guarding and signalling on a rota system, just like on ships at sea.

The second role in guarding might be to provide a small force of infantry which could be mustered to deal with landings by raiding parties. Such raiding parties were perhaps often quite small, relying on surprise and ruthlessness rather than overwhelming force. Undoubtedly they would consist of a ship's crew or a multiple of that. The number of rowing benches determined the number of warriors available. At this period we are not looking at attempted settlement or attack by armies, more individual and opportunistic raiding for booty and slaves.

Both roles would require a body of troops to be stationed within the fortlet. The vexed question as to whether wives and families were also accommodated cannot be answered here, and remains open. Their presence would certainly imply that there were rather less soldiers for any given quantity of space.

Evidence for that accommodation is slight, and for many years it has been confidently stated, as here by Collingwood in reference to Scarborough: 'From the absence of any buildings in the courtyard it is clear that the men working the signal station were lodged in the tower itself.'[28] This of course required

27 Vegetius, *Epitome of Military Science*, ed. Nicholas P. Milner (Liverpool: Liverpool University Press, 2001), p. 37.

28 Collingwood, "The Roman Signal Station," p. 46.

the tower to be of stone, while existing theories for the use of stylobates suggest that they were supports for an upper floor carrying troops, stores or armaments. This suggestion seems unlikely, since a tower structure does not require an excessively long span for horizontal timbers, nor is the weight likely to be anything beyond what was commonly experienced for floor loadings in medieval castles, which would meet the same problems.

Collingwood's dismissal of the courtyard as providing any accommodation seems somewhat hasty. There is indeed some evidence for buildings, probably timber barracks set on sill-beams, within the courtyard, in the form of what appear to be raised floors, hearths, and rubbish pits (and possibly cess-pits) (Figure 7.4). With these and the lower floor of the stone tower-base there could

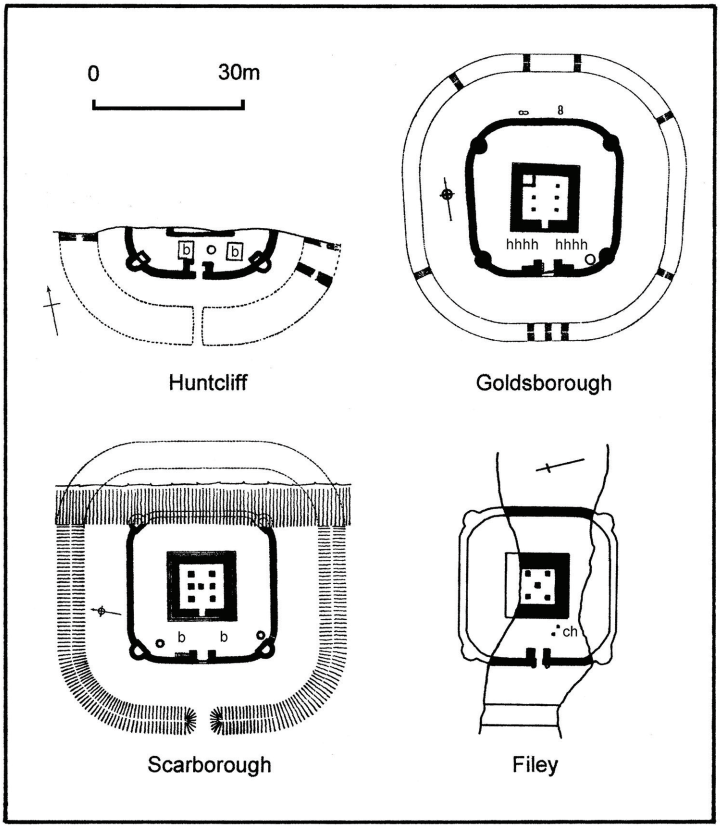

FIGURE 7.4 Ground plans of the Yorkshire fortlets, showing suggested evidence for barrack blocks in the courtyard. Huntcliff, areas of flooring (b); Goldsborough, hearths (h); Scarborough, spaces between rubbish pits (b); Filey, coin hoards (ch)
DRAWING: THE AUTHOR AND I. FRONTANI AFTER HORNSBY AND STANTON 1912; HORNSBY AND LAVERICK 1932; COLLINGWOOD 1925; OTTAWAY 2000

well be accommodation for a number of soldiers, a hint of which is given by an eightfold arrangement of hearths etc. at Goldsborough, which suggests some multiple of eight as a garrison, perhaps 16 or 32 (Figure 7.5). Not very many, because the two ovens set on the northern berm of the site there seem to have been designed for alternative use, depending on the direction of the wind, and these had presumably to provide for the needs of the whole garrison.[29]

FIGURE 7.5 Model at a scale of 2 mm to one foot, based upon the sites at Goldsborough sand Huntcliff, showing the suggested timber tower and barrack blocks in the courtyard. Much is necessarily conjectural but the aim is to show how the design might work.
MODEL: THE AUTHOR

29 White, "Turrem et Castrum," p. 63.

Having observed movement at sea they would then need to establish whether it represented friend or foe, and if the latter, would have to let someone else know, who could take appropriate action, or if the raiding party was small, take action themselves. The establishment of whether they were friend or foe might easily be done by sending oncoming ships a prearranged code, by fire, smoke, flags or a hoisted symbol. This would need to be responded to in a satisfactory way to indicate a friend. An enemy would not know the code.

Such a system was regularly in use on the coasts of southern and eastern England during the Napoleonic wars with France.[30] These stations bore little resemblance to their Roman counterparts, consisting of a signal mast with a gaff attached to carry respectively signal flags and canvas 'balls' (large spherical shapes) and with nearby accommodation for the officer and men operating the post. Both on land and at sea it was necessary to use three-dimensional symbols, since the wind could easily turn them edge-on, rendering them well-nigh invisible. It is of interest that the Admiralty regarded a fifty-foot (somewhat over 15 m high) topmast as being appropriate for signalling. This was no doubt something that they had in store in large quantities. The signal code used at these stations was devised by the Admiralty in the late 18th century, but the method of signalling may go back very much further, and it would not be difficult to devise a simple letter or numeric code at any time.

Many of the features of the system described above were absolutely normal practice at sea before the invention of radar and could easily have been transferred to land use. High lookout positions, constant watch with frequent changes of personnel, and some simple form of signalling between vessels, were always necessary at sea. It cannot be proved, of course, that such systems were used by the Romans, but it seems very likely.[31] Most views look only at the land-based activity and fail to see the large sea-borne element, blatantly unrecorded by history but absolutely required by circumstances.

The Roman sites on the Yorkshire coast were set on high cliffs, difficult or impossible to storm directly (see Figure 7.1), and with long views out to sea, but this coast also offers numerous inlets of various sizes which could house scout-ships if necessary, including the modern ports of Whitby and Scarborough as well as smaller inlets like Saltburn or Skinningrove.

30 Frank Kitchen, "The Napoleonic War Coast Signal Stations," *Mariner's Mirror* 76 (1990), pp. 337–44; John E. Goodwin, "The Naval Signal Posts on the Coast of Southern England 1794–1815." *Mariner's Mirror* 91 (2005), pp. 34–45.

31 Mason *Roman Britain*, pp. 60–61, 170, and 182–83.

I have suggested elsewhere[32] that the fortlets were placed where hostile fleets might make their first landfall, using the cliffs and high moors behind as a leading mark, without necessarily intending to land here. Their target may have been the richer lands to north and south, which they would then approach by hugging the coast. This makes more sense for a Germanic enemy, making an open sea crossing from north Germany or Jutland, rather than a Pictish one, as has been commonly suggested, which would probably make a coastwise voyage all the way from Scotland.

The fortlets do not make much sense as an intervisible chain, signalling to each other, despite valiant attempts to show this was possible.[33] The existence of a similar site at Whitby, lost by erosion, has been frequently suggested[34] following Bede's reference to "*in monasterio quod dicitur Strenaeshalc, quod interpretatur sinus Fari*" ("in the monastery which is called Streanaeshalch, which is interpreted as 'bay of the lighthouse'"), although the etymology cannot be made to work, even when placed under duress.[35]

At all events the requirements for proof of intervisibility on a coast where erosion has removed long tracts of cliff and possibly several sites can just not be met. First of all, we do not know how many fortlets there were. Five are definite, while there is a possibility that others have been lost by cliff erosion, but to prove intervisibility we need to know all the sites, and the height of the various structures. I do not personally believe that there were more than five, while the height of the structures has been hotly disputed. Most have envisaged very tall stone towers, anything between 20 and 45 m high, and intervisibility would require such heights, if that were the purpose of the structures. I do not believe that these sites were intervisible, except by chance, or that sufficient evidence can be made to support this concept. The whole subject of signalling by the Roman military was given a severe beating in an article by Donaldson[36] but this only means that extreme caution should be adopted in

32 White "Turrem et Castrum", p. 56.

33 Tyler Bell, "Reconstructing Archaeology from the Landscape; GIS, CAD and the Roman Signal Station at Whitby," in *Archaeology in the Age of the Internet – CAA 97*, eds. Lucie Dingwall, Sally Exon, Vince Gaffney, Sue Laflin and Martijn van Leuse (BAR) S750 (Oxford: BAR, 1999), pp. 81-14–81-18.

34 Tyler Bell, "A Roman Signal Station at Whitby." *Archaeological Journal* 155 (1998), pp. 303–22.

35 Bede, *Historia Ecclesiastica Gentis Anglorum* III, ed. Charles Plummer (Oxford Clarendon Press, 1896), p. 25.

36 George H. Donaldson, "Signalling Communications and the Roman Imperial Army," *Britannia* 19 (1988), pp. 349–56.

suggesting chains of signal stations without substantial evidence. It does not by any means entirely destroy the concept of Roman signalling.[37]

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37 See also the articles by Williams and Thiel on Roman signalling and Bakke on Greek signalling in this volume.

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CHAPTER 8

A Fire Beacon System in Byzantine Apulia? Visualizing Empire in 11th Century Capitanata

Lucas McMahon

1 Introduction

The visual military signalling employed in the Roman Empire was usually quite simple. The army did not have a professional signalling corps, and basic pre-arranged signals appear to be the extent of what was usually performed. In Byzantium, military signalling has a reputation of being more sophisticated. This is largely due to a famous 9th century long-distance optical telegraph which ran from Loulon on the Cilician frontier between Byzantium and the Abbasid Caliphate and Constantinople.[1,2] This sophisticated optical telegraph appears to be *sui generis*, and references to optical communication in Byzantium are otherwise similar to what can be seen in Graeco-Roman antiquity. Military manuals and occasional other references to beacon communications tend to refer to simple, pre-arranged signals.[3] This has not stopped scholars in looking for other beacon chains, however. Some of these are more or less plausible, such as a 6th century series of fortifications with a chain of intervisibility along the Via Axia in Macedonia, or on the islands of Euboia and Kalymnos.[4] Others require

1 Lucas McMahon, "Signalling empire between the Abbasid-Byzantine frontier and Constantinople: investigations on the ninth-century long-distance optical telegraph," *Dumbarton Oaks Papers* 79 (2025), pp. 219–45.

2 Philip Pattenden, "The Byzantine early warning system," *Byzantion. Revue internationale des études byzantines* 53, no. 1 (1983), pp. 258–99.

3 Syrianos Magister, *Peri strategias* 8, ed. and trans. George T. Dennis (Washington D.C.: Dumbarton Oaks, 1985), p. 26; *Digenis Akrites*, ed. and trans. Elizabeth Jeffreys (Cambridge: Cambridge University Press, 1998), pp. 172 and 339.

4 Viktor Lilchikj Adams, "The visual communication system of the early Byzantine castles along the *Via Axia* in the Republic of Macedonia in the 6th century AD," in *Space, landscapes and settlements in Byzantium: studies in the historical geography of the eastern Mediterranean presented to Johannes Koder,* eds. Andreas Külzer and Mihailo St. Popović (Vienna: Novi Sad, 2017), pp. 237–49; Andrew Blackler, "Communication and the role of the medieval tower in Greece: a re-appraisal," *The Annual of the British School at Athens* 117 (2022), pp. 393–414; Nikos D. Kontogiannis and Michael Heslop, "The defences of middle Byzantium in Greece (seventh-twelfth

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further investigation, such as Clive Foss's claim that Kayser Kale near Kütahya was a signalling station from the second half of the 12th century, based upon the difficulty of approach to the fortress and its excellent views.[5] Another case, and the one under consideration here, is an alleged beacon system in early 11th century Byzantine northern Apulia, in modern Foggia province, Italy.[6] A series of new urban foundations all built at the same time were arranged in a zig-zag pattern and could be seen from each other, suggesting that they might have been able to communicate by optical signals. Could the newly founded urban areas of Byzantine Capitanata have functioned as an optical telegraph, and to what end?

2 Background

Italy was ruled by the Ostrogothic kingdom after the end of the western Roman Empire. The entire peninsula was recaptured by the Romans in the middle of the 6th century, but military unrest in the A.D. 560s eventually coalesced into several Langobard polities.[7] Constantinople retained control over the south as well as Liguria, Naples, and a corridor of land connecting Rome and Ravenna, the latter of which was the capital.[8] In A.D. 751 the Langobardi conquered Ravenna and central Italy was lost to the empire. By the middle of the 9th century Arabs and Langobardi had taken most of Apulia from Byzantium, but a successful intervention under the emperor Basil I (r. A.D. 867–86) re-asserted authority in the region and Bari was retaken in A.D. 876.[9] By the middle of

centuries," in *Medieval Greece: encounters between Latins, Greeks, and others in the Dodecanese and the Mani*, ed. Michael Heslop (Abingdon: Routledge, 2021), pp. 188–94.

5 Clive Foss, *Survey of medieval castles in Anatolia I: Kütahya* (Oxford: British Archaeological Reports, 1985), pp. 93–94.

6 Jean-Marie Martin and Ghislaine Noyé, "Habitats et systèmes fortifiés en Capitanate. Première confrontation des données textuelles et archéologiques," in *Castrum 2. Structures de l'habitat et occupation du sol dans les pays méditerranées: les méthods et l'apport de l'archaeologie extensive*, ed. Ghislaine Noyé (Rome and Madrid: École française de Rome and Casa de Velázquez, 1988), p. 520; Jean-Marie Martin, *La Pouille du VIe au XIIe siècle* (Rome: École française de Rome, 1993), p. 261; Ghislaine Noyé, "New light on the society of Byzantine Italy," in *Social change in town and country in eleventh-century Byzantium*, ed. James Howard-Johnston (Oxford: Oxford University Press, 2020), p. 184.

7 Eduardo Fabbro, *Warfare and the making of early medieval Italy (568–652)* (Abingdon: Routledge, 2020), pp. 8–42.

8 Lucas McMahon, "Digital perspectives on overland travel and communications in the Exarchate of Ravenna (sixth through eighth centuries)," *Studies in Late Antiquity* 6, no. 2 (2022), pp. 284–334.

9 Jean-Marie Martin, "Byzantine Apulia," in *Byzantium, Venice and the medieval Adriatic: spheres of maritime power and influence, c.700–1453*, ed. Magdalena Skoblar (Cambridge: Cambridge

the 10th century Byzantine Italy was ruled by a *katepano* based in Bari, which eventually lent its name to the area of northern Apulia under investigation here, Capitanata.[10] Inner and northern Apulia was a land of limited human habitation in this period.[11] A number of new settlements appear in the 10th century, with evidence from places like Vaccarizza of a centralized fortification programme.[12]

Leo of Ostia, the 11th century chronicler and monk of Montecassino, recorded that the military authority in Byzantine southern Italy, the *katepano* Basil Boioannes (A.D. 1017–28) fortified Troia, Dragonara, Civitate, and Fiorentino.[13] By the mid-11th century all four were episcopal sees, which may date from the time of foundation, an were also an attempt to stamp Byzantine control on the landscape.[14] Nearby Bovino and Lucera were already fortified.[15] In addition, William of Apulia implies that Boioannes had done major construction work in Melfi.[16] These locales named in the written texts form a chain running north-south along the (modern) north-western border that Apulia shares with Molise and Campania. In addition, Castelluccio Valmaggiore and Biccari have surviving Byzantine towers from the 11th century and Tertiveri, Biccari, and Montecorvino may have been new foundations at this time as well.[17] Bari had

University Press, 2021), pp. 188–202; Vera von Falkenhausen, "Between two empires: Byzantine Italy in the reign of Basil II," in *Byzantium in the year 1000,* ed. Paul Magdalino (Leiden: Brill, 2002), pp. 135–59.

10 Jean-Claude Cheynet, "La place des catépans d'Italie dans la hiérarchie militaire et sociale de Byzance," *Νέα Ῥώμη* 4 (2007), pp. 143–61.

11 Martin, "Byzantine Apulia," pp. 193–96.

12 Enrico Cirelli, Elvira Lo Mele and Ghislaine Noyé, "Vaccarizza: una cittadella bizantina sotto la motta normanna," *The Journal of Fasti Online* 160 (2009), pp. 1–18.

13 Leo of Ostia, *Die Chronik von Montecassino*, 2.51, ed. Hartmut Hoffman (Hannover: Hahnsche Buchhandlung, 1980), p. 261; for Troia: Francisco Trinchera, ed. *Syllabus Graecarum membranarum* (Naples: Joseph Cataneus, 1865), p. 20.

14 Walther Holtzmann, "Der Katepan Boioannes und die kirchliche Organisation der Capitanata," *Nachrichten der Akademie der Wissenschaften in Göttingen, Philologisch-Historische Klasse* 2 (1941), pp. 21–39.

15 Jean-Marie Martin, "Une frontière artificielle: la capitanate italienne," in *Actes du XIVe congrès international des études byzantines, Bucarest, 6–12 Septembre 1971,* eds. Mihai Berza and Eugen Stănescu (Bucharest: Editura academiei republicii socialiste România, 1975), p. 381; Vera von Falkenhausen, *La dominazione bizantina nell'Italia meridionale dal IX all'XI secolo* (Bari: Ecumenica Editrice, 1978), p. 57.

16 William of Apulia, *Gesta Roberti Wiscardi,* 1.247-48, ed. and trans. Marguerite Mathieu (Palermo: Istituto siciliano di studi bizantini e neoellenici, 1961), p. 112.

17 Catherine Holmes, *Basil II and the governance of empire (976–1025)* (Oxford: Oxford University Press, 2005), p. 441; Martin, *La Pouille*, pp. 261 and 267; Lukas Clemens and John Zimmer, "An architectural survey of the medieval residential tower at Tertiveri (Foggia province, Apulia)," in *Château et commerce: actes du colloque international de Bad*

only recently received its fortified governmental centre in A.D. 1011.[18] The fortification programme was primarily military in nature, as the situation in Byzantine Italy had become precarious during the A.D. 1010s.[19] The new fortifications shielded Apulia from the north and west, suggesting that the foreign enemy in mind may have been the Langobard Duchy of Benevento as well as the Eastern Franks, who had participated in affairs in southern Italy for nearly two centuries by this point. However, the establishment of a number of strong points in the area is probably due more directly to the revolt of Mleh/Meles of Bari in A.D. 1016, which began in northern Apulia and involved the rebel bringing in outside military support.[20]

3 Methods

The technique employed here to examine visibility is the viewshed, a GIS (Geographic Information System) method to determine what points are visible from a given observation spot. Viewsheds are a blunt instrument and as such are best applied fairly generally, but serve a purpose here since the goal is to determine approximate point-to-point intervisibility.[21] In addition, viewsheds permit a level of simulation that cannot be achieved by observation on the ground by accounting for the height of the viewer and the viewed point. While some Byzantine fortifications survive in Capitanata, most do not, thus making it difficult to make personal observations from an offset of 15 m above the ground, for example.

The total study area is approximately 10,500 square kilometres, comprising most of Foggia province in northern Puglia. Geodesic viewsheds were

Neustadt an der Saale, Allemagne, 23–31 août 2014, eds. Peter Ettel, Anne-Marie Flambard Héricher and Kieran Denis O'Conor (Caen: Presses universitaires de Caen, 2016), pp. 91–98.

18 André Guillou, "Un document sur le gouvernement de la province. L'inscription historique en vers de Bari (1011)," in *Studies on Byzantine Italy*, ed. André Guillou (London: Variorum, 1970), pp. 1–22.

19 von Falkenhausen, "Between two empires," pp. 141–46.

20 Carlo Guido Mor, "La difesa militare della capitanata ed i confini della regione al principio del secolo XI," *Papers of the British School at Rome* 24 (1956), pp. 35–36; von Falkenhausen, "Between two empires," p. 149; Nicholas S.M. Matheou, "Hegemony, elitedom, and ethnicity. "Armenians" in imperial Bari, c.874-1071," in *Italy and the East Roman world in the medieval Mediterranean: empire, cities and elites, 476–1204*, eds. Thomas J. MacMaster and Nicholas S.M. Matheou (Abingdon: Routledge, 2021), pp. 245–65.

21 Mark Gillings, "Mapping liminality: critical frameworks for the GIS-based modelling of visibility," *Journal of Archaeological Science* 84 (August 2017), pp. 121–22.

performed in ArcGIS Pro 2.8.0. The TINITALY digital elevation model (DEM, 10 m) was used.[22] The observer offset above the ground was set to 20 m, unless other evidence permitted a more precise figure. The figure of 20 m is based upon surviving Byzantine towers from this region: the Byzantine tower at Biccari dates to the early 11th century and is 23 m tall, while a tower of similar construction and date at Castelluccio Valmaggiore rises to 20 m. A fire-tower base from the Peloponnese suggests a height of 15–25 m.[23] However, the viewshed algorithm does not account for built structures. The method employed here to account for this is to modify one cell of the digital elevation model manually to create a slightly higher altitude value at the location of the tower. Despite the points being located upon the artificially heightened DEM the original offsets were retained in the point data. Tests indicate that this did not affect the results. The efficacy of the technique became evident after generating the viewsheds; in several cases the immediate area around the point to be viewed was invisible to the viewer, since they lacked the height to look down on the fluvial spur upon which most of the sites on the Tavoliere plain were located. However, the raised cell was often visible, suggesting that a tower could have been seen. Here a locale is considered to be visible if it falls within 500 m of an area marked as visible by the viewshed.

The precise location and height of built structures are only estimates, and this also assumes that a structure is operating as part of an optical communication system. While a surviving tower may provide an obvious vantage point for visibility it may have been intended to serve other purposes such as defence, storage, or a way for an authority to stamp their mark on the landscape. An example of this is Castelluccio Valmaggiore, which has limited visibility despite a surviving tower of 20 m and being situated at a higher elevation than most of the other sites. Optical communication systems thus may have been based in the surroundings of a settlement and are not necessarily easy to detect archaeologically. A good example of this comes from the Byzantine city of Euchaïta in north-central Asia Minor. Field surveys have indicated that the city had a range of outposts in its immediate hinterland, some of which

22 Simone Tarquini, Stefano Vinci, Massimiliano Favalli, Fawzi Doumaz, Alessandro Fornaciai and Luca Nannipieri, "Release of a 10-m-resolution DEM for the Italian territory: Comparison with global-coverage DEMs and anaglyph-mode exploration via the web," *Computers & Geosciences* 38 (2012), pp. 168–70.

23 Joseph L. Rife, "Leo's Peloponnesian fire-tower and the Byzantine watch-tower on Acrocorinth," in *Archaeology and history in Roman, medieval and post-medieval Greece: studies on method and meaning in honor of Timothy E. Gregory,* eds. William R. Caraher, Linda Jones Hall and R. Scott Moore (Aldershot: Ashgate, 2008), p. 297.

may have operated optical communication systems.[24] A place like Melfi makes it clear that a simple study of point-to-point intervisibility is insufficient, as a series of hills to the immediate north of the city block virtually all views to and from this direction. This does not, however, preclude the possibility of Melfi functioning as part of an optical telegraph, but merely that the city requires a relay in its immediate surroundings.

4 Results and Discussion

The immediate question is whether the four new settlements founded by Basil Boioannes operated as an optical communication system. Civitate, Fiorentino, and Dragonara form a triangle in northern Capitanata; at no point is one of the new settlements more than 15 km from the others, whereas Troia is further to the south, about 28 km from Fiorentino. Both Dragonara and Civitate are adjacent to the northern frontier of Capitanata, as defined by the river Fortore.

The results of the viewsheds raise questions about the efficacy of such an optical telegraph (Figure 8.1). The first issue is that Dragonara, the fortification closest to the frontier, is also the lowest. At 68 m above sea level (aSL), it is far below Civitate (160 m aSL), and a similar problem exists in relation to Fiorentino (190 m aSL), and Troia (450 m aSL). The fluvial valleys of the Tavoliere mean that these places cannot see Dragonara, and the situation is also true in reverse: Dragonara cannot see Fiorentino, Civitate, or Troia. Dragonara commands views of the river Fortore and seems unlikely to have been part of an optical telegraph itself. This does not mean that the fortress could not have been in optical communication with some of the other new foundations. For example, the small hills west-south-west of Civitate could have served as an effective relay point. Similarly, the hills to the south and the east of Dragonara block views coming from Fiorentino. These are approximately 1 km from the main site and thus could easily be bridged by a relay, which need not have been optical. Work done on the Roman defences at Porolissum in modern Romania suggest that under good conditions auditory signals remain

24 James Newhard, Norman S. Levine and Olivia Adams, "Appendix 3: Assigning function to survey data using heuristic geospatial modelling," in *Archaeology and urban settlement in late Roman and Byzantine Anatolia: Euchaïta-Avkat-Beyözü and its environment*, eds. John Haldon, Hugh Elton and James Newhard (Cambridge: Cambridge University Press, 2018), pp. 274–82.

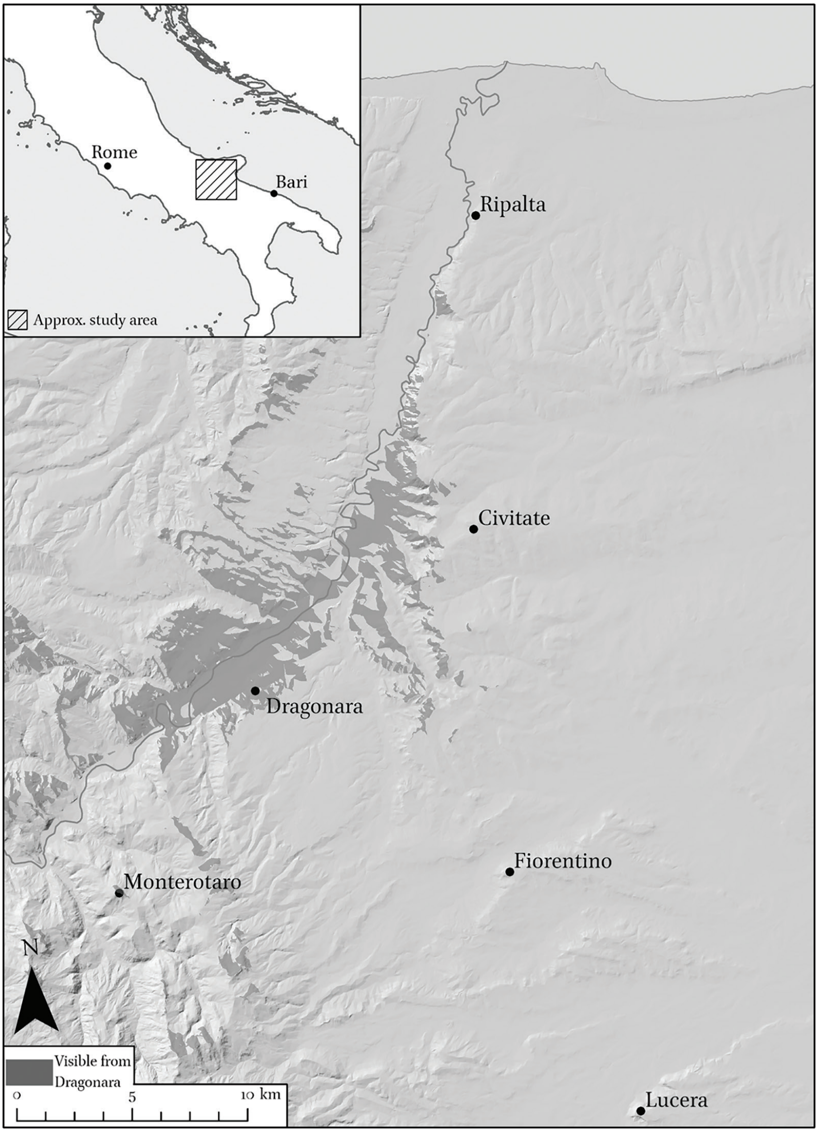

FIGURE 8.1 Viewshed from the site of Dragonara (base data, Tarquini *et al.*, 2012)
ILLUSTRATION: LUCAS MCMAHON

easily perceptible at a distance of 2 km,[25] although this topic has been little explored in Byzantium.

25 Vlad-Andrei Lăzărescu, Ștefan Bilașco and Iuliu Vescan, "Big Brother is watching you! Approaching Roman surveillance and signalling at Porolissum," in *Landscape archaeology*

Hypothesizing about relays only goes so far, and any two sites could be linked if enough relays are invented. Rather, Dragonara should probably be classed as what Jonathan Shepard termed a 'bunker',[26] a peripheral stronghold that may not be easy to spot. This is not to say that Dragonara was invisible, but rather that it did not dominate the landscape in a manner akin to Troia. Some tests suggest that a traveller on the road from Santa Croce di Magliano would only be able to see Dragonara when they were about 5 km from the fortress. Dragonara remains invisible on the road from Rotello to Badia di Santa Maria di Melanico until just over 3 km away. Rather than being primarily part of an optical communication system, Dragonara seems more likely to have functioned as a relatively concealed fortification that controlled a substantial segment of the river Fortore. Its viewshed of the river valley is excellent, with thorough views extending about 6 km upstream and a similar distance downstream.

This is similar to Civitate, which can see the riverbanks but not the Fortore itself. Further north, Ripalta has good views over the opposing bank for approximately 12 km, as well as downstream as far as the Adriatic. A cumulative viewshed of the three locales (Figure 8.2) shows little overlap; the three sites can cover the river valley, but all three are necessary to encompass its length.[27] The greatest overlap is on the left bank of the Fortore opposite Dragonara, but this area is more than 10 km out from Civitate and thus was less effectively under surveillance given the degradation of human vision over distance.[28] Only tiny portions of prominent peaks are visible to all three, including Monterotaro. It seems too much of a coincidence that the three known Byzantine settlements of the 11th century together are able to see almost the entire course of the lower Fortore river valley, which attests to their role in border observation as well as the careful planning that went into the new sites. Their roughly equal spacing reinforces their defensive role: as the crow flies 13 km separate Ripalta and Civitate, and 12 km between Civitate and Dragonara. Even if these foundations were not able to communicate optically without the assistance of relays, news from one could be passed on to the others within a matter of hours by terrestrial means.

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on the northern frontier of the Roman Empire at Porolissum, eds. Coriolan Horațiu Opreanu and Vlad-Andrei Lăzărescu (Cluj-Napoca: Mega Publishing House, 2016), pp. 292–301.

26 Jonathan Shepard, "Bunkers, open cities and boats in Byzantine diplomacy," in *Byzantium, its neighbours and its cultures,* eds. Danijel Dzino and Ken Parry (Canberra: Australian Association for Byzantine Studies, 2017), p. 12.

27 Mor, "La difesa militare," pp. 35–36.

28 Pastor Fábrega-Álvarez and César Parcero-Oubiña, "Now you see me. An assessment of the visual recognition and control of individuals in archaeological landscapes," *Journal of Archaeological Science* 104 (April 2019), pp. 56–74.

FIGURE 8.2 Multi-point viewshed from Dragonara, Civitate, and Ripalta (base data, Tarquini *et al.*, 2012)
ILLUSTRATION: LUCAS MCMAHON

While the choice to situate the new foundations on interfluvial spurs cannot be denied, the distances between them are significant because many of them are just over a half-day's military march from each other. Infantry moved at about 17–24 km per day, while unaccompanied cavalry could traverse 60–75 km per day.[29] The size of many of these establishments suggest that the numbers of troops present was probably quite low, and so small groups without the burden of much baggage likely moved on the faster end of this scale. Ripalta, Fiorentino, Dragonara, and Civitate were all a little over two hours' march from each other, meaning that communications could be effected rapidly and they could easily reinforce each other.

What about the fourth foundation of Boioannes, Troia? Located on an interfluvial spur 28 km south of Fiorentino, Troia was highly visible to its surroundings and consequently had extensive views (Figure 8.3). Perhaps more significantly, it was located on the Via Traiana, a 2nd century road that went from Benevento to Brindisi. The Via Traiana remained one of the major routes from central Italy to the southern Adriatic coast in the Middle Ages.[30] Troia guarded the approach to Byzantine Italy from Benevento, and soon proved its worth when it stopped the army of the king of East Francia, Henry II, during his expedition to the south in A.D. 1022.[31] Troia's viewshed is excellent and extends further than 50 km in all directions except the west. Troia can see Civitate and Fiorentino. However, these do not establish a chain since Fiorentino cannot see Civitate. In any case, existing establishments need to be considered, and Lucera sits between Troia and Fiorentino. Lucera may have been part of the original re-conquest in the late 9th century and had been lost, but by the late 10th century was certainly part of the empire again.[32] It would serve as an effective relay point, and is able to see Civitate, Fiorentino, and Troia, as well as the hills to the south and east of Dragonara.

The viewsheds of the new foundations are notably extensive in relation to the older chain of Byzantine defences to the south. Bovino, Sant'Agata di Puglia, and Melfi all have limited views, indicating that they were intended to control the landscape rather than observe vast expanses of it. Likewise, they are not easy to see and do not seem to have been able to communicate optically with each other. Ascoli Satriano functioned here in a way similar to Lucera or Troia, with much wider views despite being on lower ground, while being

29 John Haldon, *Warfare, state, and society in the Byzantine world 565–1204* (London: Routledge, 1999), pp. 164–66.

30 Pietro Dalena, "Il sistema viario della Puglia dal tardo antico all'alto medioevo (sec. V–X)," in *Bizantini, Longobardi e Arabi in Puglia nell'Alto Medioevo* (Spoleto: Fondazione Centro italiano di studi sull'Alto Medioevo, 2012), pp. 89–103.

31 Graham A. Loud, *The age of Robert Guiscard: southern Italy and the Norman conquest* (Abingdon: Routledge, 2000), p. 69.

32 Vera von Falkenhausen, "Zur byzantinischen Verwaltung Luceras am Ende des 10. Jahrhunderts," *Quellen und Forschungen aus italienischen Archiven und Bibliotheken* 53 (1973), pp. 395–401 and 402 n1; Mor, "La difesa militare," pp. 29–30.

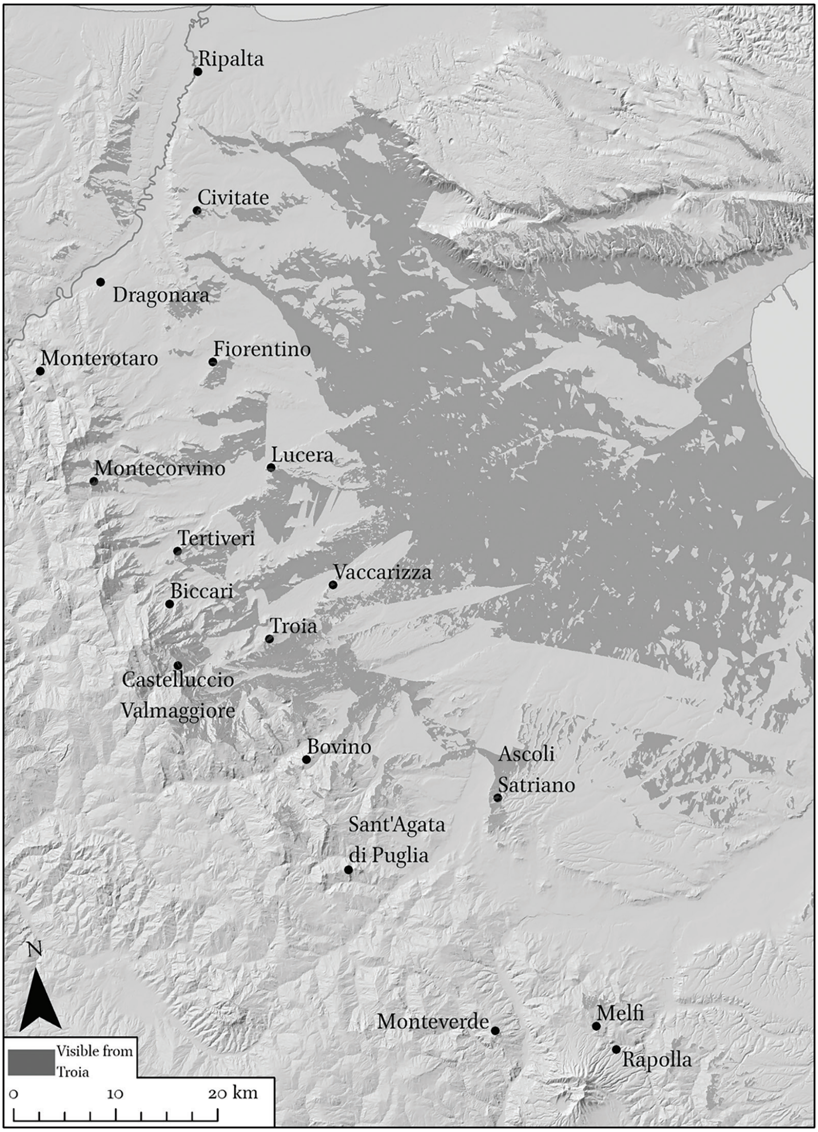

FIGURE 8.3 Viewshed from Troia (base data, Tarquini *et al.*, 2012)
ILLUSTRATION: LUCAS MCMAHON

slightly farther from the border. The hills that nestle Ascoli Satriano block each other's views, and so any attempt from there to survey the surroundings in all directions requires at least three observers. If Castelluccio Valmaggiore was also established as part of Boioannes' efforts to secure northern Capitanata, then it seems to have functioned similarly to Bovino or Sant'Agata di Puglia in that it was not primarily a point for viewing the landscape, despite the existence of a substantial surviving tower.

This amount of intervisibility in Capitanata (Figure 8.4) creates a problem: if an optical signal is supposed to travel from one location to another to deliver

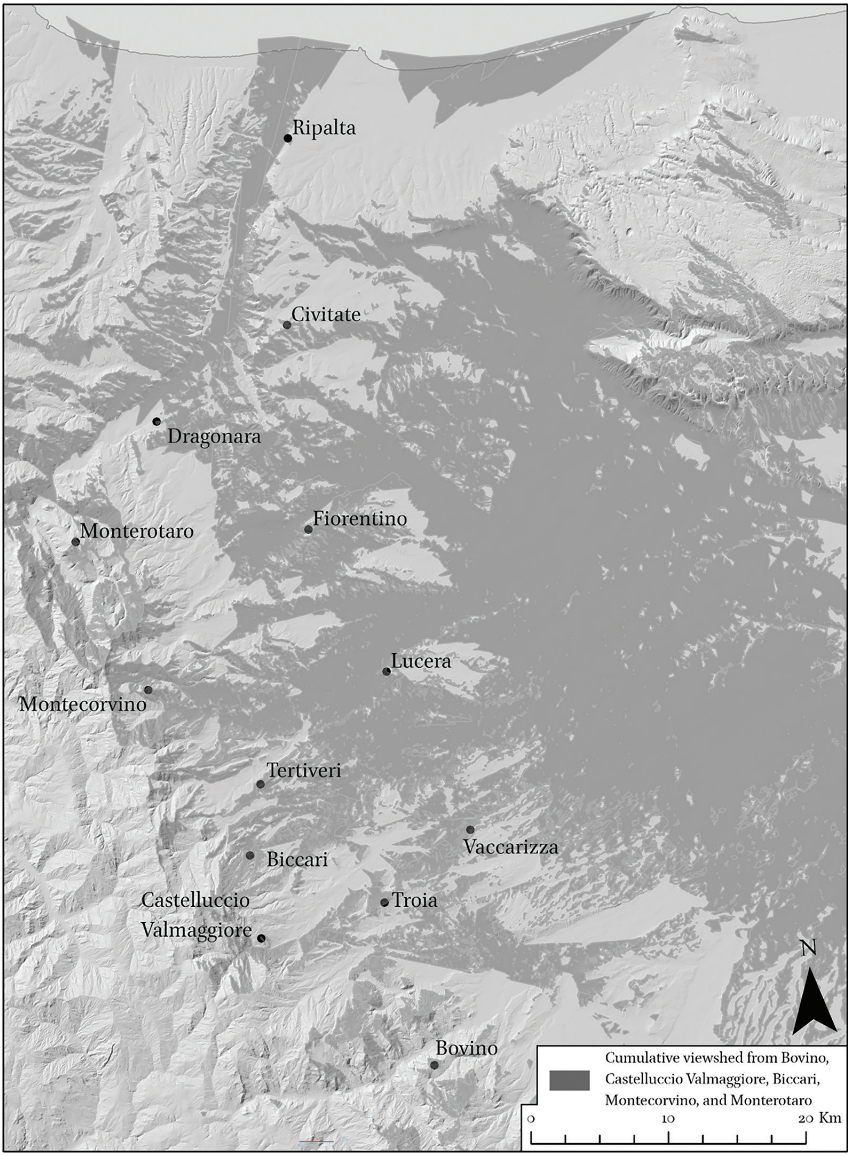

FIGURE 8.4 Multi-point viewshed and site-to site visibility of all sites named in the map in Byzantine northern Capitanata (base data Tarquini *et al.*, 2012)
ILLUSTRATION: LUCAS MCMAHON

a message, where is such a message intended to go? Ultimate military authority in Byzantine Italy was based in Bari some 140 km east along the road from Troia. In theory Troia could receive an optical signal from Civitate, Fiorentino, or a relay near Dragonara and dispatch a rider along the Via Traiana to Bari, but what would that message include? And how should optical signalling be considered when so many places can see so many other places?

The transition from signal to message is where the drawbacks of optical signalling become evident. An optical signal that the enemy has been sighted only works if someone is on guard to light the first signal, and someone else is paying attention to receive it. The 12th century Greek romance *Digenis Akritis* has just such a case: the beacon is lit to summon soldiers, but no one shows up.[33] In addition, the receiving party has to know what the signal means before it can become a message. The *Strategikon*, a late 6th century military manual ascribed to the emperor Maurikios, makes reference to signals having to be arranged in advance.[34] Byzantium's information-gathering efforts beyond its borders suggest that competent local administrators might have known when to be watching, although none of this is direct evidence for that.[35]

In that sense, the optical communication system is little more than a tripwire. The efforts of Leon the Mathematician in the 9th century to devise an optical telegraph that could send different messages is indicative of an awareness of this fundamental limitation. The surviving list of messages is, however, not encouraging. The four that are preserved mention enemy action, a raid, arson, or "something else" (ἄλλο τι).[36] Such a message provides little in the way of useful military information, and nothing suggests that the 9th century beacon system was ever employed in other times or places. The size, composition, and bearing of an attacker is the sort of information that Byzantine military authorities were interested in: the *Strategikon* of Maurikios notes that experienced scouts should be able to estimate the size of an enemy force by looking at the ground trampled and the size of the camp, as well as by counting the

33 *Digenis Akritis*, pp. 172 and 339.

34 Maurikios, *Strategikon*, 7.B.15, ed. George T. Dennis, (Vienna: Verlag der Österreichischen Akademie der Wissenschaften, 1981), p. 348.

35 Nike Koutrakou, "'Spies of Towns'. Some remarks on espionage in the context of Arab-Byzantine relations (VII–Xth centuries)," *Graeco-Arabica* 7/8 (2000), pp. 243–66; Jonathan Shepard, "Imperial information and ignorance: a discrepancy," *Byzantinoslavica* 56, no. 1 (1995), pp. 107–16; Jonathan Shepard, "Photios' sermons on the Rus attack of 860: The questions of his origins, and of the route of the Rus," in *Prosopon rhomaikon: Ergänzende Studien zur Prosopographie der mittelbyzantinischen Zeit,* eds. Alexander Beihammer, Bettina Krönung and Claudia Ludwig (Berlin: De Gruyter, 2017), pp. 111–28.

36 Pattenden, "The Byzantine early warning system," p. 259; McMahon, "Signaling empire," p. 221.

standards of an opposing army.[37] The 10th century *De Velitatione Bellica* ('On Skirmishing Warfare') similarly suggests that scouts can determine the size of a force from the prints of their horses and the amount of grass grazed by their mounts.[38] An attempt recorded in Theophanes Continuatus to trick a Paulician army in the A.D. 870s along the eastern frontier involved yelling out the names of units and generals that were not actually present, which suggests that the Paulicians were expected to be aware of at least the broad outline of Byzantine military dispositions, and the opposite is generally true as well.[39] A repository of general military knowledge existed alongside the need to acquire specific information during a period of hostilities. This sort of information cannot be passed along by a beacon system, and indeed *De Velitatione* points to an effort to overcome just this sort of weakness by instituting a human chain: those who spot invaders are to ride to the next guard post (3–4 Roman miles distant), and those sentries were then to pass along the information to the next post and so on.[40] This had an added advantage of not using an optical or aural signal that might have been detectable by attackers, who would then be aware that their presence was known.[41]

Despite these limitations, optical signals were clearly employed in the Byzantine world. However, the places where optical signalling is most prevalent outside of the realm of metaphor is in regard to military operations, particularly military treatises and historical texts that recount campaigns. Most of this signalling is short-range and impermanent, in that it takes place between units on the march, scouting parties, and small garrisons.[42] Moreover, evidence from the Abbasid Caliphate points to the establishment of temporary communication infrastructure set up for a campaign season or two.[43] Yet GIS visibility studies of the sort conducted above attempt to look at military communications from the perspective of permanent structures and static figures

37 Maurikios, *Strategikon*, 2.20, 9.5, pp. 140–42 and 330.

38 Nikephoros II Phokas, *De Velitatione Bellica*, 6, ed. and trans. G.T. Dennis (Washington, D.C.: Dumbarton Oaks, 1985), p. 160.

39 Theophanes Continuatus, *Chronographiae quae Theophanis Continuati nomine fertur liber quo vita Basilii imperatoris amplectitur*, 42, ed. and trans. Ihor Ševčenko (Berlin: De Gruyter, 2011), p. 154. For Abbasid awareness of Byzantine military arrangements, see John Haldon, "Kudāma ibn Dja'far and the garrison of Constantinople," *Byzantion* 48, no. 1 (1978), pp. 78–90.

40 Nikephoros II Phokas, *De Velitatione Bellica*, 1, p. 150.

41 Lăzărescu, Bilașco, and Vescan, "Big Brother is watching," p. 280.

42 Syrianos Magister, *Peri strategias*, 8, p. 26.

43 Abū Ja'far Muḥammad ibn Jarīr al-Ṭabarī, *The History of al – Ṭabarī, volume XXXIII: storm and stress along the northern frontiers of the 'Abbāsid Caliphate*, trans. C.E. Bosworth (New York: SUNY Press, 1991), pp. 8 and 84–85.

in a landscape, yet military operations tend to involve movement, and frontiers and border-zones are rarely clearly fixed. This does not mean that such studies should not be attempted, but rather that new techniques to account for human mobility alongside that of light ought to be considered in the future.

5 Concluding Thoughts (1): Defensive Systems?

An invented scenario can put this all into perspective. Let us assume that the local garrison commander at Dragonara had received intelligence indicating that a Norman raid was being put together and had soldiers watching out. A dust cloud and flashes of metal indicated its imminent arrival, and lookouts in Dragonara saw this from some 6–7 km away.[44] The Normans had to cross the Fortore, and even mounted were at least an hour from Dragonara. Dragonara dispatched riders to both Civitate and Fiorentino, both of which would ideally arrive in about an hour. This process is repeated, and by the end of the second hour Ripalta and Lucera have received the news. At this point the raiders will likely have reached Dragonara, forcing them to make a decision about whether to attack or to leave a garrisoned strongpoint to their rear. By the end of the third hour, the riders will have reached Tertiveri and Vaccarizza, each another 13 km from Lucera. From Tertiveri another 13 km will put a rider at Troia and thus on the main highway to Bari. From Troia the Via Traiana extends for 135 km to Bari, which would take the hypothetical rider a little more than two days to reach. That rider would arrive with militarily useful information, but this would ultimately take something like three days, at which point a decision would have to be made, messages sent, forces raised, etc., all the while a fast messenger was still two to three days from returning to Troia. Even if a local signalling system existed in northern Capitanata, its benefits would primarily be limited to the north. In terms of bringing information to the central authorities in Bari, a signal flashed from the Fortore frontier would reach Troia only 4–5 hours faster than a rider. Even the 9th century beacon chain was set up on the principle of more information over speed. While the system is noted for the arrival of the message within one hour of dispatch, the synchronization of the clocks meant that the outgoing message could be delayed by up to 23 hours. Thus, it seems unlikely that any optical system in northern Capitanata was in place for long-distance communications. Short-range signalling remains more likely, although the lack of site-to-site intervisibility without the inclusion of

44 Maurikios, *Strategikon,* 7.B.15, p. 258; Leon VI, *Taktika* 14.98, ed. and trans. George T. Dennis (Washington, D.C.: Dumbarton Oaks, 2010), pp. 344–46.

relays precludes a chain of beacons and the information relayed over such distances would only be marginally faster than a messenger. What remains to be seen is whether the local military signalling described in Syrianos,[45] which is capable of sending different messages based on the number of fires lit, functions at a distance of approximately 13–15 km. The distance between many of these sites is too consistent to be a coincidence, but any future work will need to consider local environmental conditions such as humidity, hours of daylight across the seasons, and the degradation of vision over distance.

6 Concluding Thoughts (II): Making Empire Visible in Capitanata

The practical efficacy of the intervention of Basil Boioannes for the defence of northern Capitanata is unclear. Troia resisted the East Frankish king and emperor. The Normans, who would bring Byzantine rule in southern Italy to an end, bypassed the system entirely, taking Melfi in early A.D. 1041, and Byzantine control seems to have been weak to non-existent by A.D. 1053 when the Normans decisively defeated a major combined papal-East Frankish force near Civitate.[46] Intervisibility continued outside of times of war. The example of Lucera indicates that existing settlements came to be administered in a fashion more akin to other parts of the empire during the 11th century.[47] The new settlements were set within a Byzantine administrative framework immediately upon foundation, as is suggested by the increasing employment of Byzantine titles and in archaeological evidence, such as the *praitorion* at Vaccarizza.[48] However, top-down efforts to regularize the administration do not exclude local ethnic, religious, linguistic, and cultural variety. Ethnonyms found in Capitanata include Franks, Langobardi, Rus', and Armenians, as well as Jews and people hailing from particular military districts in Byzantine Anatolia.[49] New settlements meant the transplantation of peoples from elsewhere in the empire, and those people could retain memories of their origins

45 Syrianos Magister, *Peri strategias*, 8, p. 26.

46 Loud, *The age of Robert Guiscard*, pp. 92–101 and 118–20.

47 von Falkenhausen, "Zur byzantinischen Verwaltung Luceras," pp. 395–401.

48 Vera von Falkenhausen, "Die Capitanata in byzantinischer Zeit," *Quellen und Forschungen aus italienischen Archiven und Bibliotheken* 96 (2016), pp. 52–60; Cirelli, Lo Mele, and Noyé, "Vaccarizza: una cittadella," pp. 7–8.

49 *Annales Barenses*, ed. W.J. Churchill (Toronto, 1979), pp. 119–20; Vera von Falkenhausen, "The Jews in Byzantine southern Italy," in *Jews in Byzantium: dialectics of minority and majority cultures*, eds. Robert Bonfil, Oded Irshai, Guy Stroumsa and Rina Talgam (Leiden: Brill, 2012), pp. 281–94; Matheou, "Hegemony, elitedom, and ethnicity," pp. 245–72.

for generations.[50] All of these people could legally be Roman while retaining other forms of identity.[51] In this environment where a range of peoples comprise one political unit, the high level of intervisibility between settlements may have served as a regular reminder of political control and unity. Byzantine coinage ordered exchange, the use of the Byzantine calendar and liturgy in Capitanata ordered time, and the visible presence of imperial strongpoints in high places, alongside the presence of surveyors and tax collectors, ordered space. This was tangible and unavoidable. In a document dating to A.D. 1019, Basil Boioannes set out grazing rights for the animals of the people of Troia and Vaccarizza.[52] The document sets forth a spatial definition of Troia's hinterland. The efficacy of such arrangements would no doubt benefit from a visual reminder of the empire's authority in this newly settled frontier region.

In a similar way, Dimitris Krallis argued that the imperial presence visible on a range of hilltops may have been intended to contribute to a sense of communal identity.[53] In the case of 9th century Anatolia, the beacons linked province and capital and contributed to the idea that the capital shared in the threat posed by Arab raiders. While what sort of imagined community such intervisibility may have helped create remains a matter of informed speculation,[54] the possibility of viewing (or being viewed by) multiple imperial fortresses from almost any point in northern Capitanata reinforced control over the landscape. Worth noting is how little the outermost defences can see beyond imperial lands to the west (Figure 8.5). Further investigation would be needed to establish the Byzantine character of these locales and their role in the local landscape, the view of an earlier outer line of defences in higher places combined with an inner line established by Boioannes is quite convincing from a cartographical perspective. Castelluccio Valmaggiore and Bovino have some control over their local valleys, their visibility towards the west is limited to a few kilometres. The more prominent Monterotaro and Montecorvino similarly

50 Timothy Greenwood, "Basil I, Constantine VII and Armenian literary tradition in Byzantium," in *Reading in the Byzantine Empire and beyond*, eds. Teresa Shawcross and Ida Toth (Cambridge: Cambridge University Press, 2018), pp. 447–66.

51 Annick Peters-Custot, "Between Rome and Constantinople: The Romanness of Byzantine southern Italy (9th–11th centuries)," in *Transformations of Romanness*, ed. Walter Pohl, Clemens Gantner, Cinzia Grifoni and Marianne Pollheimer-Mohaupt (Berlin: De Gruyter, 2018), pp. 231–40.

52 *Syllabus Graecarum membranarum*, pp. 18–20.

53 Dimitris Krallis, "Time, space, and physical reality: Byzantine authors and the materiality of the Roman imagined community," in *Byzantine authors and their times*, ed. Vassiliki N. Vlyssidou, (Athens: NHRF, 2021), pp. 189–90.

54 Ruth M. van Dyke, R. Kyle Bocinsky, Thomas C. Windes and Tucker J. Robinson, "Great houses, shrines, and high places: intervisibility in the Chacoan world," *American Antiquity* 81, no. 2 (2016), pp. 205–30.

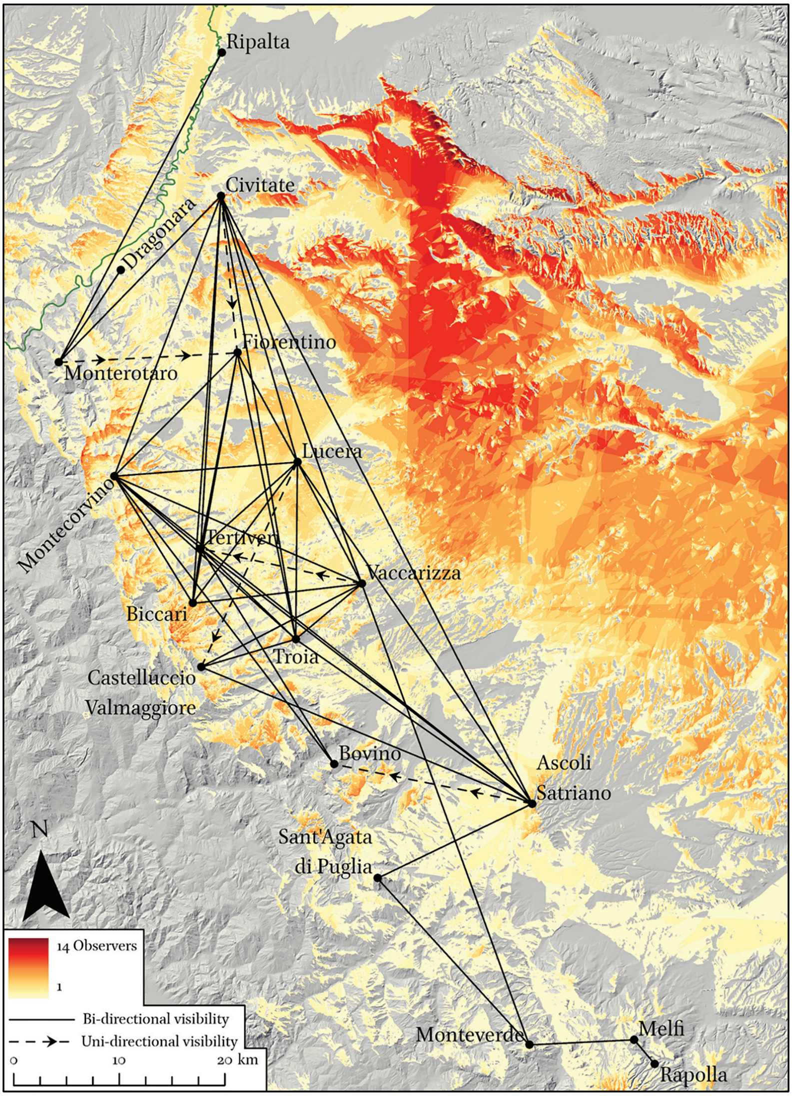

FIGURE 8.5 Cumulative viewshed from the westernmost sites (Bovino, Castelluccio Valmaggiore, Biccari, Montecorvino, and Monterotaro) (basedata Tarquini et al., 2012)
ILLUSTRATION: LUCAS MCMAHON

have limited views outside of imperial territory. In contrast, the outer line of defences can see virtually the entire Tavoliere plain. This imperial panopticon was an unavoidable reminder of the presence of the empire, and indeed the establishments are located in such a manner to view Byzantine lands more effectively than the frontiers. The fortifications served to keep the population in at least as much as they were intended to keep certain populations out.[55] These fortifications may have signalled simple messages between each other, but their presence sent another signal, and that message was meant to be received by a much wider audience: that the Roman Empire had returned to Italy, and it was there to stay.

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55 James C. Scott, *Against the grain: a deep history of the earliest states* (New Haven, CT: Yale University Press, 2017), pp. 27–30.

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CHAPTER 9

The Defensive Network of Cardona (Barcelona) and Visual and Audible Communication Systems in the Middle Ages

Ainhoa Pancorbo Picó and Andreu Galera Pedrosa

1 Introduction

The study presented in this paper focuses on the valley of Coma[1] and the plain of Bergús,[2] located in the north-west sector of Cardona municipality, in Barcelona, Spain. The area has an elongated configuration about 12 km long, orientated south-west to north-east and delimited by ridges on each side, with the nucleus of Bergús to the west and the town of Cardona, its castle and the salt valley to the east. The town and castle of Cardona would seem to owe their existence to an extensive deposit of rock salt which forms a mountain mass—the Muntanya de Sal—close to the town. Surveys show that this deposit has been continuously utilised since Neolithic times with open-pit quarries and working terraces still prominent in the landscape. There are particularly high densities of activity in the Roman period as is demonstrated by an abundance of pottery sherds, and recent excavations have revealed a settlement of the Roman Republican period on the northern side of the salt valley associated with the exploitation of this precious mineral. The present-day settlement was established in its current location at the beginning of the 11th century.[3]

The important role the castle in Cardona played in medieval times to control both access to the salt outcrops and the road network that crossed the central region of Catalonia, is well established. The castle is first mentioned in

1 A Catalan toponym indicating a depression in mountainous terrain.
2 Unclear etymology, but has traditionally been associated with a demonym of Iberian root, *Bargusi*, mentioned by Titus Livius and Polybious which could be located in an area delimited to the south by the valley under study.
3 Ainhoa Pancorbo Picó, Albert Martín Menéndez and Andreu Galera Pedrosa, "Les intervencions arqueològiques realitzades al camp de futbol de Cardona (Bages): el jaciment del Campet de la Sal," *Tribuna d'Arqueologia* 2016–2017 (Barcelona: Departament de Cultura, 2019), pp. 171–97.

DOI:10.1163/9789004749702_010

A.D. 798.[4] In the 9th and 10th centuries the counts of Barcelona and Urgell granted two town charters: the first around the year A.D. 880 by Wilfrid the Hairy (d. A.D. 897) and the second in A.D. 986 by Borrell II (d. 993). The latter includes the right of the inhabitants of the castle and the territory ascribed to its jurisdiction to access the salt outcrops one day a week to cut the salt necessary for domestic consumption. Such a property and source of income was of great value and was to be protected and defended. Therefore, the counts ceded the domain of Cardona to the viscounts of Osona, who soon adopted the toponym of Cardona as their surname and became the viscounts of Cardona. Like elsewhere in the Spanish March, the viscounts maintained their dominance through a network of castles and palatinates (Figure 9.1). Through these, by the end of the 11th century, they had acquired significant control of the territory and, with it, the demesne of a score of castles, covering a total area of about 40 km around the urban core, equivalent to 6 per cent of the Catalan territory.

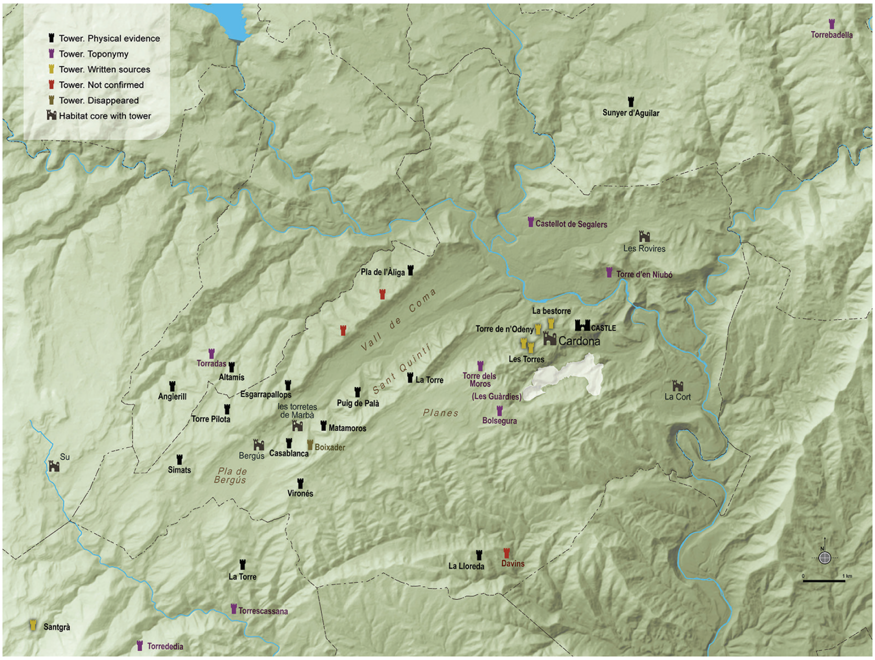

FIGURE 9.1 Map of the area under study with the mentioned sites in the text. Author's work based in a plan drawn by Helena Rovira on request for this article
ILLUSTRATION: L. MCMAHON

4 Andreas Du Chesne, ed., *Historia Francorum scriptores coetanei ab ipsius gentis origine ad nostra usque tempora* (Paris: Sebastian Cramoisy, 1636).

The castle itself has undergone numerous modifications since its construction. In the 17th century a crown of bastions was constructed atop the castle, and between 1972 and 1976 a good part of its old residential pavilions was turned into a hotel complex, thereby ruling out the possibility of detailed archaeological investigation. Despite this, written and photographic documentation, together with several military plans of the castle from the 17th and 18th centuries, allow us to discover something of its ancient structures and understand the reasons for their construction.

Apart from articulating the territory via that network of castles, control of the dominion was guaranteed, on a smaller scale, by a chain of watchtowers, beacons and other complexes distributed around the main roads and valleys providing access to the salt outcrops. Recent studies into the character and distribution of these lesser sites and their roles in the defensive system, as well as the systems of communication between them, have enabled us to define its typology according to the form and extension of their structures. It has also helped us trace the relationship between sites and the local population, between the castle and its tower, and to reconstruct the territory that, broadly speaking, coincides with the medieval castral domain. Surveys carried out in the early 1990s[5] gave some indication of the structure of one such territory, comprising the salt valley where the mineral was mined and exploited, the fortress that ensured control over it, and the village or urban core which developed around its base.

This current approach,[6] has involved prospecting the territory again, clearing and conducting a topographical survey of some of the structures, analysing historical written and cartographic sources as well as the toponomy and, finally, also reviewing the results of the excavations carried out in the 1990s on one of them, Puig de Palà: the only one that has been the subject of archaeological investigation (see Figure 9.1).[7]

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5 Mercedes Juan and Xavier Solé, "Prospecció arqueològica del terme municipal de Cardona (Bages, Barcelona), 1990–1992: primers resultats," (*XXXIX Assemblea Intercomarcal d'Estudiosos,* Cardona, october 22–23, 1994) (Cardona, Ajuntament de Cardona, 1997), pp. 111–22. Another survey was carried out in 2011 regarding the medieval structures: Jordi Gibert, *L'expressió material del poder durant la conquesta comtal. Esglésies, castells i torres a la Catalunya central (segles X–XI)* (Claramunt: Ajuntament de la Pobla de Claramunt, 2018).

6 This study was possible thanks to a grant from the Department of Culture of the Generalitat de Catalunya. The research was carried out with the permission and co-operation of local land owners, to whom we are also grateful.

7 These works were directed by Dr José Ignacio Padilla and conducted from 1996 to 2000 by a team from the University of Barcelona, including this article's authors.

Here, we will discuss the first results of this research which includes an outline of the aforementioned typology of sites, and a description of the suggested visual and audible communication system that existed between them and the castle. In conclusion we suggest that each site had a specific role within the large-scale control and defensive system.

2 Reconstructing a Landscape of Control

Bergús (Figure 9.2) is located on a wide and fertile plain with abundant hydrographic resources, which naturally and historically constitutes a crossroads between the mountainous area of the pre-Pyrenees to the north, the area of Barcelona and its harbour to the south, and the dry, rain-fed land to the west. The importance of this last location explains the presence of imposing towers, such as Ardèvol, Vallferosa and Peracamps, that control the area. In Bergús there is a concentrated dwelling nucleus with various components, including the Romanesque church of Sant Joan and its associated cemetery (described by Prim Bertran[8] when studying anthropomorphic graves associated with

FIGURE 9.2 The nucleus of Bergús from the south, near the disappeared tower of Boixader. On the left is one of the towers under study, Torre Pilota. PHOTO: A. PANCORBO

8 Prim Bertran, *Hallazgo de sepulturas antropomorfas y de una ollita gris en Bergús* (*Cardona, Barcelona*) (Acta Historica et Archaeologica Mediaevalia) 3 (Barcelona: Universitat de Barcelona, 1982), pp. 173–83.

the church), and a square tower, today integrated within a later habitation, the function of which is yet to be determined, but has traditionally been interpreted as a watchtower. The first documentary reference we have for Bergús and its church is a land sale of A.D. 981, where it is recorded that the goods forming part of the transaction were located '*in fines Cardona, ubi vocant Bergusi, ad sancto Ioanne, in ipsa villa*'.[9] Other documents for this same period mention as limits '*ipsa curte morischa*' and '*ipsos palatios*'.[10] Thus, although the surviving fabric of the church dates to the first half of the 11th century, written sources attest to its existence in the late 10th century. Indeed, one of the ashlars at the base of its bell tower has a carving representing what looks like a *fossor* or grave digger (possibly reused from a nearby site), perhaps indicating an even earlier date.

Around Bergús, a series of archaeological sites, identified as watchtowers, can be found along the ridge flanking the valley both to the east—in the direction of the castle—and to the west. In this latter direction, we find three sites close to Bergús exhibiting the same kind of structures and extension. From north to south, they are Anglerill, Simats and La Torre (near Torrescassana) (see Figure 9.1). Of these three sites only Simats (1.5 km west from Bergús) lies in the current municipality of Cardona. Subsequent remodelling of the site obscures its original layout, and all that remains is a round tower, about 5 m in diameter. Nevertheless, both Anglerill (1.3 km north of Simats) and La Torre (2.8 km to the south), correspond to the typology: in each case a tower presides over a set of dwelling remains, whose function is yet to be determined. The Anglerill tower is rectangular, while the La Torre one is circular.

Focusing again on Bergús, from the tower it is also possible to see Torre Pilota (600 m north-west), les Torretes de Casablanca (620 m east), the summit of Matamoros (1.4 km north-east), and—before it was razed—it was also possible to see the tower of Boixader (about 960 m south-east). In each of these four cases, the towers are circular, and of the two that are amenable to more detailed survey, the towers have a 5 m diameter and numerous structures on their south-eastern slopes, covering an area of 350–400 m^2. In front of the tower of Matamoros, on the other side of the valley, 1 km away and always directly intervisible, is the tower of Esgarrapallops, which is also intervisible with Casablanca. From these two sites, one can also glimpse the castle of Cardona, about 5.5 km to the east. However, the network of watchtowers continues to follow a similar pattern, i.e. standing about 1 km apart.

9 On the limits of Cardona, in the place called *Bergusi*, in the same villa.

10 Francesc Rodríguez Bernal, *Collecció diplomàtica de l'Archivo Ducal de Cardona (965–1230)* (Diplomataris) 71. (Barcelona: Fundació Noguera, 2016), pp. 90–93.

On the northern ridge of the valley, we find vestiges of another tower, about 3 km from Esgarrapallops. Pla de les Àligues has been cleared and topographically surveyed. It is also possible, though not verified, that there are two more towers, or perhaps beacons, between the two mentioned above, on the basis of the terrain and by comparison with data obtained during the fieldwork on the southern ridge. Prospection did not identify the typical cone-shaped remains of a beacon; however, it is possible that stone structures or evidence for wooden ones are obscured by the lush vegetation. On the southern slope to the east of Bergús, the sites of Boixader and the towers of Casablanca and Matamoros link to four more sites: the towers of Marbà, Puig de Palà, Serrat del Vilar,[11] and the 'torre del Moros'. The first three were prospected and have been the focus of topographical survey during the current research, and the fourth is documented in toponomy and written sources.

The town, in addition to being walled since the 11th century,[12] was also protected from any approach down the valley by two towers, known as Les Torres ('the towers') which, despite disappearing sometime in the 19th century, are widely documented in both 14th century written sources and the many military plans of Cardona and its castle drawn up in the 17th and 18th centuries (Figure 9.3).[13] On the northern side of the town, there were also two more towers mentioned in the 14th century, one in the west—torre de n'Odeny—and another in the east, known as la Bestorre, where later the hospital of St. James would be built. Despite not being recorded until the 14th century, it can be assumed that both existed prior to the documentary references.

The topographical survey of these sites leads us to conclude that they correspond mostly to four different types. First, there is Puig de Palà (Figure 9.4). It is located halfway up the southern ridge and is visually connected to Bergús and the vast majority of other sites. With an area of more than 2,700 m^2, it is almost seven times larger than the others. The whole ensemble is presided over by a tower that is 7 m in diameter and surviving to a height of more than 3 m, radially surrounded by dwelling remains arranged in a rectangular grid, within one of which an oven was identified. To the south of the tower, there are

11 Written sources from the 13th-century call this tower as La Torre (as the one near Torrescassana) and recently it was catalogued under the name of a neighbouring house (Tower of the mount of can Jaume). This generic name is common all around the country together with 'torre dels moros' in allusion to a possible Arabic origin.

12 Mercedes Juan and Xavier Solé, "L'origen i desenvolupament de la vila de Cardona," *L'església Parroquial de Sant Miquel de Cardona. El gòtic al mig Cardene* (Centre d'Estudis del Bages, 2003), pp. 26–32.

13 Meritxell Gisbert, *Cartografia de Cardona. De la Guerra de Successió a la Guerra del Francès: 1717–1858* (Cardona: Ajuntament de Cardona, 2011), pp. 111, 113, 135, 137, 173 and 175.

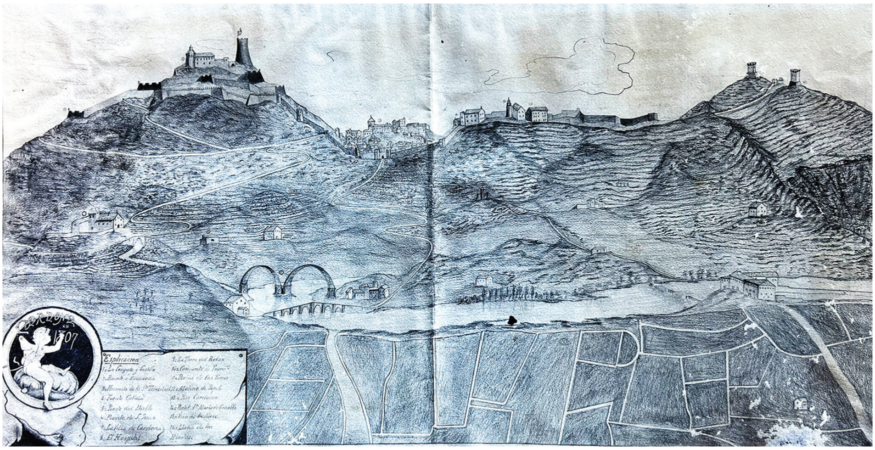

FIGURE 9.3 Drawing of the northern slope of Cardona and its castle, dated from 1807. It can be seen from left to right, the castle, the walled village with one of the round towers mentioned in the text and the two towers known as Les Torres. Unknown artist. Historical Archive of Cardona.

FIGURE 9.4 Aerial view of the archaeological site of Puig de Palà
PHOTO: C. PALÀ

two more concentrations of constructions including a large building, still to be interpreted, and a path crossing the ensemble. Such a site must be seen more as a focus of power associated with a fortified settlement assemblage rather than as a simple watchtower or surveillance site.

The place-name Palà refers to the term *palatium*, which we must connect to the reference '*ipsa curte morischa'* in written sources. Pierre Bonnassie,[14] followed by Flocel Sabaté,[15] and recently and in more depth the Ocorde research group from the Autonomous University of Barcelona,[16] have associated *palatia* with power nuclei from which public lands attached to the first Andalusian state were managed. In central Catalonia these *palatia* are mostly located on the Rivers Llobregat and Cardener, their tributaries, and the main roads. This fact also emphasises Puig de Palà as a property with a differentiated status, associated in some way both to the origins in the early Middle Ages of Bergús and the castle of Cardona. When it comes to the owners, the first reference to this site, from A.D. 1005, describes how Viscount Ramon of Cardona, together with his wife and children, donated this place ('*in locum ubi dicitur podium de Palacio'*) in favour of spouses Ermemir and Serena.[17] As will be seen, this pattern of changed ownership occurs in several of the sites studied.

A second type, located exceptionally down the valley, is represented by 'the towers of Marbà'. Although physical remains for the tower—implied by the place-name and known traditionally—could not be established by our exploration, a great number of structures can clearly be recognized, including public and private spaces concentrated across an area of about 1700 m². The whole complex was surrounded by a second wall comprising in total an enclosure of about 4000 m². Written sources from the 11th century refer to this place as '*locum quem vocant Celatam*', using the term *celar* 'to hide', which might give some indication to the function of the site. It has direct inter-visibility with Bergús, Casablanca, Boixader, Matamoros, Torre Pilota and Esgarrapallops, all of them located at distances of between 300 m and 1200 m from it, which indicates the strategic importance of this location.

14 Pierre Bonnassie, *Catalunya mil anys enrera*. Economia i societat feudal. Vol I (Barcelona: Edicions 62, 1979).

15 Flocel Sabaté, *El territori de la Catalunya medieval. Percepció de l'espai i divisió territorial al llarg de l'edat mitjana* (Barcelona, Rafael Dalmau, 1997).

16 Ramon Martí, "El *palatium* rural, una institución fiscal del siglo VIII," in *Lo que vino de Oriente. Horizontes, praxis y dimensión material de los sistemas de dominación en Al-Andalus (siglos VII–IX),* ed. Xavier Ballestín and Ernesto Pastor (Oxford: Archaeopress, 2013), pp. 133–48.

17 Andreu Galera, *Diplomatari de la vila de Cardona (anys 966–1276)* (Diplomataris) 15 (Barcelona: Fundació Noguera, 1998), pp. 67–68.

The sites of Torre Pilota, Casablanca, Matamoros, Esgarrapallops, la Torre (near Torrescassana) and apparently also Boixader, correspond to the same third typology. In each case there is a circular tower 5 m in diameter, with an undetermined number of dwelling structures arranged in a quadrangular grid, occupying an area of about 400 m^2, on the south side. In the case of Esgarrapallops the diameter of the tower is slightly larger at 5.8 m.

Finally, the sites of Pla de les Àligues, to the north-east, and La Torre del Serrat del Vilar, to the south have a rectangular plan of less than 6 m on each side. Other squared structures lie on the northern slopes, but have smaller dimensions to those mentioned above, although they are probably affected by agricultural works that have reduced their dimensions.

In the great majority of the sites that have been explored and cleared, it has been possible to recover some sherds of medieval grey pottery which can be dated back to around the 11th–13th centuries and, in the case of Puig de Palà, the occupation of the site lasted until the 15th century, as has been proven by archaeological works. Also, the written documentation, together with the archaeological works that took place in the 1990s, reveal that Puig de Palà came to have up to four habitat nuclei.

Although other towers can be found in the rest of the territory of Cardona (e.g. Vironés, La Lloreda, Les Rovires, La Cort), which, typologically, are very similar to those studied and can therefore be assigned to the same period and purpose, these are not concentrated to the same degree. This is probably due to two main factors, the first of which is topographical. The eastern sector of Cardona's territory is the easiest to enter, both from the valley of Coma and by Planés, a valley located to the south. To the east, the River Cardener makes access to salt much more difficult, while to the north-west and south-east the landscape is more mountainous. Hence, the need to control the Coma depression to avoid being flanked by a surprise attack. This has made sense strategically in terms of defending and controlling the territory and has remained unchanged over time, from the Islamic riots documented from the 8th century[18] to the Napoleonic Wars in the 19th century, when the tower of Cardona's castle was reduced by half, and its base reinforced to accommodate

18 This author has recently identified an Arabic toponym mentioned in a fragment of a volume of *al-Muqtabis*, the chronicle by the historian Ibn Hayyan, as Cardona. This allows us to document an Andalusian incursion against the castle in August-September 841. (D. Bramon, "Rectificació sobre un topònim mal identificat en una algarada dels andalusins conta la plana de Vic i el Bages, l'any 841." *Ausa* 185 (2020), pp. 519–21). This raid highlights the leading role of Cardona and its castle in the area of central Catalonia, and provides a much better explanation of the actions by Count Guifré in the 870s when granting a first town charter, which unfortunately has disappeared.

artillery. Still today, the inside hides part of the old medieval tower with an outer diameter of 10.5 m.

In relation to this latter conflict (1808–14), it is worth remembering how in the autumn of 1810, part of Marshal MacDonald's forces flanked Coma from the river valley to access Sant Quintí ridge and Planés, in order to join the bulk of the French troops and face the Spanish soldiers defending Cardona and its castle, on a day that ended with the defeat and withdrawal of the attacking forces.[19] In this sense, it is significant that, going back to 1463, with the beginning of the civil war that devastated Catalonia for ten years (1462–72), the town of Cardona organized its defence with night surveillances of the roads of Sant Quintí (Cervera-Lleida), along with Santovà (Berga, Puigcerdà) and Manresa-Barcelona. Also, lookouts were located at certain points of the territory, including the 'coll de les Àligues', which is explicitly mentioned, and a toponym coinciding with one of the explored sites.

The second factor has to do with ownership. It must be underlined that all the cases studied here correspond to the demesne of the lords of the castle and its jurisdiction, as we have seen in the case of Puig de Palà. However, already from the first years of the 11th century, the lords began to cede a significant part of this land to the church of Sant Vincenç, as well as to other minor lords, their *milites,* who, in turn, built towers on their land. This formed a network for controlling the territory through visual communication with each other at short distances, as seen above.

In this regard, a fundamental aspect must be stressed: the central and hierarchical role in this network played by the castle of Cardona and its main tower (known as *torre de la Minyona*), which belongs to the first phases of the fortress. Built on the summit of the mount, this cylindrical tower, originally about 22 m high, and its courtyard was the reference point for the first enclosure built around it, as is seen also other nearby contemporary castles such as Coaner, Fals or Ardèvol.[20]

As already mentioned, the first documentary reference we have of the *Cardonam castrum* is from A.D. 798 when Louis the Pious, son of emperor Charlemagne and then king of Aquitaine, ordered Count Borrell to occupy and fortify the city of Ausona, together with the castles of Casserres and Cardona and other abandoned fortresses. Louis the Pious's interest in the castle of Cardona

19 Adolfo Blanch, *Cataluña. Historia de la Guerra de la Independencia en el antiguo Principado* (Tomo) II (Barcelona: Imp. de Tomàs Gorchs, 1861), pp. 100–04.

20 Jordi Bolòs, "l'arquitectura civil i militar i l'arqueologia," *Catalunya Romànica XXVII: Visió de síntesi, restauracions i noves troballes, bibliografia, indexs generals* (Barcelona: Enciclopedia Catalana, 1998), pp. 19–62.

and the other two enclaves can be explained by the area's geopolitical importance as a border between the Frankish territory and Al-Andalus. His interest was also due to the need to control the basins of the Rivers Ter, Llobregat and Cardener with their respective communication axes as a precursor to the conquest of the city of Barcelona (A.D. 801) and the subsequent progression south, as far as the River Ebre.

Over the following two centuries the castle maintained its control over the surrounding territory, as evident in the concession made in April 986 by Count Borrell II in granting a second town charter in favour of Cardona and its inhabitants. He did so in order to reaffirm his authority over the southern border following the defeat during the previous summer in the wake of the attack by al-Mansur and the looting of Barcelona. There was no better way to vindicate his own power than by heading the letter with a reference to the first town charter delivered by his grandfather Wilfrid. In the new document, the Count established an obligation for the men of Cardona to work 'one day a week doing the works of the castle, that is, the towers, walls, embankments and moats that you will dig deep, and this will serve for its safeguarding'. However, in the list of rights and obligations granted at that time, the most important one to understand with regard to the subsequent evolution of the fortress was the cession made in favour of Viscount Ermemir: "I give you as patron, Viscount Ermemir and his successors, in order to follow them when you'll be asked". From then until the extinction of the lordship in 1812, Ermemir and his successors held the title of Viscounts of Cardona. The viscounts were responsible for maintaining and controlling the southern boundaries of their county. The transfer of this domain in Ermemir's favour, as well as the improved control of the castle and consequently the income generated by salt exploitation, meant his centre of power was displaced from the neighbouring county of Osona to Cardona. Furthermore, it is significant to consider the proximity to the southern border and the possibility of obtaining important territorial gains. In A.D. 1000, Viscount Ramon was already titling himself as '*vicecomites Chardonensis*' to show his patrimonial appropriation of the title and its close relation with the new dominion of Cardona.

The first step taken by the viscount lineage upon occupying the fortress was to delegate the government of the castle to *castilians* or *veguers*.[21] In Cardona this position remained in the hands of the Brull-Descatllar family, retainers of the counts of Cardona until the 15th century. The castellan was responsible for the castle tower and was obliged to provide the

21 Rodríguez Bernal, "*Collecció diplomàtica*," pp. 36–41.

lookout service, both day and night, and to take care of the prisoners who were guarded inside.[22] What is more interesting for us is that they were also responsible for guarding the horn that was in the tower and sounding it in the event of any threat. Documentary testimonies referring to this task abound, but perhaps the most significant one is the contract signed in A.D. 1391 between the Brulls' and Pere de Vila, an inhabitant of the castle village, to extend the lookout service in the tower for another year, both day and night, and to blow the horn ("*ad preconitzandum cornum in castro Cardone et in ipsa turri ipsius castri tenere guaytam de die et de nocte prout iam per mihi es solitum facere*") for a price of 200 sous.[23]

Another example can be found in the summer of 1369, when, at the request of the lord, the university of the town decided to acquire an indeterminate number of horns or tubas (*quasdam tubas sive trombas ad opus dicte ville*) at the same time that an impending war with Castile made companies of mercenaries from the south of France a very real threat. The purchase was made in the city of Valencia by Ramon de Niubó, the viscount's butler, for a price of 117 sous and 5 diners that were remunerated by the administrator of the construction works of the town walls under construction at that time, and so the acquisition could be linked to the defences of the town.[24] In this regard, it is interesting to note that in the atrium of the canonical church of Sant Vicenç in the castle of Cardona, is a pictorial representation dating to the 14th century of the siege of the city of Girona (A.D. 1285), featuring a man blowing a horn (Figure 9.5). Therefore, it can also be inferred for that at the time the picture was painted the lookout service in the castle and the blowing of the horn were fundamental for safeguarding the tower and its village, as well as for basic communication with the rest of the territory. This explains why in A.D. 1437 the consul of the town claimed from the count of Cardona the restitution of the figure of the 'torredà' when the Brull-Descatllar family abandoned their responsibilities.

About two centuries later, when the figure of the 'torredà' was already a memory of the past, the same tower would house the so-called 'bell of the service alarm' (*sometent*), which invoked the local militia in advance of any danger or threat. This is reflected in documents from the year 1643, when Louis XIII's French troops took possession of the castle in the middle of the Reaper's War (Guerra dels Segadors, 1640–52). Then, we are told that the representative of the French king accessed the castle keep where the bell was located (*in*

22 Galera Pedrosa, "*Territori, senyoriu i*," pp. 238–39.

23 Diocesan Archive of Solsona, Fons Cardona, 3, f. 159r.

24 Library of Catalunya, Batllia de Cardona, Bat Car 77/3.

FIGURE 9.5 Detail of a man blowing a horn in a pictorial representation, from the 14th century, of the siege of the city of Girona (A.D. 1282)
PHOTO: A. PANCORBO

turri dicti castri nominata del Homenatge quidem alii eiusdem universitatis sic alia verba insumanitate dicte turre vociferando emisserunt et campanam nominatam del Somatent ibidem existententi pulsarunt).

3 Conclusion

In light of the above, and focusing again on the network of towers described previously, it would seem that between the 11th and 14th centuries visual communication was almost complete between Bergús and the castle, being interrupted only once between both places. However, we have seen how written and iconographic documentation refers to the horn and tuba as instruments of audible communication that coexisted with this visual system, the use of which might have been limited by weather conditions. An extensive study on these instruments in medieval contexts was carried out by José Ignacio Padilla and Karen Álvaro (2010). They studied them following the discovery of some ceramic fragments, dating from the late 13th and early 14th centuries, during the archaeological works conducted in the fortress of Ausa (Basque Country), with several parallels being found in the south of France.

It is also worth mentioning here the research, based on experimental archaeology, carried out by the Art historian Laura de Castellet,[25] who experienced the scope of sound produced by horns made of both horn and ceramic in the area immediately adjacent to that of our study. She was able to conclude that the sound of an antler horn could travel a distance of 2 km, a ceramic horn about 3 km, and ceramic tubas could reach up to 5 km. On this basis the sound of a horn from a tower located 17 km south-west of the castle of Cardona, when transmitted through a series of sites similar to those studied here, might take only 4.5 minutes to reach the castle. Consequently, considering the number of towers explored, it must be deduced that by combining both the visual and sound interconnection, Coma, Bergús and the castle and town of Cardona could have had an easy, fluid and probably complex communication.

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25 Laura deCastellet, “Cartografia sonora de la comunicació castral. La fonosfera del corn i del dret a cornar a la Catalunya medieval,” *Svmma. Revista de cultures medievals* 8 (2016), pp. 4–25.

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Pancorbo Picó, Ainhoa, Albert Martín Menéndez, and Andreu Galera Pedrosa, "Les intervencions arqueològiques realitzades al camp de futbol de Cardona (Bages): el jaciment del Campet de la Sal." *Tribuna d'Arqueologia 2016–2017,* 171–97. Barcelona: Departament de Cultura, 2019.

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CHAPTER 10

Fires over England—Sources for and Functions of Viking Age Signalling

Stuart Brookes

1 Introduction

Without written sources it is difficult to know how exactly beacons functioned. It might be assumed that they raised the alarm, warning of imminent danger or the threat of approaching foes. Presumably, there was also an expected response: to run for the hills or to mobilise armed forces; but however likely such notions might be, it is extremely difficult to reconstruct with any certainty the systems in which beacons operated.

The present paper argues that by examining the spatial pattern of beacon chains alongside that of places of military assembly, it is possible to discern different systems of civil defence in early medieval England. Moreover, it will suggest that developments in these two institutions can be linked, in some cases directly, but more often only by reference to the cadastre of administrative districts—the shire and smaller units known as hundreds—from which armed forces were drawn, and to the strongholds that these troops garrisoned. By comparing all the elements of the defensive landscape some context for beacons can be gained.

The analysis is situated alongside a powerful historiographical tradition: one that regards the reign of King Alfred the Great (871–899) as a key moment in the development of the English state, and its military institutions in particular. Many scholars have argued that Alfred constructed a defensive ring of strongholds—in Old English (OE) *burh*—around his kingdom of Wessex.[1] While this belief has not been substantiated by archaeological means, it remains likely that the burhs were operational in the early 10th century, at which point they

1 E.g. David Hill and Alexandre R. Rumble, eds., *The Defence of Wessex: the Burghal Hidage and Anglo-Saxon Fortifications* (Manchester and New York: Manchester University Press, 1996); Richard P. Abels, *Lordship and Military Obligation in Anglo-Saxon England* (Berkeley: University of California Press, 1988); Ryan Lavelle, *Alfred's Wars: Sources and Interpretations of Anglo-Saxon Warfare in the Viking Age* (Woodbridge: Boydell, 2010); John Baker and Stuart Brookes, *Beyond the Burghal Hidage. Anglo-Saxon Civil Defence in the Viking Age.* History of Warfare Series 84 (Leiden: Brill, 2013).

DOI:10.1163/9789004749702_011

are recorded in a source known as the Burghal Hidage.[2] Scholarly attention has tended to focus on these major strongholds. It is argued here that beacons and mustering sites should also be considered.

2 Beacon Systems in Viking Age England

Earliest discussions of beacons in early medieval England were mainly confined to the study of place-names, in particular those containing the OE elements *weard* 'watch' and **tōt* 'lookout', and their later derivatives. These elements are commonly compounded in place-names with generics denoting vantage points, such as *dūn* 'flat-topped hill', *beorg* 'rounded hill, mound', *hlāw* 'tumulus, mound', and in fewer occasions with habitative elements such as *hām* 'homestead or settlement', *-setl* 'house' or *-ærn* 'building'. A number of place-names containing these elements are recorded by the 11th century, notably in charter boundary clauses, giving the impression that they were current in place-naming during the early medieval period. Even if they are not recorded in sources until later times, the likelihood is therefore that they date back at least to the Viking Age. This observation has enabled several place-name scholars to reconstruct regional beacon systems, for example for the Isle of Wight,[3] Devon,[4] Rutland and Lindsey,[5] often plotting these early place-names alongside beacons known from later sources.

Undoubtedly the most influential discussion of early beacon systems in this vein was a paper by David Hill and Sheila Sharp.[6] They listed references to beacons in early sources and then outlined the elements of an extensive network of beacon sites covering Hampshire and the Isle of Wight, capable of sending news of a seaborne viking attack from the coast to the interior of Wessex within just a few relays (Figure 10.1, B). Early place-names formed an important part of the reconstructed system. Of the 23 beacons identified, most have names unrelated to military activity, but seven of them have beacon elements affixed to their names. All three on the Isle of Wight, for example, have names probably

2 Fredrik William Maitland, *Domesday Book and Beyond* (Cambridge: Cambridge University Press, 1897), pp. 502–3.

3 Helge Kökeritz, *The Place-Names of the Isle of Wight* (Nomina Germanica) 6 (Uppsala: Appelbergs Boktryckeriaktiebolag, 1940), pp. LXXV–LXXXI.

4 Percy Russell, "Fire Beacons in Devon," *Report and Transactions of the Devonshire Association for the Advancement of Science, Literature and Art* 87 (1955), pp. 250–302.

5 Barrie Cox, "Yarboroughs in Lindsey," *Journal of the English Place-Name Society* 28 (1996), pp. 50–60.

6 David Hill and Sheila Sharp, "An Anglo-Saxon Beacon System," in *Names, Places & People*, eds. Alexandre R. Rumble and A.D. Mills (Stamford: Paul Watkins, 1997), pp. 97–108.

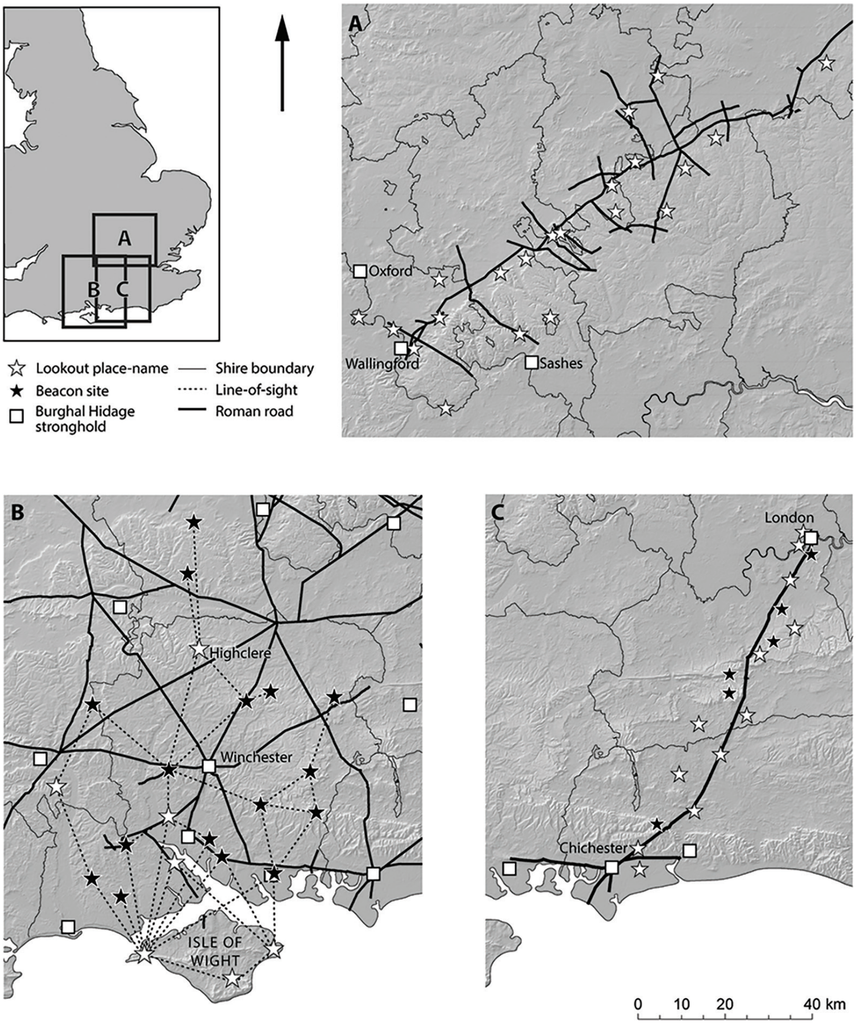

FIGURE 10.1 Nets and lines of early medieval beacons discussed by: A: Baker 2011; B: Hill and Sharp 1997; C: Gower 2002
ILLUSTRATION: S. BROOKES

derived from Old English: Totland (*c.*1240) and Tothill (*c.*1267) probably both from OE *tōt-*, and Nodehill (1327), perhaps including the OE *ād* 'beacon'.[7] Of particular importance were charter references to a *weard-setl* 'watch-house' in the parish of Highclere in the north of Hampshire; a location they identified with a place now known as 'Beacon Hill'. This watch-house is referred to in five

7 Rune Forsberg, "On Old English *ād* in English Place-Names," *Namn och Bygd* 58 (1970), p. 21.

separate charters dating from the 8th to 10th centuries,[8] and would—according to this system—have been the main relay for communicating further inland.

Notably, all of these proposed systems take the form of nets of widely-spaced beacons providing important long-range signalling. As Hill and Sharp note, the nets are interlocking and therefore the whole system is unchangeable: remove one beacon and others need also to be moved. That same characteristic allows the whole system to be dated by the oldest recorded beacon, as links all must have been used contemporaneously. In these nets, most of the putative beacon sites are on areas of high ground with commanding views over the countryside, and on average the links between them are 10–20 km. They tend to cover whole shires, with dense networks of beacons on the coast relayed inland via key beacons. They also tend to include beacons close to the borders of the shire, perhaps emphasizing a desire to provide areal coverage of the entire administrative district.

These shire nets of beacons can be contrasted with another form of beacon system discussed by Gower,[9] Baker,[10] and Reynolds and Brookes.[11] In each of these cases, more closely set beacons form linear chains running alongside significant long-distance routeways connecting strongholds. In Gower's analysis, 13 beacons were identified on either side of a 95 km-long stretch of Roman road known as Stane Street that connects Chichester and London, both major towns by the 10th century (Figure 10.1, C).[12] Baker identified a similar arrangement of beacons every 5–10 km alongside 120 km of the Icknield Way,[13] a long-distance ridgeway known by early 12th century as one of the King's Four Highways (Figure 10.1, A).[14] This chain leads into Wallingford, one of the largest strongholds listed in the Burghal Hidage which controlled one of the main crossings over the River Thames. Finally, Reynolds and Brookes in a case study of the Avebury region of north Wiltshire, reconstructed a local chain of beacon relays between

8 Peter Sawyer, *Anglo-Saxon Charters: an annotated list and bibliography* (London: Royal Historical Society Guides and Handbooks 8, 1968), nos. 258, 383, 487, 565, and 680.

9 Graham Gower, "A suggested Anglo-Saxon signalling station between Chichester and London," *London Archaeologist* 10, no. 3 (2002), pp. 59–63.

10 John Baker, "Warriors and Watchmen: Place-Names and Anglo-Saxon Civil Defence," *Medieval Archaeology* 55 (2011), pp. 258–67.

11 Andrew Reynolds and Stuart Brookes, "Anglo-Saxon civil defence in the localities: a case study of the Avebury region," in *Early Art and Archaeology in the Northern World: Studies in Honour of James Graham-Campbell*, eds. Andrew Reynolds and Leslie E. Webster (Leiden: Brill, 2013), pp. 561–606.

12 Gower, "A suggested Anglo-Saxon signalling station".

13 Baker, "Warriors and Watchmen".

14 Alan Cooper, "The King's Four Highways: legal fiction meets fictional law," *Journal of Medieval History* 26, no. 4 (2000), pp. 351–70.

four putative strongholds at Yatesbury, Silbury Hill, Avebury and Marlborough.[15] These sites are also connected by a routeway which is referred to in a 1536 survey as Hare Pathe, probably derived from the OE *here-pæð* 'army path'.

Significantly, excavations at Yatesbury, at the western end of this latter chain, provided archaeological support for the existence of a beacon. Fieldwork revealed a late Anglo-Saxon circular enclosure of *c.*200 m diameter with evidence for a possible beacon platform on the western edge of the circuit. This was a turf-built barrow of Early Bronze Age date that had been reshaped in the Viking Age to create a flat surface, with evidence for fire-reddened soil extending to a depth of up to 0.3 m. A ditch, which had been cut into the lower part of the mound, contained two distinct layers of charcoal-rich and burnt soils separated by a layer of cleaner soil, indicating at least two major episodes of burning or at least clearance of burnt debris from the mound. A large unabraded sherd of oxidised stamped pottery of Late Anglo-Saxon date was recovered from the basal fill of the ditch.[16]

It is possible that the two systems, as characterised here, are the result of the different methods by which beacon networks have been identified. Place-names in England have been collected, analysed and published on a county-by-county basis as part of the English Place-Name Society's Survey of English Place-Names (SEPN), so it is possible that shire-level networks are in part an artefact of the ways in which these place-name have been collected.[17] Nevertheless, a comprehensive search through all published SEPN volumes highlights clear discrepancies in the density of beacon place-names across different regions (Figure 10.2).

While there are hints of patterning in the terms used to describe beacons, the overall distribution of place-name forms does not really suggest regional linguistic variation. Neither is there a straightforward historical explanation. East Anglia, for example, is recorded as the target for numerous viking raids, yet it has very few OE lookout place-names. Concentrations in the Upper Thames region and south Pennines, by contrast, can conceivably be related to borderlands established between the English and Danes in the late 9th and early 10th centuries, or perhaps even between the Anglo-Saxon kingdoms of the 8th and 9th.

The same plot would also seem to highlight particular routeways that were under intense surveillance, for which some historical context could be postulated. In the 870s and 880s the Danish Great Army travelled along the Icknield Way on at least three occasions,[18] so it would make strategic sense to monitor movement along this route in the decades around 900. As one of the straightest

15 Reynolds and Brookes, "Anglo-Saxon civil defence".
16 Reynolds and Brookes, "Anglo-Saxon civil defence," pp. 572 and 575.
17 See https://epns.nottingham.ac.uk/ [accessed July 2024].
18 See maps in David Hill, *An Atlas of Anglo-Saxon England* (Oxford: Basil Blackwell, 1981).

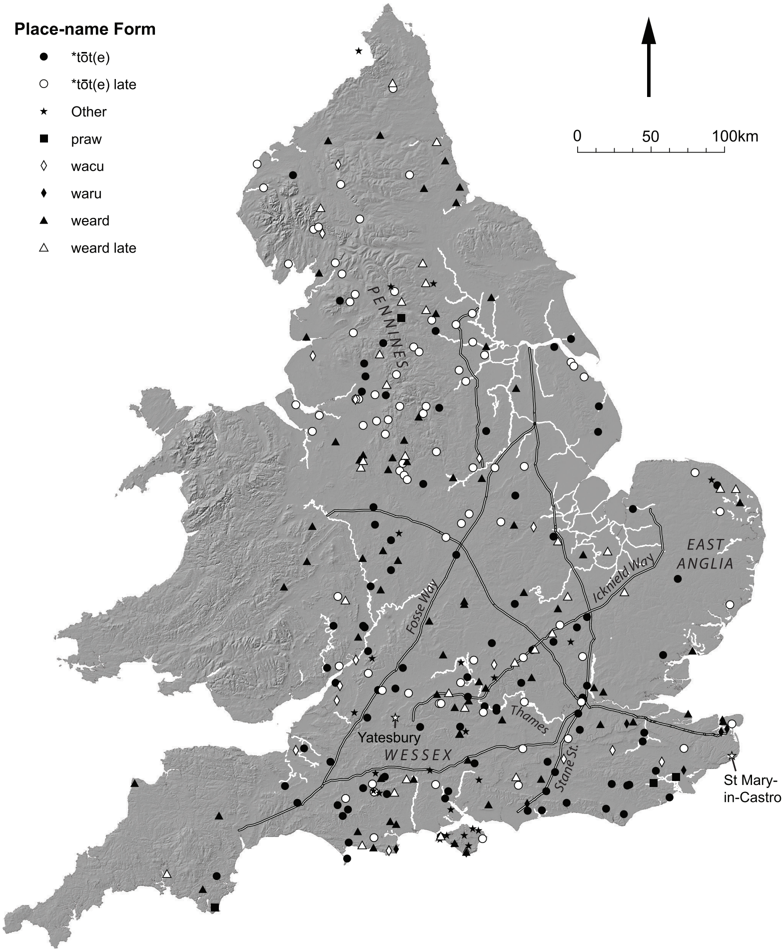

FIGURE 10.2 Beacon place-names in England
ILLUSTRATION: S. BROOKES

routes from the Danish kingdom of East Anglia into Wessex, Stane Street may have been similarly observed by English forces at this same time. In these cases, one might imagine the existence of a system of roadside watches, relying on runners or perhaps riders, to pass on information about land forces moving up and down these roads.

By contrast, beacons on the coast are much harder to fix in time. If—as seems likely—they were designed to alert populations of the approach of hostile fleets, suitable contexts can be found at any point between the 8th and 11th centuries. It is, however, notable that in their survey of early accounts, Hill and Sharp identified 'sea-watches' being referred to directly only in later 10th- and early 11th-century sources. Perhaps in keeping with this observation, Baker and Brookes have argued that there is archaeological evidence on the south coast of England for the construction of several new structures around 1000 that might have served as suitable maritime observation points, including timber towers, ringworks and tower-nave churches.[19] Unlike beacon place-names, these structures arguably have a more deliberate maritime orientation, overseeing the sea and major inlets in such a way as to suggest a more pre-emptive defensive response, perhaps signalling to seaborne forces and engaging enemy fleets before they can make landfall. If coastal watches always played some role in civil defence, it seems that they became more numerous and important in the later 10th and early 11th centuries.

3 Beacons and Military Mustering Sites

The notion that there are different types of beacon system preserved in the evidence can be further examined by reference to military mustering sites. In a series of papers John Baker and I have argued that there is documentary and topographical evidence that suggests the mobilisation of forces for civil defence changed over the course of the 9th and 10th centuries, from a system based largely on shires to one organised on hundreds and strongholds.[20] In the 9th century narrative accounts suggest that the main defensive forces had a regional, shire-level identity and were mobilised *ad hoc* when required. In the Anglo-Saxon Chronicle[21] we hear of shire armies such as the *Wilsǣte* (802), *Sumorsǣte* and *Dornsǣte* (848), the men of Hampshire and Berkshire (860), often led by the local ealdorman and mustered for specific defensive operations. The most famous account of such a mobilisation is that carried out by Alfred the Great in 878 as part of his preparations for the Battle of Edington. According to the Anglo-Saxon Chronicle: "[Alfred] rode to Egbert's Stone (*Ecgbryhtes stan*) to the east of Selwood, and there came to join him all Somerset and Wiltshire and that part of Hampshire which was on this side of the sea"[22]—

19 John Baker and Stuart Brookes, "Overseeing the sea: some West Saxon responses to water-borne threats in the South-East," in *The Maritime World of the Anglo-Saxons*, eds. Stacy S. Klein, William Schipper and Shannon Lewis-Simpson (Essays in Anglo-Saxon Studies) 5 (Tempe: ACMRS, 2014), pp. 37–58.

20 John Baker and Stuart Brookes, "Explaining Anglo-Saxon military efficiency: the landscape of mobilisation," *Anglo-Saxon England* 44 [for 2015] (2016), pp. 221–58.; Stuart Brookes, "Assembly practices in 10th-century England: continuities and innovations in military mobilisation," in *Change and Continuity in tenth-century Western Europe*, eds. Igor Santos Salazar and Catarina Tente (Oxford: Archaeopress, 2023), pp. 53–63.

21 Michael Swanton, trans. and ed., *The Anglo-Saxon Chronicle* (London: Dent, 1996).

22 Swanton, *The Anglo-Saxon Chronicle*, A 878, p. 76.

a description that implies not only that military units were organised by shires, but also that mustering took place at predetermined assembly places.[23]

Several locations have been suggested as the likely location of Egbert's Stone – all of them close to the corner of Somerset, Wiltshire, and Dorset.[24] Amongst the candidates we have suggested Moot Hill Piece, in Gillingham hundred, in Dorset, named presumably from its function as an assembly place.[25] Moot Hill Piece has a very distinctive topographical form shared with several other places, termed 'hanging promontories'.[26] It is also similar to a category of sites, found particularly north of the Thames, that are named with specific reference to armed groups, in OE *here-* or *fyrd-*.[27] These place-names are surprisingly rare in pre-11th-century sources but are typically in close proximity to important route-ways, are often at the points where the edges of two or three shires meet, and have an affiliation with monumental sites or places of early ceremonial importance (Figure 10.3). To this class of site should also be added *Cwichelmeshlæw*, which is located adjacent to the Ridgeway close to the former boundary of Oxfordshire and Berkshire, and was venue of a shire assembly in 990–2,[28] and site of a failed confrontation between the West Saxons and Danes in 1006.[29] Together these sites suggest the existence of a shire-level system of mobilisation that should be set alongside that of shire-level beacons and military units; that is the system that would seem to have been utilised by Alfred in 878. Indeed, the account of 878 suggests there may even have been an inter-shire system to coordinate large-scale mobilisations.

This system can be contrasted with that of linear chains of beacons focussed on burhs. The careful positioning of beacons alongside routes leading into strongholds arguably reflects a greater tactical concern than simply raising the alarm. This system facilitated communication between neighbouring strongholds, enabling the coordination of garrisons stationed there. The closer spacing of beacons could also provide more geographically specific details about enemy movements, as is also suggested by the fact that many of these beacons

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23 Baker and Brookes, "Explaining Anglo-Saxon military efficiency".

24 John Peddie, *Alfred Warrior King* (Stroud: Sutton, 1999), pp. 135–42.

25 John Baker and Stuart Brookes, "Monumentalising the political landscape: a special class of Anglo-Saxon assembly-sites," *Antiquaries Journal* 94 (2013), p. 157.

26 Baker and Brookes, "Monumentalising the political landscape," p. 157.

27 Baker and Brookes, "Explaining Anglo-Saxon military efficiency".

28 Sawyer, *Anglo-Saxon Charters,* no. 1454.

29 Swanton, *The Anglo-Saxon Chronicle,* 1006; Margaret Gelling, *The Place-Names of Berkshire*, 3 vols (EPNS) (Cambridge: At the University Press, 1973–6), pp. 481–82; Howard Williams, *Death and Memory in Early Medieval Britain* (Cambridge: Cambridge University Press, 2006), pp. 207–11.

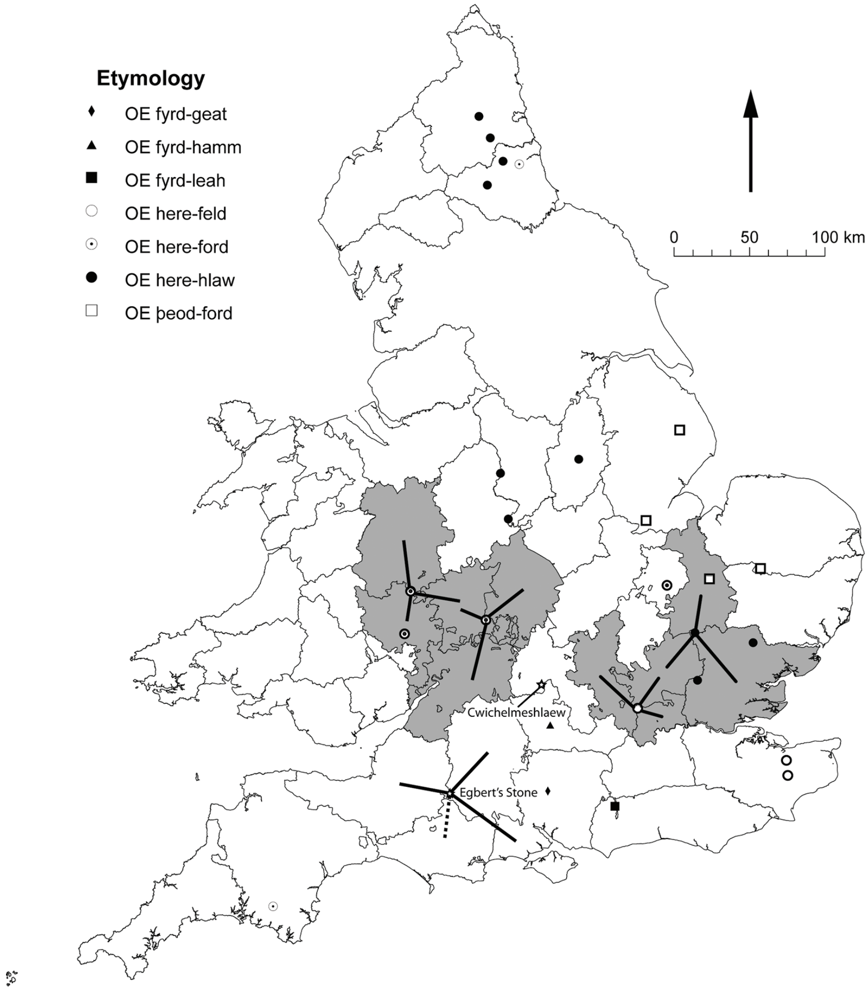

FIGURE 10.3 Shire-level meeting places
ILLUSTRATION: S. BROOKES

overlook crossroads in the road network. The sense is very much that these linear chains reflect a concern with territorial control, policing routes and the populations moving along them, not just communication between two distant points.

The closer spacing of these beacons has already been noted, but it is also striking that the locations of these beacons bear some relationship with administrative territories known as hundreds. Hundreds are first recorded in the mid-10th century and appear to have been introduced as an organized framework of local and regional assemblies, or moots.[30] According to the Hundred Ordinance—an Old English legal text regulating the schedule and procedures of the hundred courts, likely produced during or soon after the reign of King Edmund (939–46)—freemen of each district were compelled to meet every four weeks, commonly at outdoor locations, in order to settle disputes, conduct trade, impose fines and other punishments, and, importantly, mobilize armed posses to enforce the law.[31] They were also probably the means by which troops were mobilised to garrison the burhs.[32]

Close inspection of one of the best recorded beacon chains serves as an example of how beacons and hundreds were connected (Figure 10.4). As reconstructed by John Baker the Icknield Way system comprises at least 15 beacons in the central England shires of Oxfordshire, Buckinghamshire, Hertfordshire and Bedfordshire, continuing after a gap in the evidence into Cambridgeshire.[33] The extents of individual hundreds within these shires can be approximated by combining evidence from Domesday Book of 1086, supplemented by the boundaries of estates, parishes, and hundreds mapped at later dates.[34] Of the 29 hundreds this chain crosses, 23 have good connections to one of the 15 beacon sites. Many beacons appear to be located on the boundaries between neighbouring hundreds, or are located in small detached parts from more distant hundreds, in a way to suggests their locations are respected by the hundredal geography, providing access to people from each territory. This is indeed the case of the earliest recorded beacon place-name in this chain: Warren Hill in Nuffield, Oxfordshire, recorded as *wearddune* 'watch-hill' in the mid-10th-century charter bounds of Newnham Murren.[35] By Domesday, this boundary—and the beacon atop it—was formalised as that between the neighbouring hundreds of Ewelme and Langtree.[36] Finally,

30 H.R Loyn, "The Hundred in England in the Tenth and Eleventh Centuries," in *British Government and Administration: Studies Presented to S. B. Chrimes*, eds. H. Hearder and H.R. Loyn (Cardiff: University of Wales Press, 1974), pp. 1–15; Tom B. Lambert, *Law and Order in Anglo-Saxon England* (Oxford: Oxford University Press, 2017), pp. 133–39.

31 Felix Liebermann, ed., *Die Gesetze der Angelsachsen* 1 (Halle a. S.: Max Niemeyer, 1898), pp. 192–94; Dorothy Whitelock, ed., *English Historical Documents, c. 500–1042,* 2nd ed. (Oxford: Oxford University Press, 1979), pp. 429–30.

32 Baker and Brookes, "Explaining Anglo-Saxon military efficiency".

33 Baker, "Warriors and Watchmen".

34 Stuart Brookes, *Domesday Shires and Hundreds of England* [data-set] (York: Archaeology Data Service, 2020). https://doi.org/10.5284/1058999.

35 Sawyer, *Anglo-Saxon Charters,* no. 738. The charter is dated to 966 and thus broadly contemporary with the Hundred Ordinance.

36 Stephen Mileson and Stuart Brookes, *Peasant Perceptions of Landscape: Ewelme Hundred, South Oxfordshire, 500–1650* (Oxford: Oxford University Press, 2021), pp. 119–21.

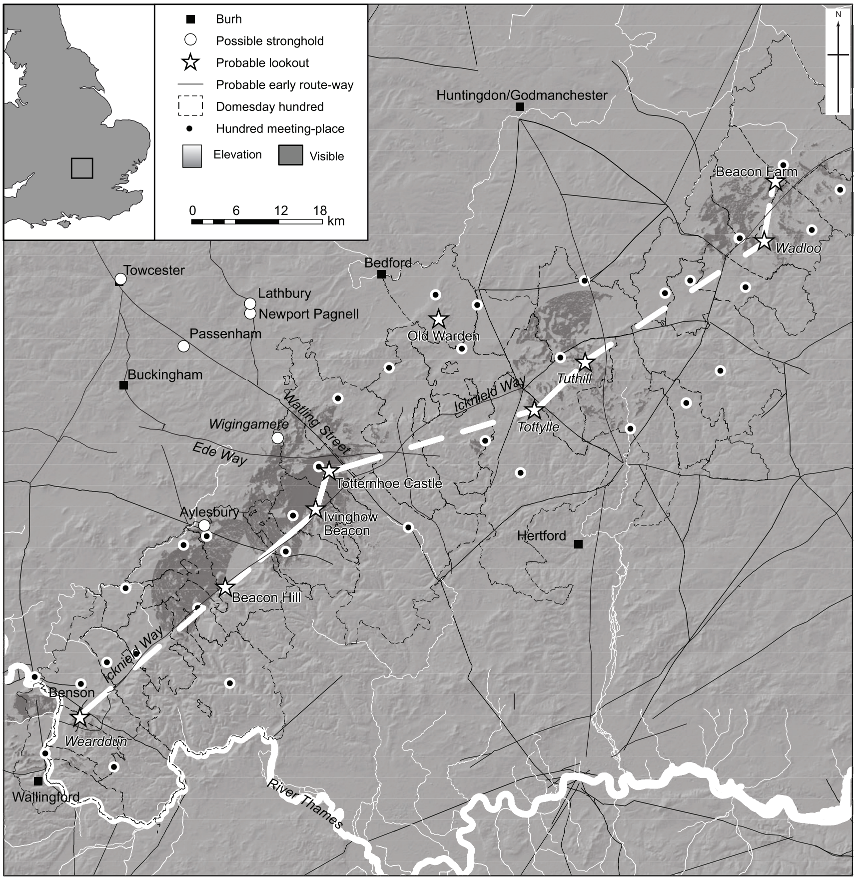

FIGURE 10.4 The beacon system of the Icknield Way, showing Domesday hundreds and their meeting-places
ILLUSTRATION: S. BROOKES

when they can be securely identified, hundred meeting-places appear commonly to be located beside routeways in positions that are intervisible with adjacent beacons.

Given the ephemeral archaeological signature of both beacons and meeting-places it may be impossible to prove the existence of this system through fieldwork, but, given the seeming association between beacon sites, hundredal administrative arrangements and places of 10th- or 11th-century hundredal assemblies, it is not unreasonable to suggest that many hundred meeting-places were used as sites of military muster coordinating with beacons. In that case, it might be suggested that a very regular system of civil defence existed by the 10th century, comprising mobilisations focussed on major strongholds, a continual cycle of mustering at hundred meeting-places, and the manning of local lookouts.[37]

Perhaps significantly, the identification of a further phase of putative coastal watches around the year 1000 also coincides with the appearance in the sources of new forms of administrative districts, known as 'ship-sokes' (*sipessocna*), responsible for building or manning ships.[38] The evidence for these arrangements is much more fragmentary than for hundreds, and most of these districts cannot be reconstructed on the ground. David Hill[39] has plotted two: one from a note on the provision of shipmen from estates belonging to St Paul's, London (*c.*995–8),[40] and a second from a writ of Bishop Æthelric complaining of losses sustained by the bishopric of Sherborne, Dorset, in respect of lands which contributed to the ship-scot (*scypgesceot*) (*c.*1001–12).[41] In both cases these districts are significantly larger than hundreds, and this can be connected with the Anglo-Saxon Chronicle entry for 1008 that states 'the king ordered that they should build ships all over England: that is, one warship (*scegð*) from three hundred and 10 hides'.[42] Perhaps in keeping, a triple hundred of Oswaldslow, in Worcestershire, is also recorded as owing ship-soke in a—albeit spurious—charter of 963.[43] Whatever the precise details were, it seems plausible that ship-sokes were groupings of pre-existing hundred territories, with the scaling up of manpower and resource a concomitant of these more local arrangements.

4 Conclusions

All defensive systems are designed to counter particular threats, but so too do they rely on infrastructure, systems of mobilisation, and communications. In the foregoing I have described how an appreciation of any individual element of the defensive response requires us to consider also its relationships to other aspects of the human and strategic landscape. How beacons intersected with

37 For further discussion of the military organisation of the hundred system, see *inter alia* Abels, *Lordship and Military Obligation.*

38 Nicholas J. Hooper, "Some Observations on the Navy in Late Anglo-Saxon England," in *Studies in Medieval History Presented to R. Allen Brown*, eds. Christopher Harper-Bill, Christopher J. Holdsworth and Janet L. Nelson (London: Boydell, 1989), pp. 203–14.

39 Hill, *An Atlas of Anglo-Saxon England*, pp. 92–93.

40 Agnes Jane Robertson, ed. *Anglo-Saxon Charters* (Cambridge: Cambridge University Press, 1939), no. 72.

41 Sawyer, *Anglo-Saxon Charters,* no. 1383.

42 Swanton, *The Anglo-Saxon Chronicle,* E, p. 138.

43 Sawyer, *Anglo-Saxon Charters,* no. 731.

mobilisation, what forms of defensive response were being communicated, and how manpower and resources were arranged and organised, are all interconnected elements in civil defence.

Nor are defensive measures necessarily static. In this case, the scale and form of warfare in the 8th century was significantly different to that of the 11th, not least in the size of the armies and the nature of conflict involved. While early on in this period isolated raids, often on coastal and riverine locations, were the main threat, from the later 9th century, more concerted campaigns aimed at conquest, required a different response. By studying beacons alongside mustering and communication we can consider the sequence of military innovations taking place in the Viking Age.

The evidence presented here shows it to be an evolving system, which Table 10.1 attempts to summarise. Crudely put, *ad hoc* shire-level mobilisations, that appear to have characterised the 8th and earlier 9th centuries, would seem to have been supported by more widely-spaced and prominent beacons. These were supplemented in later centuries by increasingly localised administrative measures, reflected both in the size and regularity of hundredal organisation, and the intensity of surveillance over land and sea. The connectedness of these lookouts with strongholds in use during the late 9th or 10th centuries, and their location in areas (such as central England) that written sources indicate were the venue of West Saxon military campaigns at that time, is suggestive of an active use of such observation posts by King Alfred and his immediate descendants. This is not to say that such sites were previously non-existent, or that they were not (re)used subsequently.

TABLE 10.1 Schematic classification of defensive developments in Viking Age England

Date visible from	**Military units**	**Mustering sites**	**Beacons**	**?Strategy**
8th/e. 9th century	Shire	Shire-level 'army' sites	Shire-level mobilisation	Responsive
l. 9th/e. 10th century	+ Burghal garrisons, ?and hundreds	Burhs and hundreds (divisions of shires)	Local/linked to burhs. Emphasis on controlling inland movement	Containing
*c.*1000	+ Ship-sokes	[multi]-hundredal/ manors/burhs	Regional/devolved to groups of manors. Emphasis on sea-watch	Excluding

Indeed, there are indications that developments may have been cumulative. In his discussion of the defence of Devon, Slater has noted the careful positioning of the early 10th century Burghal Hidage stronghold of Halwell to control the area known as the Hams, with intervisible Iron Age forts perhaps reused as a beacon system in Anglo-Saxon times.[44] As suggested by accelerator mass spectrometry dating of the masonry walls, around the mid-10th century this system was enhanced by an additional stronghold at Oldaport.[45]

A similar enhancement might be indicated by lookouts and the organisation of shipbuilding requirements around 1000, that suggest an increasingly maritime orientation to defensive measures. In both scale and ambition, a national system of ship-sokes, supported by a local manorial class, may reflect an increasing belief in the effectiveness of coastal defence in a way that is not apparent in earlier centuries. In keeping, it is from around this time that a scaling-up in the size of naval fleets is visible in the sources.[46]

In all these chronological stages, beacons and lookouts are likely to have played a key role in signalling and coordinating armed responses, but finding them requires a multi-disciplinary approach. Here I have suggested that, when used together, place-names, written evidence and landscape archaeology can provide sufficient clues to reconstruct elements of signalling and sighting systems. This shows that they are an intrinsic element of civil defence, and thus deserve as much study as fortifications, linear earthworks, and other elements of the military landscape.

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44 T.R. Slater, "Controlling the South Hams: the Anglo-Saxon *Burh* at Halwell," *Report and Transactions of the Devonshire Association for the Advancement of Science, Literature and Art* 123 (1991), pp. esp. 76–77.

45 Paul Rainbird, "Oldaport and the Anglo-Saxon Defence of Devon," *Devon Archaeological Society Proceedings* 56 (1998), p. 161 and fig. 4; Paul Rainbird and Denise Druce, "A late Saxon date from Oldaport," *Proceedings of the Devonshire Archaeological Society* 62 (2004), pp. 177–80.

46 Morten Ravn, *Viking-Age War Fleets* (Maritime Culture of the North) 4 (Roskilde: Viking Ship Museum, 2016), pp. 100–01.

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CHAPTER 11

Watching the Sea, Guarding the Land—a Discussion of Potential Maritime Defence Systems in Viking Age Denmark

Thorsten Lemm

1 Introduction

The coastline of Norway, Denmark and Sweden, including the numerous islands and fjords extending far into the country, totals over 150,000 km in length.[1] In addition, there are numerous larger and smaller navigable lakes, rivers and streams. It is therefore not surprising that waterways were the most important communication routes in Scandinavia during the Viking Age (A.D. 793–1066). On the one hand, they enabled the peaceful transport of goods and travel, but on the other hand, they always offered opportunities for attack and incursion by enemies. Consequently, proper systems of coastal defence can be identified at various places in Scandinavia. Components of these systems were lookouts, beacons, warships, sea barrages and, of course, the local population, who had to take up arms in case of emergency.

In a recently conducted study regarding the Schlei inlet in southern Jutland, evidence of just such components was gathered. By taking into account archaeological and toponymic evidence and by conducting viewshed and visibility analyses it was possible to reconstruct a defensive system based on visual communication for the protection of the trading town of Hedeby (Germany). Based on the results of that study, this paper will show for selected examples that the same combination of military defence components can also be found elsewhere, and will argue that comparable coastal defence systems may also be inferred in other regions of late Viking Age and medieval Denmark.

2 The Scandinavian Leiðangr

Maritime defence in Scandinavia is first and foremost seen in the context of the military organisation known as *leiðangr* (Danish *leding*, Swedish

1 https://snl.no/Norge; https://snl.no/Sveriges_kyst; https://snl.no/Danmark.

 | DOI:10.1163/9789004749702_012

ledung, Norwegian *leidang*), a maritime troop levy serving both attack and national defence, in which it was regulated that one warship (*snekkja*) was to be equipped and manned per ship district.[2] The *leiðangr* is documented in late 12th- and 13th-century legal texts from all three Scandinavian kingdoms. The first surviving reference to a general military obligation in Denmark—called *expeditio* in the Latin source—stems from a document issued by King Canute IV (r. 1080–6) in 1085.[3]

The introduction of the *leiðangr* in Norway is—very likely erroneously—attributed to King Håkon the Good (**c.*918, †961, r. *c.*933–61) by the 13th century sagas *Fagrskinna*[4] and *Heimskringla*.[5] The oldest mention of the term *leiðangr* is found in the Norwegian scaldic court poetry of the 11th century. Moreover, certain phrases, such as the ruler putting up a fence of ships or weapons around his own country, are likely to be understood synonymously with his levying of the *leiðangr*.[6] Danish scalds of the 11th century did also use several of the synonymous phrases, according to which Malmros would like to infer an existence of the *leiðangr* in Denmark as early as around A.D. 1000.[7] However, it is questionable what was specifically meant by the term *leiðangr* or its presumed paraphrases in the 11th century, or whether a continuous,

2 Rikke Malmros, "Leding og skjaldekvad," republished in *Vikingernes syn på militær og samfund. Belyst gennem skjaldenes fyrstedigtning* (Aarhus: Aarhus Universitetsforlag, 2010), pp. 55–56; Niels Lund, ""If they neglect military service, they shall emend to the king" – The scutage in Danish charters and laws," in *Maritime Warfare in Northern Europe. Technology, organisation, logistics and administration 500 BC–1500 AD. Papers from an International Research Seminar at the Danish National Museum, Copenhagen, 3–5 May 2000,* eds. Anne Nørgård Jørgensen, John Pind, Lars Jørgensen and Birthe L. Clausen (Copenhagen: National Museum, 2002), pp. 271–72.

3 Malmros, "Leding og skjaldekvad," pp. 55 and 58; Lund, "If they neglect," pp. 271 and 273.

4 *Fagrskinna, Nóregs kononga tal.* Samfund til udgivelse af gammel nordisk litteratur, ed Finnur Jónsson (Copenhagen: Møller, 1902–03), ch. 11, p. 34–35.

5 Malmros, "Leding og skjaldekvad," p. 117; Bjørn Myhre, "Boathouses and naval organization," in Military Aspects of Scandinavian Society, in a European Perspective A.D. 1–1300. Papers from an International Research Seminar at The Danish National Museum, Copenhagen 2–4 May 1996, eds. Anne Nørgård Jørgensen and Birthe L. Paulsen (Copenhagen: National Museum, 1997), p. 169.

6 *Hákonar saga góða*, Heimskringla I–III. Ìslensk Fornrit XXVI–XXVIII, ed. Bjarni Aðalbjarnarson (Reykjavík: Hið Íslenzka Fornritafélag, 1941–1951), ch. 20, p. 176; Malmros, "Leding og skjaldekvad," pp. 117–124; Rikke Malmros, „Leiðangr in Old Norse court poetry," in *Maritime Warfare in Northern Europe. Technology, organisation, logistics and administration 500 BC–1500 AD. Papers from an International Research Seminar at the Danish National Museum, Copenhagen, 3–5 May 2000,* eds. Anne Nørgård Jørgensen, John Pind, Lars Jørgensen and Birthe L. Clausen (Copenhagen: National Museum, 2002), pp. 277–80.

7 Malmros, "Leding og skjaldekvad," pp. 125–38; Malmros, "Leiðangr in Old Norse court poetry," pp. 277–84.

unchanged form of the *leiðangr* can be derived from it into the High Middle Ages.[8] In 1047 King Harald *the hard-ruler* Sigurdsson (*1015, †September 25th 1066, r. 1047–66) of Norway laid claim to the throne of King Sven Estridsen of Denmark (**c.*1019, †April 28th 1076, r. 1047–1074). He equipped a Norwegian fleet almost every year and led military campaigns into Danish waters. In 1050, Hedeby was the target of one of his attacks, during which the town appears to have been completely engulfed in flames. First in 1064, the two kings made peace and pledged themselves to refrain from further raiding.[9] This multi-year conflict provides a plausible historical background for the establishment or large-scale expansion of a nationwide coastal defence system in Denmark. Nevertheless, it may be assumed that the defensive *leiðangr* was already established before its offensive form could be demanded and enforced by the king and in 1085 even transformed into a tax.[10]

8 Niels Lund, "Lið, leding og landeværn: hær og samfund i Danmark i ældre middelalder" (Roskilde: Vikingeskibshallen, 1996); Oliver Grimm,"The military context of Norwegian boathouses AD 1–1500," in *Maritime Warfare in Northern Europe. Technology, organisation, logistics and administration 500 BC–1500 AD. Papers from an International Research Seminar at the Danish National Museum, Copenhagen, 3–5 May 2000,* eds. Anne Nørgård Jørgensen, John Pind, Lars Jørgensen and Birthe L. Clausen (Copenhagen: National Museum, 2002), pp. 116–17; Oliver Grimm, Großbootshaus – Zentrum und Herrschaft. Zentralplatzforschung in der nordeuropäischen Archäologie (1.–15. Jahrhundert) (Ergänzungsbände zum Reallexikon der Germanischen Altertumskunde) 52 (Berlin, New York: de Gruyter, 2006), p. 125; Gareth Williams, "Ship-levies in the Viking Age. The methodology of studying military institutions in a semi-historical society," in Maritime Warfare in Northern Europe. Technology, organisation, logistics and administration 500 BC–1500 AD. Papers from an International Research Seminar at the Danish National Museum, Copenhagen, 3–5 May 2000, eds. Anne Nørgård Jørgensen, John Pind, Lars Jørgensen and Birthe L. Clausen (Copenhagen: National Museum, 2002), pp. 305–06.

9 *Haralds saga Sigurðarsonar,* Heimskringla III. Íslenzk Fornrit XXVIII, ed. Bjarni Aðalbjarnarson, Reykjavík: Hið Íslenzka Fornritafélag, 1979), ch. 26, p. 114–5; *Fagrskinna,* ch. 55, pp. 257–9; Claus Krag, "Vikingtid og rikssamling: 800–1130." Aschehougs Norges Historie Bind 2. Oslo: Aschehoug, 1995; Jon Viðar Sigurðsson, "Norsk historie 800–1300. Frå høvdingmakt til konge – og kyrkjemakt." Oslo: Det Norske Samlaget, 1999; Edith Marold, "Hedeby – an 'International' Trading Place for Danes, Swedes, Norwegians, Germans, Frisians and Slavonic People. The Linguistic and Literary Evidence." *Offa* 58 (2001), pp. 13–20.

10 Williams, "Ship-levies in the Viking Age," p. 297. Against a *leiðangr* organisation prior to 1085 see Lund, "If they neglect military service," pp. 274–75; in favor of a (late) Viking Age *leiðangr* organisation see Malmros, "Leding og skjaldekvad," p. 137; Malmros, "Leiðangr in Old Norse court poetry"; Ole Crumlin-Pedersen, "Gensyn med Skuldelev 5 – et ledingsskib?," in *Festskrift til Olaf Olsen på 60-års dagen den 7. juni 1988,* ed. Aage Andersen (Copenhagen: Det Kongelige Nordiske Oldskriftselskab, 1988), pp. 152–53; Ole Crumlin-Pedersen, "Large and small warships of the North," in *Military Aspects of Scandinavian Society, in a European Perspective A.D. 1–1300. Papers from an International Research Seminar at The Danish National Museum, Copenhagen 2–4 May 1996,* eds. Anne Nørgård

In Norway, the remains of Viking Age and medieval boathouses point to the places where warships were stationed.[11] Comparable archaeological findings are hardly available from Denmark. Here, it is mainly place- and field-names such as Snekkedal or Snekkebjerg that can be traced back to the Old Norse (ON) term *snekkja* (OD *snekke*) meaning 'small vehicle', 'warship' or '*leiðangr* ship', which indicate activities in connection with ships during the Viking Age and/or Medieval Period.[12] According to the fact that the term *snekkja/snekke* was also used to denote a *leiðangr* ship, the *snekke*-sites might theoretically even be regarded as places, where warships were stationed in order to defend the Danish coastline.[13]

3 Lookouts, Beacons and Sea Barrages

Besides warships, the defence of the extensive coasts of the north also required other military components such as off-shore works. These are well known from various Danish inlets such as Gudsø Vig, Egernsund or Fodevig—both as archaeological features and/or indicated by local place-names. Interestingly, many of these constructions can be dated to the first decades of the 11th century.[14]

Jørgensen and Birthe L. Paulsen (Copenhagen: National Museum, 1997), pp. 190–92. The possibilities for a Viking Age *leiðangr* are discussed in more detail in Williams, "Ship-levies in the Viking Age" and Klassen, "Fribrødre Å and the question of a leiðangr institution in Viking Age Denmark," in *Fribrødre Å. A late 11th century ship-handling site on Falster*, ed. Jan Skamby Madsen and Lutz Klassen (Jysk Arkæologisk Selskabs skrifter) 69 (Højbjerg: Aarhus Universitetsforlag, 2010), pp. 308–14.

11 Myhre, "Boathouses and naval organization"; Grimm, "The military context of Norwegian boathouses AD 1–1500"; Grimm, *Großbootshaus – Zentrum und Herrschaft*.

12 Malmros, "Leding og skjaldekvad"; Christer Westerdahl, "Norrlandsleden I. Källor till det maritima kulturlandskapet. En handbok i marinarkeologisk inventering" (Arkiv för Norrländsk Hembygdforskning) XXIV (Härnösand: Länsmuseet-Murberget, 1989), pp. 139–43 and 181, fig. 103; Bente Holmberg, "Stednavne som historisk kilde," in *Atlas over Fyns kyst i jernalder, vikingetid og middelalder*, eds. Ole Crumlin-Pedersen, Erland Porsmose and Henrik Thrane (Odense: Odense Universitetsforlag, 1996), p. 57; Bente Holmberg and Jan Skamby Madsen, "Da kom en snekke … Havnepladser fra 1000- og 1100-tallet?," *KUML* (1997–98), p. 204.

13 Lisbeth E. Christensen, *Stednavne som kilde til yngre jernalders centralpladser*. Unpublished phd-thesis (Copenhagen University, 2010), p. 93.

14 Westerdahl, "Norrlandsleen", pp. 127–28; Anne Nørgård Jørgensen, "Sea defence in Denmark AD 200–1300," in Military Aspects of Scandinavian Society, in a European Perspective A.D. 1–1300. Papers from an International Research Seminar at The Danish National Museum, Copenhagen 2–4 May 1996, eds. Anne Nørgård Jørgensen and Birthe L. Paulsen

The most important element of a coastal defence—the one that bound all other components together—appears to have been organised systems of lookouts and beacons, which often were concentrated around Viking Age and medieval trading sites or along the waterways that led to them. For example, various elevations on islands and peninsulas surrounding Aarhus Bay bear names pointing to visual communication.[15] Lookouts and beacons have come down to us less as archaeological features than in the form of place- and field-names probably deriving from an ON *vǫrðr* (OD *warth*) meaning 'watch', 'lookout', 'supervision' or 'guardianship'—such as Varberg/Vorbjerg or Varhøj/Vårhøj.[16] In Denmark, the name element occurs most often compounded with the suffixes *-bjerg* 'mountain' and *-høj* 'hill', but it is also assumed to exist as a simplex place-name such as Vorde or Volde.[17] The *vǫrðr*-localities are understood as watch posts in the sense of a coastal defence,[18] which is also attested by medieval provincial laws. These describe the watch in general as *varðhald* 'watch-keeping', *bergvarð* 'watch at hills', *næsiæwarð* 'watch at promontories', or respectively *bøtesvarð* (Sw.) or *vitavǫrðr* (Norw.), both meaning 'watch at beacons or hills', and mention heavy fines that were imposed if someone failed in his watch-keeping duties.[19]

(Copenhagen: National Museum, 1997), pp. 202–03 fig. 4–5; Anne Nørgård Jørgensen, "Naval Bases in Southern Scandinavia from the 7th to the 12th Century," in *Maritime Warfare in Northern Europe. Technology, organisation, logistics and administration 500 BC–1500 AD. Papers from an International Research Seminar at the Danish National Museum, Copenhagen, 3–5 May 2000*, eds. Anne Nørgård Jørgensen, John Pind, Lars Jørgensen and Birthe L. Clausen (Copenhagen: National Museum, 2002), pp. 138–50.

15 Jan Skamby Madsen and Max Vinner, "Der Seeweg nach Aros," in *Aros – das Århus der Wikinger*, ed. Annette Damm (Højbjerg: Moesgård Museum, 2006), pp. 101–02.

16 Bertil Ejder, "Var på din vakt!," *Sydsvenska Ortnamnssällskapets Årsskrift* (1961–62), p. 84; see Ødegaard *et al.*, this volume, chapter 1.

17 Ejder, "Var på din vakt!," p. 97; Bent Jørgensen, *Danske stednavne.* 3rd ed, pp. 337 and 340.

18 Vilhelm La Cour, *Danske Borganlæg til midten af det trettende århundrede* I (Copenhagen: Nationalmuseet, 1972), p. 70; Holmberg, "Stednavne som historisk kilde." p. 56; Ole Crumlin-Pedersen, "Søvejen til Roskilde: nogle tanker om Isefjord og Roskilde Fjord som søfartsvej i vikingetid og tidlig middelalder," *Historisk Årbog fra Roskilde Amt* (1978), pp. 52–56 fig. 28; Jytte Ringtved, "Settlement organization in a time of war and conflict," in *Settlement and Landscape. Proceedings of a conference in* Århus*, Denmark, May 4–7 1998* (Højbjerg: Aarhus Universitetsforlag, 1999), p. 368; Christer Westerdahl, "The Cognitive Landscape of Maritime Warfare and Defence. Toponymic and Archaeological Aspects," in *Maritime Warfare in Northern Europe. Technology, organisation, logistics and administration 500 BC–1500 AD. Papers from an International Research Seminar at the Danish National Museum, Copenhagen, 3–5 May 2000,* eds. Anne Nørgård Jørgensen, John Pind, Lars Jørgensen and Birthe L. Clausen (Copenhagen: National Museum, 2002), pp. 179–80; Christensen, *Stednavne som kilde*, p. 112.

19 Westerdahl, "The Cognitive Landscape," p. 179.

In the context of organised coastal defence systems, another set of names is of interest, which also refer to beacons and lookouts. Within the high medieval national borders, the localities in question were called *böte-* in Sweden, *bavn-* in Denmark and *viti-* in Norway.[20] Based on these three different terminologies Westerdahl surmises "the establishment of a coast-oriented defence system along with the state formation process in Scandinavia".[21] Due to the geographic focus of this paper, the *bavn*-names of medieval Denmark are of special interested here. *Bavn* derives from the Old Danish *bākæn* meaning 'signal' or 'alarm', an Old Frisian loan word, which is believed to have entered the Danish language in the 14th century.[22] In parts of Funen, Ærø, north-west Zealand and southern Jutland *bavn* has developed into *barn*.[23] Due to the fact that the word is relatively young in the Danish language, the *bavn*-names cannot be considered contemporary with structures from the Viking Age.[24] Nevertheless, on some occasions they are included in late Iron Age landscape studies, which assume structural continuity over the long durée.[25] Apparently the *vǫrðr-/warth*-names, which originally used to denote natural occurences, were in many cases secondarily used as settlement names. Judging from some cases the reason for this may have been that the older names at the original locations were replaced with the younger *bākæn-/bavn*-names. An example for such a case would be the church village of Vorde in Nørlund herred, northern Jutland. It was documented in writing as Worthlegh in 1216; later spellings are e.g. Wordugh 1454, Vordhe, Wordhugh 1461. The village and church are located directly at Bavnehøj, the highest elevation of the parish.[26] Accordingly, it seems possible that names containing the word *bavn* refer to places that also functioned as beacons before the 14th century, although a large part of the names probably designates much younger structures. Some *bavn*-localities have been in use as late as the 19th century, and some names may therefore in principle be correspondingly young.[27]

20 Ejder, "Var på din vakt!," p. 61.

21 Westerdahl, "The Cognitive Landscape," pp. 178 fig. 3, 180.

22 Kristian Hald, "-bavn," in *Kulturhistorisk Leksikon for Nordisk Middelalder* 1, ed. Johannes Brøndsted (Copenhagen: Rosenkilde og Bagger, 1956); Ejder, "Var på din vakt!," p. 99; Holmberg, "Stednavne som historisk kilde," p. 56.

23 Holmberg, "Stednavne som historisk kilde," pp. 53–54.

24 Christensen, *Stednavne som kilde*, p. 115.

25 See e.g. Ringtved, "Settlement organization in a time of war and conflict," p. 368; Skamby Madsen and Vinner, "Der Seeweg nach Aros," pp. 101–02.

26 Ejder, "Var på din vakt!," p. 80, 97–98.

27 Christensen, *Stednavne som kilde*, p. 115.

Because of their large geographic distribution extending beyond the medieval Danish territory into the Swedish area—in contrast to the *bavn*-names – and due to the fact that the *vǫrðr*-names, which were originally used to denote natural occurrences and only secondarily as settlement names, it is concluded that these belong to an older stratum of place-names.[28] Hence, it may be assumed that most *vǫrðr*-places already existed in the Viking Age; some of which were subsequently renamed according to the standardized medieval languages of their respective countries—*bavn*- in Denmark and *böte*- in Sweden.[29] The semantic content of both terms (in Denmark *warth* and *bavn*) was so similar that they could be interchanged and a *vǫrðr-/warth*-name could be preserved in a signal chain of *bavn*-localities.[30]

The distribution map shows that the number of *bavn*-names clearly exceeds that of *warth*-names (Figure 11.1).[31] Nevertheless, with the exception of the islands of Langeland, Lolland, Falster and Møn in the south-east as well as the north-west of Jutland and its northern tip, *warth*-names are present throughout the area showing a clear orientation towards the coasts and inlets. There

28 Ejder, "Var på din vakt!," p. 97; Ringtved, "Settlement organization in a time of war and conflict," pp. 366–72; Westerdahl, "The Cognitive Landscape," p. 180.

29 See Ødegaard *et al.*, this volume, chapter 1.

30 Ejder, "Var på din vakt!," p. 98; Ringtved, "Settlement organization in a time of war and conflict," p. 368.

31 The mapping of warth – and bavn-placess for present-day Denmark is based on the online database provided by the Department of Nordic Studies and Linguistics of the University of Copenhagen (http://danmarksstednavne.navneforskning.ku.dk). Information regarding the names in what is now South-Schleswig in present-day Germany comes from the field-name collections of the same department, in addition to the field-name collections of G. Wegemann (Abt. 399.78) and W. Laur (Abt. 399.125) at the state archive of Schleswig-Holstein in Schleswig. The online database was searched for place – and field-names beginning with var, vår, vaar or vor as potential variations of warth or with bavn, baun or barn as potential variations of bākæn/bavn.The focus was placed on names whose basic words describe localities that are also mentioned in the medieval legal texts in connection with lookouts and beacons and/or seem logical from a topographical point of view in this context; i.e. – bjerg (mountain), – høj (hill), – bakke (hill), – næs (promontory), – holm (small island). These names are to be seen as direct references to lookouts and beacons. Combinations with basic words describing other topographical or cultural features such as – dal (valley), – kær (swamp), – kilde (wellspring), – by (village), – toft (dwelling site), – gård (farm) or – bro (bridge) were only taken into account, if the interpretation given in the database suggested a possible derivation from warth or bākæn/bavn respectively. These names are to be seen as indirect references to lookouts and beacons, e.g. in the form of a Bavntoft or a Vårby presumably pointing to a former bavnehøj or vårhøj in their direct vicinity. However, in order to avoid duplication, indirect references were not mapped if they are located in the closer vicinity of existing direct references to lookouts or beacons.

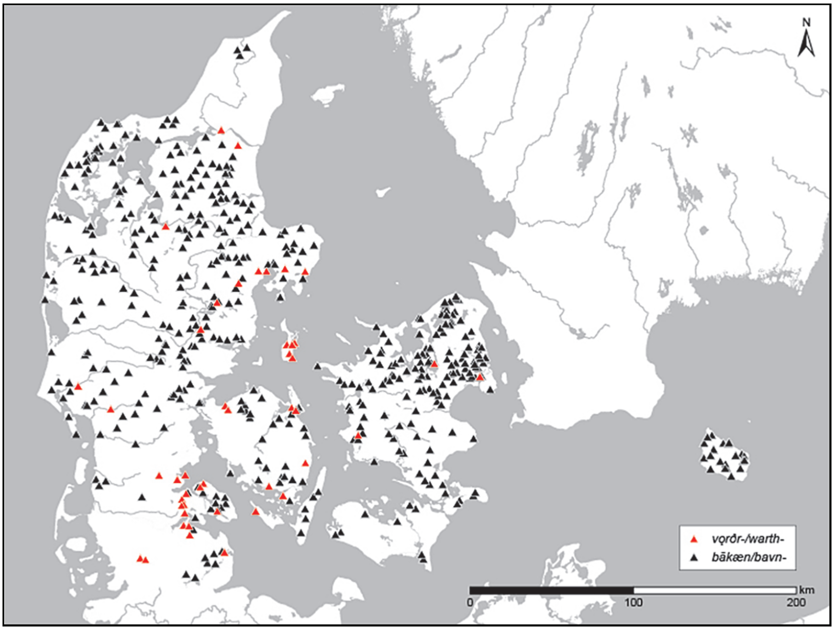

FIGURE 11.1 *Warth-* and *bavn/barn*-localities in present-day Denmark and South-Schleswig in present-day Germany. The former Danish areas in present-day Sweden are not taken into account (basedata ESRI 2010)
ILLUSTRATION: THORSTEN LEMM

are even noticeable agglomerations of them on both sides of the Flensburg inlet and on the island of Samsø south-east of Aarhus Bay. Due to their probable greater antiquity *warth*-names are more likely to provide clues to pre-medieval systems of lookouts and beacons than *bavn*-names, though the latter might reflect renamed sites. For this reason it seems legitimate to include the *bavn*-names in considerations of warning systems in the context of Viking Age and medieval coastal defence,[32] while acknowledging the temporal fuzziness that mapping these place-names introduces.

4 Military Agents

A functioning defence system involved much more than just a chain of beacons to warn of imminent attack. Agents were required to carry out defensive

32 See Hald, "-bavn," pp. 394–95; Ejder, "Var på din vakt!," pp. 97–98; Holmberg, "Stednavne som historisk kilde," p. 56.

measures by controlling strategic narrow passages in the inlets and possibly even manning warships. It can be assumed that homeland defence was in the interest of the entire population, and in case of emergency, defenders were recruited from all social groups.

Archaeological evidence for military organisation and a society subdivided, among other things, by military roles, is provided by the richly-furnished graves of the period containing martial equipment, *inter alia* weapons, riding equipment, horse equipment and sometimes even horses. Differentiated by the presence or absence of riding gear, these burials are usually referred to either as 'equestrian' or 'weapon graves'. Typically, they are interpreted as burials of warriors of a certain military rank who played a role in the strongly military-based unification of Denmark and whose families had special rights in the society. The burial custom appears around A.D. 925 and continues until around the end of the 10th century.[33]

There is an uneven distribution of these graves across 10th century Denmark, however, with concentrations in certain regions (Figure 11.2). They are far more frequent in proximity to the coast and/or in the direct vicinities of inlets and rivers, thereby indicating a connection in both economic and military respects between the deceased and their families and these waterways. It might be supposed that as members of the local elite, these warriors in some way maintained control over the waterways and might even have been assigned with their defence by the king. Moreover, most of the graves are also located close to the ancient road system (see Figures 5–7). Consequently, extremely favourable positions in terms of transport geography can be postulated for the related dwelling sites, which can be assumed to have existed in the direct vicinities of the graves.[34] It follows that these positions afforded a mobility that was the basic requirement for the warriors and their retinues to serve as agents in a coastal defence system, enabling them to promptly take up their assigned posts in times of emergency.

33 Anne Pedersen, "Military organisation and offices: The evidence of grave finds," in *Settlement and Lordship in Viking and Early Medieval Scandinavia*, ed. Søren M. Sindbæk and Bjørn Poulsen (Turnhout: Brepols, 2012), pp. 46 and 57; Anne Pedersen, *Dead Warriors in Living Memory. A Study of Weapon and Equestrian Burials in Viking-Age Denmark, AD 800–1000. 1. Text* (Odense: University Press of Southern Denmark, 2014), pp. 173 and 264–267.

34 See Thorsten Lemm, "Protecting Hedeby – Reconstructing a Viking Age maritime defense system based on visual communication," in *Early medieval waterscapes. Risks and opportunities for (im)material cultural exchange. Beiträge des 67. Sachsensymposiums vom 17.–21. September 2016 in Antwerpen. Neue Studien zur Sachsenforschung 6,* ed. Rica Annaert (Wendeburg: Verlag Uwe Krebs, 2019), p. 108.

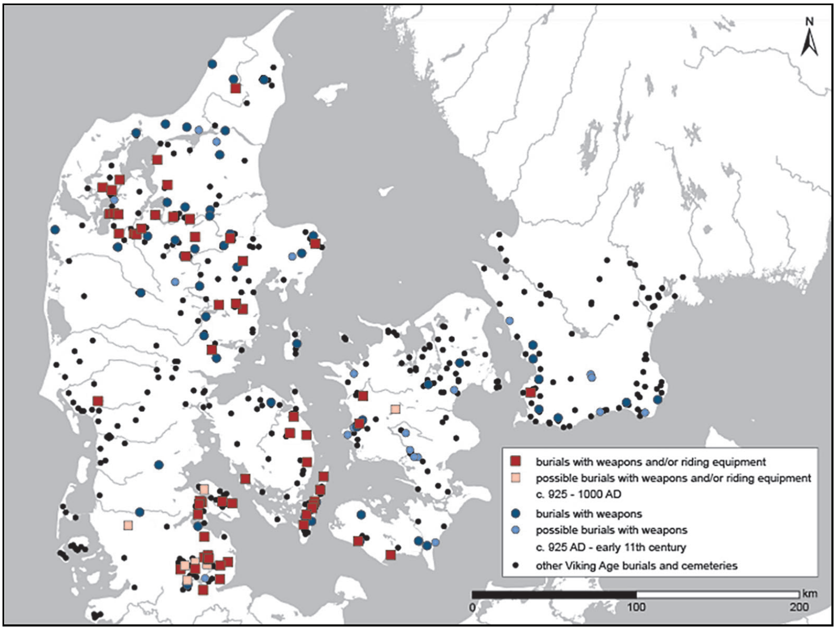

FIGURE 11.2 Burial sites in Viking Age Denmark. Whereas the weapon graves are distributed over almost the entire Old Danish area, the distribution of the equestrian graves is limited to the western part, with concentrations in eastern South Jutland and North Jutland as well as on the island of Langeland (distribution based on Pedersen 2014b: 160–2, fig. 1a–c; base data ESRI 2010).
ILLUSTRATION: THORSTEN LEMM

Besides the aforementioned graves there are two types of place-names which may provide further information on the presence of warriors in certain regions. So-called *karle*- and *rinke*-names are well known from the Danish and above all Swedish areas.[35] *Karle*-names derive from the plural form of OD *karli* or *karle*,[36] whereas the specific of the *rinke*-names is related to the OD **rink* and the ON

35 See Stefan Brink, "Social order in the early Scandinavian landscape," in *Settlement and Landscape. Proceedings of a conference in* Århus*, Denmark, May 4–7 1998*, ed. Charlotte Fabech and Jytte Ringtved (Højbjerg: Aarhus Universitetsforlag, 1999); Christensen, *Stednavne som kilde*; Andres S. Dobat, "Mapping social order. Place-names containing *rink* or *karl* and the development of political administration in 10th-century South Scandinavia," in *Navnemiljøer og samfund i jernalder og vikingetid. Rapport fra NORNAs 38. Symposium i Ryslinge 12.-15. Maj 2009*, ed. Lisbeth E. Christensen and Bent Jørgensen (Uppsala: Norna-Förlaget, 2011).

36 Lars Hellberg, "De finländska karlabyarna och deras svenska bakgrund," in *Festskrift till* Åke *Granlund. Studier i nordisk filologi 65*, ed. Lars Huldén (Helsingfors: Svenska Litteratursällskapet i Finland, 1984).

rekkr.[37] Both names are interpreted to designate the dwelling sites of retainers, followers, escorts and warriors in the military households of chieftains, petty kings or kings.[38] The *rinke*- and *karle*-names are not evenly distributed over the Danish area. In respects of land routes, waterways and maritime orientation their positioning appears to resemble that of the equestrian and weapon graves with a clear connection to the route network.[39] For this reason, it makes sense to include them in considerations about the organisation of coastal defence.

5 Controlling the Sea Route to Hedeby

One of the most important places to protect against attacks from the sea was the famous Viking Age trading town of Hedeby, situated in the far south of the Danish territory at the inner end of the Schlei, an approximately 40 km-long Baltic Sea inlet. In the surroundings of Hedeby a high degree of military and social organisation is best implied by the massive ramparts of the Danevirke, which were built, reshaped und renewed in several phases from the 5th century until the 12th century,[40] as well as by *c.*20 equestrian and weapon graves on both sides of the Schlei (Figure 11.3).

Additionally, in the hinterland of the Schlei there is one *rinke*- and one *karle*-name, both of which are fairly certain, in addition to a less certain *karle*-place-name, all of which could potentially indicate residences of or localities associated with warriors.[41] Of these, the field name Rinkenis, which may be interpreted as 'promontory of warriors',[42] is of particular interest, because it designates a strategic position east of the narrow passage of the Schlei at Arnis, which today is less than 250 m wide.[43] Although the field-name suggests

37 Kristian Hald, "Om rekkr og holdr i danske Stednavne," *Danske Folkemaal* VII (1933).

38 Brink, "Social order in the early Scandinavian landscape," pp. 424 and 432–33.

39 See Dobat, "Mapping social order," pp. 44 fig. 1 and 47–48.

40 Hans H. Andersen, *Danevirke og Kovirke: Arkæologiske undersøgelser 1861–1993* (Aarhus: Aarhus Universitetsforlag, 1998), pp. 9–17; Astrid Tummuscheit and Frauke Witte, "Der einzige Weg durchs Danewerk: Zu den Ausgrabungen am Danewerk im Jahr 2013," *Arkæologi i Slesvig – Archäologie in Schleswig* (2014) no. 15, pp. 156–57.

41 Dobat, "Mapping social order," p. 44 fig. 1, list 1: no. 12, 16 and 26.

42 Wolfgang Laur, Historisches Ortsnamenlexikon von Schleswig-Holstein. Veröffentlichungen des Schleswig-Holsteinischen Landesarchivs 28 (Neumünster: Wachholtz, 1992), p. 546.

43 Andres S. Dobat, "The fifth day. Ohthere´s route through the Schlei fjord," in *Ohthere´s Voyages. A late 9th-century account of voyages along the coasts of Norway and Denmark and its cultural context*, ed. Janet Bately and Anton Englert (Roskilde: The Viking Ship Museum, 2007), pp. 130–31 fig. 1–2; Lemm, "Protecting Hedeby," pp. 102–03 fig. 1 and 110 fig. 7.

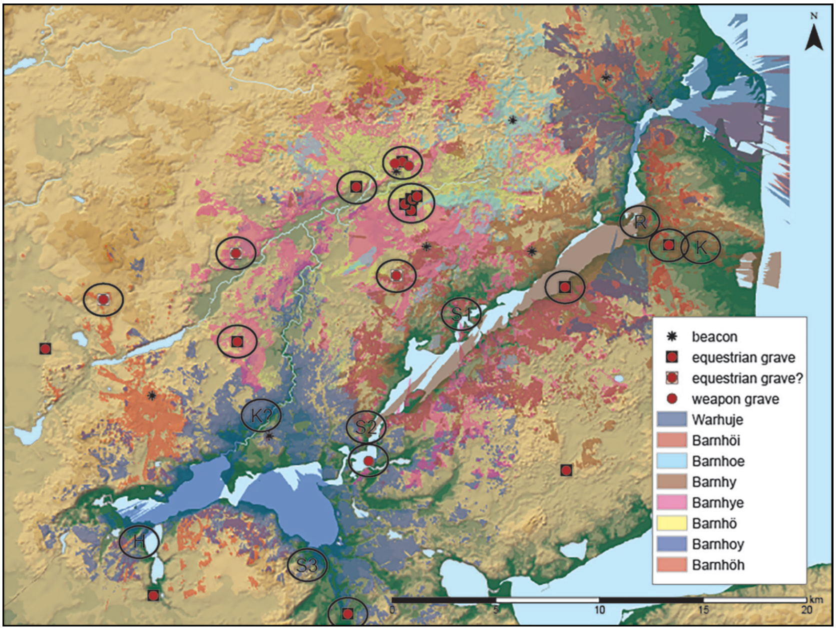

FIGURE 11.3 Schlei-region. Viewsheds of the *barn*-localities (12 km radius), selected field-names as well as equestrian and weapon graves. 85% of the graves, the promontory Rinkenis (R), the localities or immediate surroundings of Karleberg (K) and Kahleby (K?), of Schnek Wisch (S1), Schnickstedt (S2) and Schneckeberg (S3) and Hedeby (H) are included within one or more viewsheds (map is based on elevation data by LVermGeo SH)
ILLUSTRATION: THORSTEN LEMM

a connection with defence, the military and control,[44] and may be understood against the background of warriors, who according to the topographic situation were in some way assigned with controlling the narrow passage between Arnis and Rinkenis, so far, no relevant archaeological finds are known from the promontory; the nearest equestrian grave, however, was discovered at a distance of only 1.7 km.[45]

Moreover, a wooden structure was discovered in the Schlei just south of Kappeln. It consisted of at least 40 poles of oak adding up to a 12 m-long and 7 m-wide construction transversely oriented to the inlet on the tip of a shallow

44 See also Christensen, Stednavne som kilde, p. 87.

45 Silke Eisenschmidt, *Grabfunde des 8. bis 11. Jahrhunderts zwischen Kongeå und Eider. Zur Bestattungssitte der Wikingerzeit im südlichen Altdänemark* (Studien zur Siedlungsgeschichte und Archäologie der Ostseegebiete) 5,1-2 (Neumünster: Wachholtz, 2004), pp. 582–83.

water zone, thereby creating a narrow passage of merely 40–50 m in width. A single rather inaccurate radiocarbon-dating to A.D. 925–75 or 1010–1235 could suggest a use in the late Viking Age.[46] Furthermore, with Schnek Wisch, Schnickstedt and Schneckeberg there are three field-names that most likely derive from the Old Danish *snekke* and hence may point to activities in connection with ships.[47] However, as mentioned above the term *snekke* was also used to denote a warship of the *leiðangr* fleet in medieval written sources. If an early form of the *leiðangr* organisation already existed in the (late) Viking Age, warships could theoretically have been stationed at the three locations,[48] which then would have played a role in a potential defence system at the Schlei.

In the light of such a system, further field-names have to be considered that may point to communication along the Schlei inlet (see Figure 11.3). There is a *vǫrðr-/warth*-name represented by the field-name Warhuje, which denotes a 15 m-high elevation not far from the spot where the Schlei inlet opens up wide towards its mouth.[49] Moreover, seven prominent elevations on the northern shore bear field-names such as Barnhöi, Barnhoe or Barnhy. They are South Jutish equivalents to the Danish bavnehøj-names mentioned above (*barn* = Danish *bavn* = 'signal, alarm'; *höi*, *hoe* or *hy* = Danish *høj* = 'hill').[50] The distances of the *barn*-localities to the Schlei vary widely, from less than 2 km to over 5 km. Especially the large distances suggest that some beacons were primarily designed for communication with the hinterland.[51]

By conducting viewshed analyses using *warth*- and *barn*-names as observer points, it was possible to reconstruct a chain of beacons by which it was possible to send an alarm signal from the mouth of the Schlei to the hinterlands on either side and all the way to the inner end of the inlet where Hedeby was situated.[52] This signal-chain is interrupted by only one gap, probably caused

46 Uwe Holtz, Willi Kramer and Michael Stoß, "Ein Pfahlfeld in der Schlei bei Kappeln (Kappeln LA 11)," *Archäologische Nachrichten aus Schleswig-Holstein* 1 (1990), pp. 99, 102; Lemm, "Protecting Hedeby," pp. 101 and 111.

47 Andres S. Dobat, "Snekkenamen an der Schlei. Zeugnisse einer Maritimen Infrastruktur im Umfeld von Haithabu und Schleswig?," *Archäologisches Korrespondenzblatt* 32 (2002), pp. 610–615 fig. 2–5.

48 See also Christensen, Stednavne som kilde, p. 93.

49 Dobat, "The fifth day," pp. 130–131 fig. 1–2; Lemm, "Protecting Hedeby," pp. 102–103 fig. 1 and 104 fig. 2.

50 Lemm, "Protecting Hedeby," pp. 102–03 fig. 1.

51 Lemm, "Protecting Hedeby," p. 103.

52 For the procedure of the analyses and the parameters applied, see Lemm, "Protecting Hedeby," pp. 104–07.

by a forgotten place-name. However, by means of a visibility analysis even a probable location for the missing beacon can be suggested.[53]

Furthermore, it turned out that the beacons were visible from other suggested components of the defence system (see Figure 11.3). Above all this is true for 17 (=85 per cent) of the 20 equestrian or weapon graves known from the surroundings of the Schlei, which are included within one or more viewsheds of the beacon localities. The exceptions are the equestrian graves at Idstedt, Selk and Loose, the latter however only by a mere 220 m beyond the nearest barnhy viewshed. Several examples from Schleswig and Denmark imply that the distance between Viking Age graves and the related settlements usually comprised of only a few hundred meters.[54] Hence, it may be assumed that in many cases, if not all of them, the settlement sites were also included within the viewsheds. In case of an emergency, it would have been essential for the local warrior elite to be able to see the lit beacons from their residences and thereby to be summoned to defend the Schlei.

In addition, there was also a visual contact with all three *snekke*-locations and/or their direct vicinities. If warships were actually stationed there, one may assume that the associated crews resided within areas from where the beacons were visible. Moreover, Rinkenis, 'the promontory of warriors', is included in the viewsheds of Warhuje and two *barn*-localities. The same is true for the shoreline next to the wooden construction in the Schlei south of Kappeln. Different beacons were also visible from the immediate surroundings of Karleberg and the village of Kahleby bearing a possible *karle*-name.

The picture of a potential defence system, which emerges from the combination of the *warth*- and *barn*-localities' viewsheds and other proposed military components appears to be so coherent and fitting that it is difficult to regard the results and observations as purely coincidental. According to the dating of the *bavn-/barn*-names, such a system may certainly be expected for medieval Schleswig. On the basis of the *warth*-name belonging to an older stratum of place-names, by reference to examples of older *warth*-names being replaced by medieval *bavn*-names[55] and especially based on the visual connection between the beacons and the 10th century graves, it seems legitimate to propose a dating of the reconstructed defence system as early as the late Viking Age.[56]

53 Lemm, "Protecting Hedeby," pp. 104–07.

54 See Lemm, "Protecting Hedeby," p. 108 with further references.

55 Ejder, "Var på din vakt!," p. 97; Ringtved, "Settlement organization in a time of war and conflict," p. 368.

56 It has also previously been outlined how such a defence system at the Schlei might have functioned in action, see Lemm, "Protecting Hedeby," pp. 109–11.

6 Regional Studies

With a dating to the late Viking Age, the proposed system at the Schlei would not stand alone. Besides the lookouts and beacons in the eastern Limfjord area[57] and around Aarhus Bay[58] mentioned above, Crumlin-Pedersen presumes that a defence system consisting of evenly distributed *warth-* and *bavn-*localities at the Ise- and Roskildefjord is contemporary with the famous Skuldelev sea barrage, which is dated to the time around A.D. 1050.[59] However, none of the mentioned studies has been as detailed as the one dealing with the Schlei. The observations made and conclusions drawn in that study can therefore be used as a starting point for considerations of possible coastal defence systems in other regions. In the following, four regional studies will therefore be used to discuss to what extent the results obtained for the Schlei may be transferable to other Danish waters.

6.1 *Regional Study 1—Flensburg Inlet*

In contrast to the Schlei with Hedeby at its inner end, the *c.*43 km long Flensburg inlet has received far less attention in research, as most studies tended to stop at the Danish-German border. Only recently, a study brought together archaeological and toponymic information on the north and south banks (Figure 11.4).[60] Here, too, potential military agents are indicated by several equestrian graves and a single weapon grave.[61] Furthermore, the place-name Rinkenæs denoting a 'promontory of warriors'[62] on the north shore suggests the presence of such men at this narrowest part of the whole inlet, where it is only *c.*1.4 km wide. The location of the burial sites on both sides of the Flensburg inlet—at the farthest 4.4 km from the coast—in addition to the position of Rinkenæs, may once again suggest that those warriors in some way maintained control over the inlet as a waterway.

There are furthermore three *snekke*-names that point to activities in connection with ships during the Viking Age and/or medieval period, perhaps in

57 Ringtved, "Settlement organization in a time of war and conflict," pp. 364–68.

58 Skamby Madsen and Vinner, "Der Seeweg nach Aros," pp. 101–02.

59 Crumlin-Pedersen, "Søvejen til Roskilde," p. 59.

60 Thorsten Lemm and Sven Kalmring, "The Flensburg inlet in the Viking Age – a neglected maritime cultural landscape," in Interaktion ohne Grenzen. Beispiele archäologischer Forschungen am Beginn des 21. Jahrhunderts. Interaction without borders. Exemplary archaeological research at the beginning of the 21st century, eds. Berit V. Eriksen, Angelika Abegg-Wigg, Ralf Bleile and Ulf Ickerodt (Schleswig: Stiftung Schleswig-Holsteinische Landesmuseen, 2017).

61 Lemm and Kalmring, "The Flensburg inlet," p. 638.

62 Hald, "Om rekkr og holdr i danske Stednavn".

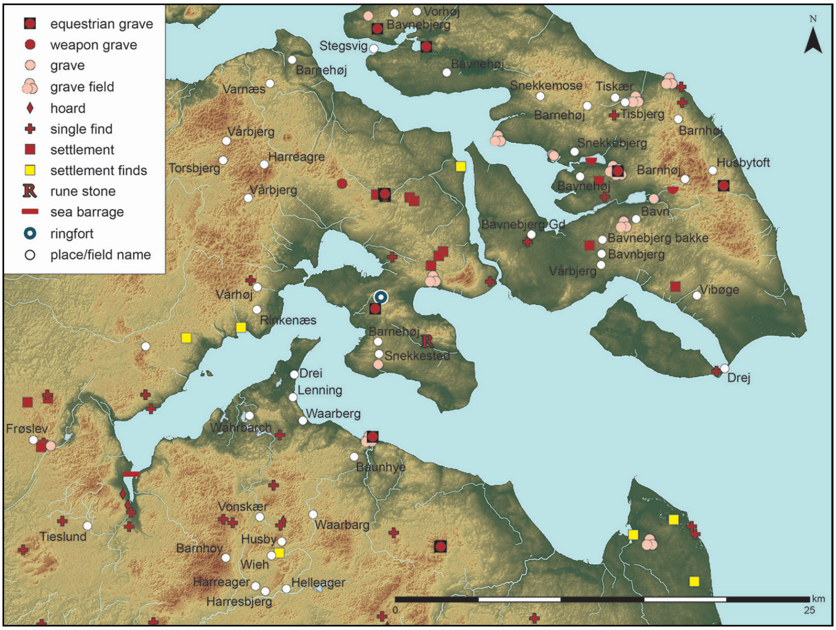

FIGURE 11.4 The Flensburg inlet. Viking Age finds and sites as well as place- and field-names. Except for Snekkebjerg and Rinkenæs (denoting the whole promontory), the field-names on the northern Danish side are not precisely located. On the southern German side, Wahrbarch is not accurately localized (map is based on data from LVermGeo SH and FOT-data from Geodatastyrelsen and Danish municipalities, July 2016).
ILLUSTRATION: THORSTEN LEMM

the form of landing places. However, they could theoretically also indicate that warships were stationed at or close to the three sites.[63] Moreover, in the hinterland of the Flensburg inlet there are 13 field-names that most likely derive from the aforementioned *bākæn*, meaning ‘signal’ or ‘alarm’. Additionally, seven field-names have to be regarded as *warth*-names pointing to ‘watch’, ‘look-out’, ‘supervision’ or ‘guardianship’. Even though elaborate viewshed analyses could not be conducted for the *bavn/barn*- and the *warth*-localities so far,[64] their frequent occurrence together with equestrian and weapon graves as well as the *rinke*- and *snekke*-names—which in principle seems to mirror the

63 Lemm and Kalmring, “The Flensburg inlet,” p. 641.
64 The reason for this is mainly the fact that the geographical references to a large part of the field names on the northern shore of the Flensburg inlet in the online database (http://danmarksstednavne.navneforskning.ku.dk) unfortunately refer to local subdistricts and not to the field names’ exact locations.

circumstances at the Schlei—may nevertheless attest to the existence of an organised defence system at the Flensburg inlet.

Such a system can be complemented with another component, namely an off-shore work, which originally consisted of three parallel rows of poles crossing the inlet at the entrance of the Flensburg harbour with a width of a little less than 500 m. Three poles were radio-carbon dated to the late 10th century, whereas a fourth pole yielded two dates of the 15th century.[65] If these dates are correct, a huge sea barrage blocked the entrance to the innermost part of the inlet at a strategic position in the late Viking Age and might later have been reused. The protection of the inlet in the late Viking Age would probably not have been necessary without a contemporary settlement at the inner end of it worth protecting, namely in the vicinity of present-day Flensburg. However, so far the location of such a settlement can only be inferred from a few 11th century coins and the Romanesque St Johannis church situated less than 200 m from a stream draining into the Flensburg harbour.[66]

6.2 *Regional Study 2—Northern Jutland*

The north of Jutland is characterised by various bays and inlets stretching far into the land—above all the Limfjord passage between the North and the Baltic Seas—as well as numerous rivers and streams (Figure 11.5). All these waters offered the possibility for peaceful traffic, but also for hostile incursions. It is therefore obvious that they were observed and protected at certain times with the help of warning systems, which may be indicated by the very large number of *bavn*-localities in this area. *Warth*-names in the eastern and southern Limfjord as well as around Aarhus Bay suggest that the indicated signalling systems may already have Viking Age or older roots. Furthermore, a whole series of *snekke*-names could suggest the locations of stationed warships.

Next to south-eastern Jutland, this region has the highest concentration of equestrian and weapon graves in Denmark, many of which show a connection to the land and waterways. In addition to this archaeological evidence, toponymic evidence of the presence of local elite families is also found here in the form of various *karle*- and *rinke*-names. Once more, this concentration may probably be understood with the economic and military use of the waterways. Apart from sea barrages, the area in northern Jutland features all components

65 Erich Halbwidl and Martin Segschneider, "Die (früh)mittelalterliche Pfahlsperre in der Förde bei Flensburg," *Archäologische Nachrichten aus Schleswig-Holstein* 21 (2015), pp. 64–66.

66 Eisenschmidt, *Grabfunde des 8. bis 11. Jahrhunderts*, p. 603; Lemm and Kalmring, "The Flensburg inlet," pp. 638 and 643.

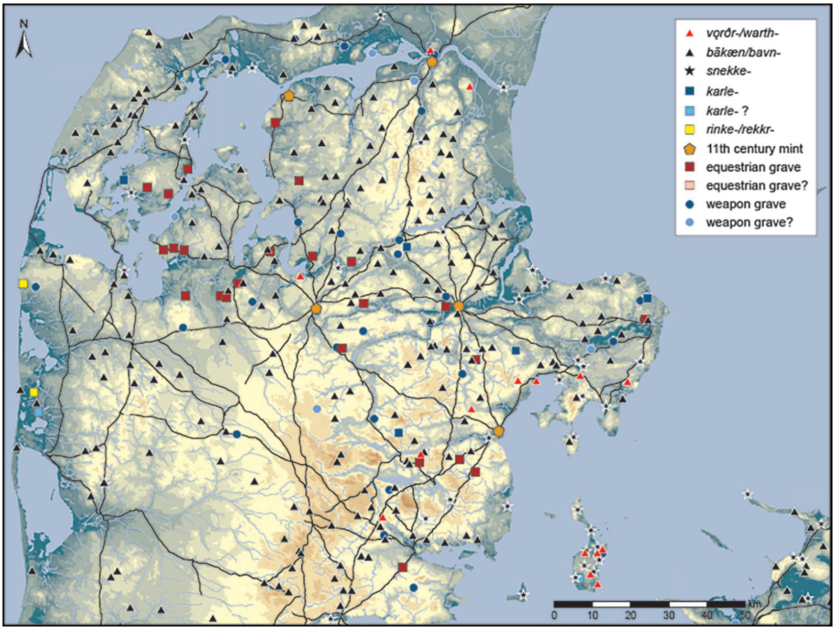

FIGURE 11.5 Northern Jutland. Selected Viking Age finds and sites, place- and field-names as well as the 18th-century road system (based on the maps of The Danish Academy of Sciences) (SRTM base data ESRI 2008)
ILLUSTRATION: THORSTEN LEMM

of defence systems that have been discussed for the Schlei region. Potential targets to be protected against attacks from the sea could have been numerous landing places at sheltered bays (e.g. Sebbersund or Bejsebakken)[67] and especially the early mints of the 11th century with origins in the Viking Age.

6.3 *Regional Study 3—South Funen Archipelago*

A strong correlation between equestrian and weapon graves and waterways is also very well observable on the island of Langeland, which is situated quite strategically within the South Funen Archipelago (Figure 11.6). Its southern tip, where the place-name Snekkegrund indicates a *snekke*-locality,[68] was located

67 Torben Trier Christiansen, "Detektorfund og bebyggelsesudvikling ved Sdr. Tranders i det sydøstlige Aalborg – præsentation af en detektorplads og nogle udfordringer vedrørende tolkningen af detektorfundene," in *Viele Funde – große Bedeutung? Potenzial und Aussagewert von Metalldetektorfunden für die siedlungsarchäologische Forschung der Wikingerzeit. Bericht des 33. Tværfaglige Vikingesymposiums, 9. Mai 2014, Wikinger Museum Haithabu*, eds. Volker Hilberg and Thorsten Lemm (Kiel: Ludwig, 2018), p. 122 fig. 6.

68 Holmberg and Skamby Madsen, "Da kom en snekke," p. 220 cat.-no. 98.

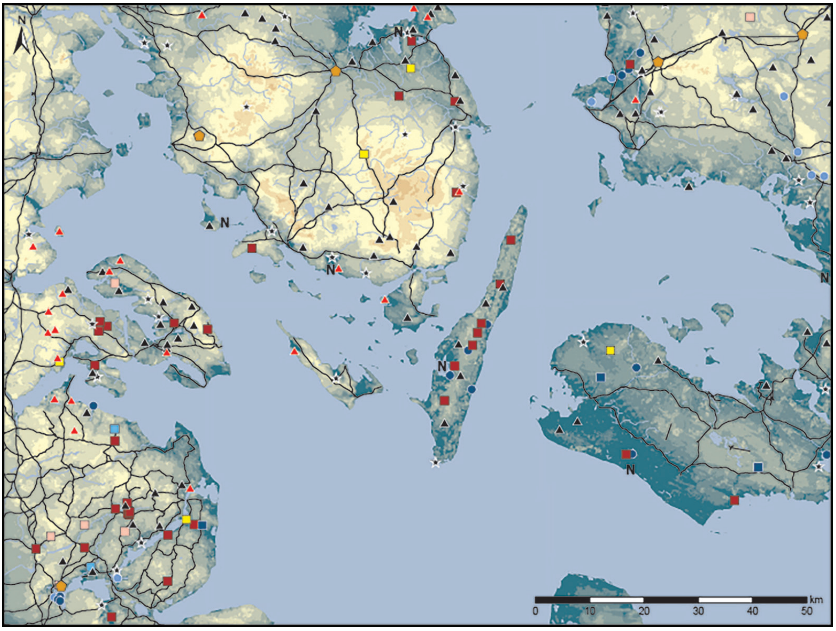

FIGURE 11.6 South Funen archipelago with the island of Langeland in the centre. Selected Viking Age finds and sites, place- and field-names as well as the 18th-century road system in Denmark (based on the maps of The Danish Academy of Sciences) and the reconstructed ancient road system in southern Schleswig. N = naval bases from west to east at Helnæs, Nakkebølle, Kertinge Vig (Munkebo), Henninge Nor, Hominde and Vordingborg (after Nørgård Jørgensen 2002: fig. on p. 138). For the legend, see Figure 5 (SRTM basedata ESRI 2008)
ILLUSTRATION: THORSTEN LEMM

directly at the junction of several sea routes—Great Belt/Langeland Belt, Little Belt/Als Belt and Femarn Belt coming upon the Bay of Kiel including the Flensburg inlet, the Schlei, Eckernförde Bay, the Kiel inlet and Hohwacht Bay. On the 50 km long and only up to 9 km wide island, seven equestrian graves and four weapon graves were documented.[69] Apart from a concentration in the centre, the graves or the warriors' assumed dwelling sites in their immediate vicinity respectively were distributed relatively evenly over the elongated island. The elite residences on the surrounding islands—Als, South and East

69 Anne Pedersen, *Dead Warriors in Living Memory. A Study of Weapon and Equestrian Burials in Viking-Age Denmark, AD 800–1000. 2. Catalogue. Publications from the National Museum, Studies in Archaeology & History 20:1 2 Jelling Series* (Odense: University Press of Southern Denmark, 2014), pp. 76–80.

Funen, South-west Zealand and Lolland—indicated by corresponding graves as well as *rinke*- and *karle*-names,[70] almost all show an orientation towards the coast, too.

From the same islands, and also from Ærø, further *snekke*-names are known that point to activities in connection with ships or even places where warships might have been stationed. These are supplemented by historically indicated and/or archaeologically proven military harbours often protected by off-shore works.[71] Moreover, on the islands and coasts adjacent to the mentioned sea routes there are several *bavn*-localities indicating warning systems. *Warth*-names present on all mentioned islands except for Langeland and Lolland might once again suggest a pre-medieval origin of these systems. According to this, all components of potential defence systems can once more be found together in this region of Denmark. This would suggest that traffic on the sea routes mentioned above was surveiled in order to protect landing places, trading sites and other localities near the coast from raids. Visibility analyses conducted in the past have already shown the potential of surveiling the sea routes in this region from high points in the landscape.[72]

What is striking, however, is the fact that on both sides of the Little Belt between the island of Als and Kolding Fjord there are no *bavn*- or *warth*-names, nor any indications of the presence of a local warrior elite (see Figures 11.1 and 11.7).[73] Hence, the surveillance of this part of the Little Belt might have been less important than the control of the other sea routes mentioned. This could be because the narrow passage at Erritsø farther north, which, with a width of less than 700 m at its narrowest point, was presumably easy to defend, would have represented too dangerous a route for southbound enemy ships, and instead a voyage through the significantly wider Great Belt and the Langeland Belt was to be preferred.

70 Dobat, "Mapping social order," pp. 44 fig. 1, 65 and 67; Pedersen, *Dead Warriors in Living Memory. A Study of Weapon and Equestrian Burials in Viking-Age Denmark, AD 800–1000. 2. Catalogue*, pp. 164–65 map 2b-c.

71 Nørgård Jørgensen, "Naval Bases in Southern Scandinavia from the 7th to the 12th Century," p. 126 and fig. on p. 138.

72 Jan Bill, "Piracy and naval organisation in the Baltic Sea in the 9th century: some security considerations concerning Wulfstan's voyage" in *Wulfstan's Voyage. The Baltic Sea region in the early Viking Age as seen from shipboard*, eds. Anton Englert and Athena Trakadas (Roskilde: Viking Ship Museum, 2009) pp. 344–48 fig. 3–5.

73 The absence of place names referring to beacons was also recently highlighted by Dr. Jens Ulriksen at the workshop "Aristocratic residences in Northern Europe" by Vejle Museums and the National Museum at Kongernes Jelling on 21–22 October 2021; see Ravn and Juel, this volume.

6.4 *Regional Study 4—South-West Jutland*

The fourth regional study discussed here focusses on South-west Jutland, where the early town of Ribe would have represented the highest value target for raids originating from the North Sea (Figure 11.7). With Kalby Mark pointing to a former Karleby 17 km south and the burial of Grimstrup 22 km north of Ribe, there is evidence of the presence of a local warrior elite. The latter represents the only equestrian grave in western Jutland, flanked by the only two *warth*-names in western Jutland—Varde and Vardho. This combination is presumably indicative of the existence of a late Viking Age defence system to protect the town of Ribe. It is also quite possible that several of the elevations later (re-)defined by *bavn*-names were already serving as beacon hills during that period.

Regarding their distribution, an interesting picture emerges in this region. Besides the clusters of *bavn*-names west of Varde and south of Kalby Mark and two localities on the island of Fanø, there are two chains of beacon hills—one via Grimstrup and one via Ribe—running north-eastwards inland from

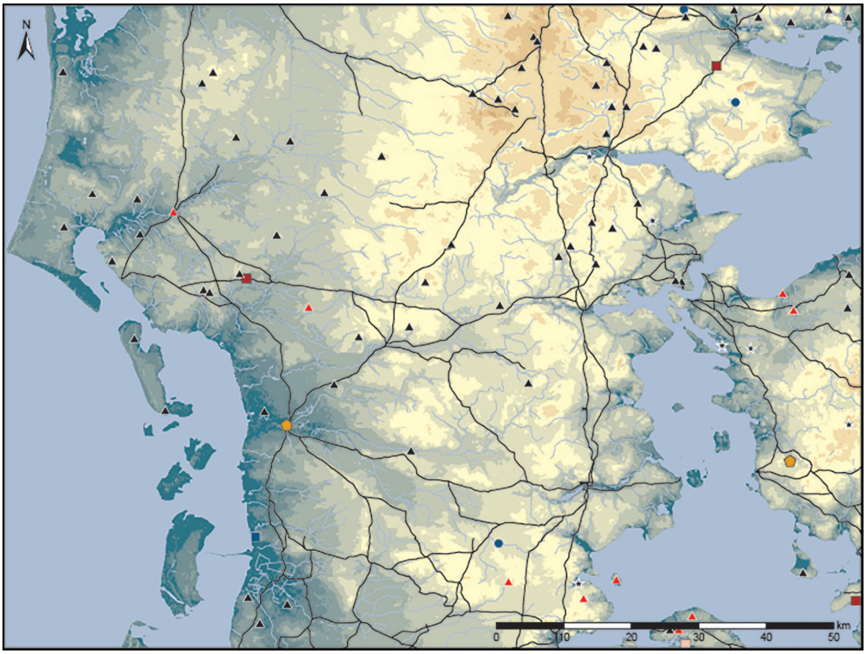

FIGURE 11.7 The surroundings of the town of Ribe in south-west Jutland. Selected Viking Age finds and sites, place- and field-names as well as the 18th-century road system (based on the maps of The Danish Academy of Sciences). For the legend, see Figure 5 (SRTM base data ESRI 2008)
ILLUSTRATION: THORSTEN LEMM

the North Sea coast. They may have served primarily for communication with the hinterland, as was also the case on a minor scale for some *barn*-localities north of the Schlei.[74] Long chains of *bavn*-locations can also be seen elsewhere in Denmark, e.g. in Central Jutland or in the south of Zealand (see Figure 11.1). The chain of beacons running via Ribe, would apparently even have allowed communication across the Jutland Peninsula. Whether these lines of communication can be traced back to the Viking Age, the Middle Ages, or modern times cannot be answered at present. However, despite the sparse archaeological and toponymic sources in this region there seem to be clues for a late Viking Age coastal defence in the wider area of Ribe.

7 Conclusions

As shown above, those components that were relevant for defence systems such as lookouts and beacons, potentially stationed warships, sea barrages and the acting agents in case of an external threat, the warriors who bore the brunt of the defence, occur together in different densities in various regions of Denmark. From a macro perspective, combinations of the components discussed are particularly common near the coast as well as around inlets and navigable rivers. These regions thus show clear parallels to the circumstances at the Schlei, where it could be shown with the help of GIS-based analyses that the individual components were connected via visual contact with the beacons and lookouts.

Assuming the hypothesis put forward here regarding the transferability of the results from the Schlei-study is correct, sophisticated defence systems are likely to have existed in various regions of Denmark as early as the late Viking Age;[75] and this does not only apply to the examples presented here. Combinations of the above-mentioned components, each with *warth*-names as indicators of an older temporal horizon, can be observed at the Schlei, at the Flensburg inlet, at the North Sea coast north of Ribe, in the Limfjord region, around Aarhus Bay, in north-west and north-east Funen, in the South Funen

74 See Lemm, "Protecting Hedeby," p. 103.

75 For the time being, however, the results presented here should only be seen as a first step towards the reconstruction of late Viking Age coastal defence systems. In a second step, time-consuming viewshed and visibility analyses for all *warth* – and *bavn-/barn*-localities in the selected study regions are required, which could not be carried out within the framework of this paper. A third step, which is also relevant for the surroundings of the Schlei, involves fieldwork of various kinds, especially drilling and excavation at postulated beacon hills to obtain concrete evidence of the age of the signal fires.

Archipelago, at the Roskildefjord, and in western and north-eastern Zealand. These are, however, so many regions that it is almost possible to assume a centrally planned nationwide coastal defence in the late Viking Age.

Defence systems like the one reconstructed for the Schlei region and the ones proposed for other Danish areas presuppose a high degree of political and military organisation.[76] According to Heimskringla[77] and Fagrskinna[78] the Norwegian king Hákon Aðalsteinsfóstri is not only credited with the introduction of the *leiðangr*, but is also said to have implemented an organised system of beacons as early as the middle of the 10th century. Based on the combined account of the two institutions in both sources, one may conclude that beacon systems were understood as part of the defensive *leiðangr* that came into effect when an enemy fleet or army invaded the country.

It is questionable from when a sufficiently stable central power capable of such an organisation may be postulated for Denmark. Without any confirmation through written sources, an early form or a predecessor of the medieval *leiðangr* may have developed at the earliest in the course of Harald Bluetooth´s strongly military-based formation of Denmark in the second half of the 10th century.[79] As a consequence thereof, regional coastal defence systems may also have emerged, which were borne by the local population led by the warrior elite and served the protection of waterways and those sites especially valuable for the crown. Judging from the dating of many Danish off-shore works an intensified expansion of such systems may have taken place in the first decades of the 11th century.

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77 "Hákonar saga góða," *Heimskringla I–III.* Ìslensk Fornrit XXVI–XXVIII, ed. Bjarni Aðalbjarnarson (Reykjavík: Hið Íslenzka Fornritafélag, 1941–51), ch. 20, p. 176.

78 "Fagrskinna. Nóregs kononga tal." *Samfund til udgivelse af gammel nordisk litteratur*, ed. Finnur Jónsson (Copenhagen: Møller, 1902–03), ch. 11, pp. 34–35.

79 Malmros, "Leding og skjaldekvad," p. 137; Ole Crumlin-Pedersen, *The Skuldelev Ships I. Topography, History, Conservation and Display. Ships and Boats of the North, Volume 4.1* (Roskilde: Viking Ship Museum, 2002), p. 320; Williams, "Ship-levies in the Viking Age," p. 305; Klassen, "Fribrødre Å," p. 335.

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CHAPTER 12

A Fortified Viking Age Settlement at *Erritsø*, South-Eastern Jutland, Denmark—an Indication for the Defence-in-Depth of a Kingdom in the Early Viking Age

Mads Ravn and Christian Juel

1 Introduction

The narrow Little Belt in south-eastern Jutland funnels into a passage between the present garrison town of Fredericia on the Jutland side and the fishing town of Middelfart on the opposite island of Funen (Figure 12.1). Today the place is an important industrial hub where east meets west and north meets south via the essential roads connecting Copenhagen and Europe: the E20 (east-west) and the E45 (north-south). Our recent investigations suggest that in the Viking Age this area was also a hub for traffic by land and sea, between the early 9th century town of Hedeby in present-day Germany to the south and early 9th century town of Kaupang in southern Norway to the north. It was also at a crossroads of terrestrial routes between the presumed royal seat at Lejre on the island of Zealand in the east[1] and the early town of Ribe in the west of Jutland. These routes all intersect at Erritsø, suggesting that it was an important hub in the—then Danish—kingdom of the early 8th and 9th centuries A.D., possibly even a strategic fall-back position in a defence-in-depth system, behind the linear earthwork of *Danevirke*, lying 111 km to the south. Recent dating has pushed back the origins of this monument to the 5th century, a point we will return to below. While there are good grounds then for seeing the position of Erritsø as important, we do not know exactly how the Danish kingdom was organized territorially during the 8th and 9th centuries, or how autonomous, for example, Jutland was. In this regard, the entry for the year A.D. 813 in the Royal Frankish Annals[2] is highly suggestive, stating:

1 Tom Christensen, *Lejre bag myten. De arkæologiske udgravninger* (Jysk Arkæologisk Selskabs Skrifter) 87 (Aarhus: Jysk Arkaeologisk Selskab, 2015).

2 See Bernard Walther Scholz, *Carolingian Chronicles*, 99. *Annales Regni Francorum* under the year 813 or in Latin *Annales Regni Francorum* 1895, p. 138: *Missi sunt de hoc conventu quidam*

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From the imperial court [in Aachen] some Frankish and Saxon nobles were sent across the river Elbe to the border of the Normans; they should make peace with them according to the desire of their kings and deliver them over to their brother. With them a similar number, namely sixteen, of the great men of the Danes met at the appointed place, and after mutual oaths were taken, the peace was confirmed, and the brother of the kings returned to them. They were not at home, however, but had *drawn to Westarfolda with an army, the farthest region to the north-west of their kingdom*, which overlooks the northern tip of Britain, and whose chiefs and people denied them obedience. (Our translation and emphasis)

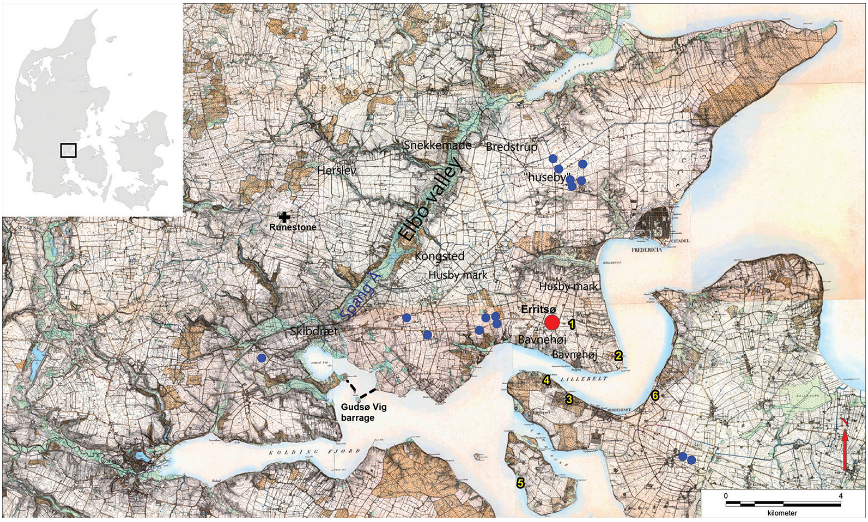

FIGURE 12.1 In cadastral maps of A.D. 1842–99 one sees that the Spang stream at the border of Elbo shire west of Erritsø may have been deeper and harder to cross before draining in the 19th and 20th centuries. On this map one sees with small, blue dots contemporary late Iron Age and Viking Age sites. Known beacons are labelled 'bavnehøje'. The numbers indicate prestigious silver deposits or finds. Nr. 1 is the Erritsø Treasure of 1380 grams of Permian silver rings and ingots from the east. Graphics: Vejle Museums.
ILLUSTRATION: THORSTEN LEMM

Francorum et Saxonum primores trans Albim fluvium ad confinia Nordmannorum, qui pacem cum eis secundum petitionem regum illorum a facerent et fratrem eorum redderent. Quibus cum pari numero nam XVI erant de primatibus Danorum in loco deputato occurrissent, iuramentis utrimque factis pax confirmata et regum frater eis redditus est. Qui tamen eo tempore domi non erant, sed ad Westarfoldam ‘ cum exercitu profecti, quae regio ultima regni eorum inter septentrionem *et occidentem sita, contra aquilonem Brittaniae summitatem respicit, cuius principes ac populus eis subici recusabant.*

From this passage we can infer that southern Norway and thus perhaps Kaupang were part of the Danish sphere of interest, at least in the early 9th century, so in all probability, Jutland was too.

Given this context, we will, in the following, describe evidence for a presumed fortified royal hall, which chronologically for one long-lived phase seems to coincide with the above-mentioned events. Whether it was Danes or Jutes who controlled this fortified hall is difficult to say, but circumstantial evidence suggests that this location at Erritsø was conceived and placed here out of a very specific strategic necessity. We shall return to this conclusion below.

2 Results

As new evidence shows, the fortified Viking Age halls at Erritsø to the west of the so-called royal residences in Zealand and Scania were probably established in the early 8th century A.D. The type of halls that we have excavated are identical to the well-known 8th—and 9th century halls from Lejre and Tissø, among other places. Excavations in the moat also identified a well from which a wooden plank could be dendrochronologically dated to have been felled after A.D. 779, thereby providing absolute dating evidence of a *terminus post quem* for one of the two hall units. Despite conforming to a well-known type of building, this hall complex in Erritsø is also somewhat unique being the only example of this type of hall in southern Scandinavia. This is so because the site also revealed a significant square defence system enclosing the hall, comprising a moat and palisade, and measuring 110 × 110 m (Figure 12.2). A similar but more conspicuous palisade and defence system is found at Jelling only 30 km to the north-west dating to the 10th century, however in this case without a moat.

Excavation revealed the moat to be up to two metres deep and V-shaped in profile. A few metres inside the moat there are traces of a palisade that may have been up to three metres high. The height is estimated from the postholes, which are at least one metre deep, suggesting it formed part of a significant structure. Modern experience suggests that around a third of a post needs to be in the ground to support a secure and sturdy palisade. There was evidence for planks placed on the inside of the moat, maybe to prevent the soil from the inner dyke from filling in the moat, and on the outside, there were in some places traces of stakes pointing obliquely outwards. Both would likely have hindered enemies from crossing the moat easily, suggesting that they were designed to have been functional and not merely symbolic. The structure was worthy of a warlord or a king!

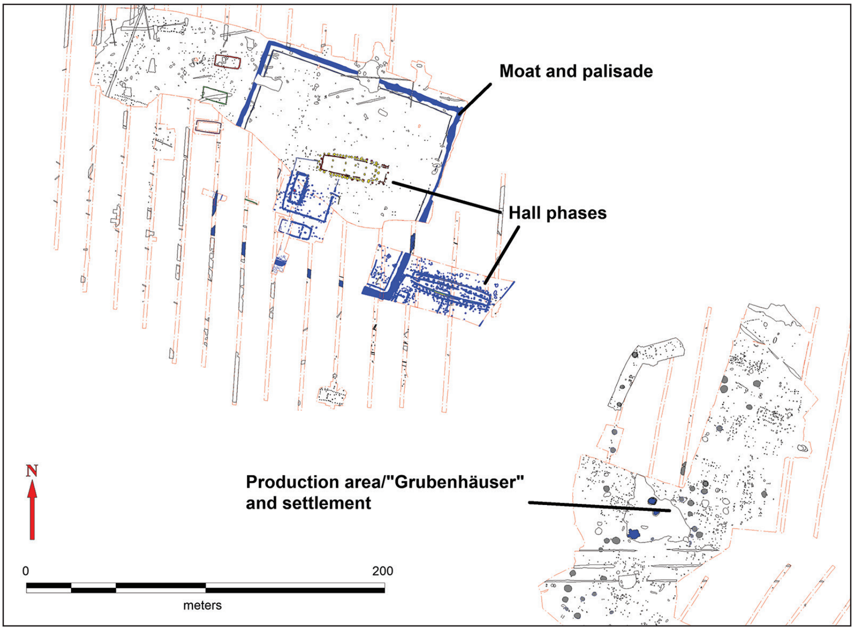

FIGURE 12.2 Overview over the entire area investigated with the elite area with the halls in the west and the production area with the sunken feature buildings or *Grubenhäuser* in the east. The *Grubenhäuser* underline that there was a significant production, possibly of sails associated to the elite residence. GRAPHICS: VEJLE MUSEUMS

The aim of the most recent research project and excavations has been to confirm the aforementioned observations.[3] In addition, it was also important to find out in more detail when and why the place was established and abandoned. These issues are important for several reasons. One is that these centuries before the late Viking Age in Denmark are poorly understood from the written sources, making archaeological evidence especially important for understanding this period. Second, the written sources describe the late 9th century as a time when several dynasties of kings fought each other. Given the military evidence recovered to date, the research might shed further light on this situation and the role

3 This is an ongoing research project. The site was discovered in 2006 by accident in a rescue excavation where only one third of the 10th-century hall was excavated. The rest was excavated by smaller and larger field research projects in the following years, first in 2016 (financed by the Beckett foundation), and annually between 2018–21 (financed by the Augustinus Foundation), and directed by the present authors. The two recent field seasons have additionally been conducted in collaboration with the field school of Aarhus University by Dr. Sarah Croix. The last years' focus has been on the sunken feature buildings/Grubenhäuser area, only a few 100 metres to the east (for an update see Ravn ed. 2024).

this site played. Therefore, the main goal of the project was to collect as many observations in the field and analyse as many scientific samples from secure contexts as possible, so that the dating framework could be narrowed down significantly. At present, there are questions whether activity at Erritsø can be directly related to the rise to power in the 10th century of the dynasty at Jelling,[4] or whether in Erritsø there lived a different itinerant dynasty, based principally in Zealand and Lejre, that had established a bridge-head here in Jutland. The architectural similarities between the Erritsø and Lejre halls might be evidence for the latter.[5] In this context, it is worth mentioning that a place-name of possible *huseby* type has been identified a few kilometres to the west of the Erritsø site, though no archaeological finds have substantiated this place's importance so far. As *huseby* names generally date to the 11th century and suggest that royalty was present, this could point to a kind of continuity in the area up into the time of the Jelling dynasty.[6] The other important goal from the recently completed studies was to find out when elite activity first became visible at the site, and in this regard the 2019 season held a number of surprises.

3 Interpretation and Historical Context

The investigations revealed that the Erritsø settlement was founded perhaps already in the late 7th or early 8th centuries A.D.[7] The excavations revealed approximately 60 m south-east of the proposed 9–10th century fortified hall

4 See Mads Ravn, Christian Juel, Charlotta Lindblom and Anne Pedersen, "Erritsø – new investigations of an aristocratic, early Viking Age manor in Western Denmark *c.* 700–850 AD," in *Early medieval Waterscapes. Risk and opportunities for* (*im*)*material cultural exchange*, ed. Rica Annbert (Neue Studien zur Sachsenforschung) 8 (Braunschweig: Ulwe Krebs, 2019), pp. 37–44; Christian Juel and Mads Ravn, "*Erritsø* – a fortified Early Viking Age manor near Lillebælt. New investigations and research perspectives," in *The Fortified Viking Age. 36th Interdisciplinary Viking symposium in Odense, May 17th 2017*, eds. Jesper Hansen and Mette Bruus (Kulturhistoriske Studier i Centralitet) 3 (Odense: South Danish University Press, 2018), pp. 16–25.

5 The latter thesis and the project as a whole are elaborated in Mads Ravn & Christian Juel. The Erritsø excavations in a Bayesian perspective. In, Mads Ravn ed, Viking Age Aristocratic Residences in Northern Europe. (Aarhus: Aarhus University Press 2024), p. 276–302.

6 Lisbeth Eilersgaard Christensen, "Husebyer in Denmark – *Husby* in Grejs parish, Nørvang hundred, and *Husby* in Ullerup parish, Elbo hundred," in *Husebyer – status quo, open questions and perspectives. Papers from a workshop at the National Museum, Copenhagen 19–20 March 2014*, eds. Lisbeth Eilersgaard Christensen, Thorsten Lemm and Anne Pedersen (Publications from the National Museum, Studies in Archaeology and History) 20, no. 3 (Copenhagen: Jelling Series, 2016). p. 56–57.

7 Mads Ravn *et al.*, "*Erritsø* – new investigations"; Juel and Ravn, "*Erritsø* – a fortified Early Viking Age manor".

described above, another hall, 50 m long and 12 m wide which later has been dated to the 8–9th centuries.[8]

Observations from the excavations of the second hall show that it consisted of three phases, which means that it was renovated at least twice (see Figure 12.2). If each post building stood for 30–50 years before it had to be renovated, the hall may have had a total lifespan of up to 150 years, which in many ways represents a significant duration in the landscape. Indeed, taken together, the two neighbouring halls have five construction phases, potentially representing 250 years of continuous occupation at the same site, i.e. within a radius of 60 m.

It is important to know how long people have lived in the area, because it firstly supports the importance of the place in its context, and secondly in terms of power. Thirdly, it is important because the site's long continuity and the shape of the hall can be compared to elite localities on Zealand, especially Tissø, Lejre and Järrestad in Scania, places that have been linked to the early kingdoms of Denmark.[9] These last three places mentioned, also stand out for having similar long site continuity.

4 The Chronological and Spatial Distribution of the Halls

From initial observations it appears as if the two halls respected each other, meaning that they could have been contemporary in several phases. However, through excavation it was shown that one of the fences found around the inner courtyard is cut by the moat from the younger fortified hall, which we date to the 10th century. In the absence of other dates or observations, this suggests that the hall furthest to the east is the oldest, at least for some time during its existence, as also typology suggests. It is also interesting that this hall to the east does not have a moat and palisade, as the younger hall to the west does from the 10th century. There is not the same investment in defence applied to the eastern hall (Figure 12.2). Why in the 9th century did they move a large hall 60 m to the west, enclosing it behind a massive palisade?

One hypothesis could be that the oldest hall played a role in the disciplinary campaign of Louis the Pious (A.D. 814–40) recorded in the Royal Frankish Annals (*Annales Regni Francorum*). In summary, the account is as follows:

In the spring of A.D. 815 the Emperor Louis the Pious sent an army of Saxons and Obotrites to Jutland. The goal was to fight the kings of the Danes. After the

8 Mads Ravn & Christian Juel. The Erritsø excavations in a Bayesian perspective. In, Mads Ravn ed, Viking Age Aristocratic Residences in Northern Europe. (Aarhus: Aarhus University Press 2024), p. 276–302.

9 Tom Christensen, "*Lejre bag myten*".

sons of King Godfred (A.D. 799–810) came to power, they would not recognize the peace at the border of the Frankish kingdom.

The exiled king Harald Klak (d. A.D. 842), who had previously been part of a dual kingdom of Denmark, helped incite the conflict on behalf of Emperor Louis. According to the Royal Frankish Annals, Emperor Louis' troops failed in contacting the army and navy of the sons of Godfred. After a seven-day march from the Elbe River, the army of Saxons and Obotrites reached an unnamed place, which we believe—given the distance such an army might travel in seven days—was located at the Little Belt. The army waited there for three days while Godfred's sons with a fleet of 200 ships, according to the Annals, were hiding "on an island three miles from the mainland". Three miles suggest that it may have been by the Little Belt, south of *Erritsø*, though we cannot pinpoint it more precisely. The forces returned to the emperor, "after ravaging the entire surrounding country and having been given forty hostages by the people".[10] They reached Paderborn in July.[11]

Given their presence in the area, maybe the army ravaged the Erritsø site and burned it down? If so, we should find extensive traces of charcoal, which indeed was found in the early hall towards the east that did not have a moat and palisade.[12] Following from this it is possible that the fortified palisade and moat were built after A.D. 815, as our relative and absolute datable evidence would also seem to suggest. Following the bad experiences from this invasion, it would have become obvious that Erritsø was an important, strategic hub in the defence of Jutland—a realization that was also reached many centuries later with Fredericia, which was established in 1650, 5 km to the north, following the Swedish invasion of Jutland and Denmark during the Thirty Years' War.

10 Bernard Walther Scholz, *Carolingian Chronicles*, 99. *Annales Regni Francorum*, 106: "Iussum est ab imperatore, ut Saxones et Abodriti ad hanc expeditionem praepararentur, temptatumque in illa hieme duabus vicibus, si Albia transiri posset, sed mutatione subita aeris emolliti glacie fluminis resoluta negotium remansit inperfectum, donec tandem hieme transacta circa medium fere Maium mensem oportunum proficiscendi tempus adrisit. Tunc omnes Saxonici comites omnesque Abodritorum copiae cum legato imperatoris Baldrico, sicut iussum erat, ad auxilium Harioldo ferendum trans Egidoram fluvium in terram Nordmannorum vocabulo Sinlendi perveniunt et inde profecti septimo tandem die in loco, qui dicitur …, in litore oceani castra ponunt. Ibique stativis triduo habitis, cum filii Godofridi, qui contra eos magnis copiis et ducentarum navium classe conparata in insula quadam tribus milibus a continenti separata residebant, cum eis congredi non auderent, vastatis circumquaque vicinis pagis et acceptis popularium obsidibus XL ad imperatorem in Saxoniam reversi sunt. Ipse enim tunc temporis in loco, qui dicitur Padrebrunno, generalem populi sui conventum habebat".

11 For an elaboration see also Kasper Holdegaard Andersen, "Failure or success. New Perspectives on the Frankish invasion of Jutland in AD 815," in *Aristocratic Residences in Northern Europe*, ed. Mads Ravn (Aarhus: Aarhus University Press), 2024. pp. 197–210.

12 Ravn & Juel 2024.

In short, the site was a fall-back position placed in a strategically important place, and the landscape good for observing and potentially defending against an advancing army or navy. In that latter case, it is the occupants of the older hall, without fortifications, who would have been the victims of Louis' assault. We found a dirham in the top layer of the moat. According to the National Museum, it is dated between A.D. 750–815, which does not exclude that the place was built after A.D. 815. This latter hypothesis may explain why the occupants moved from an otherwise stable hall, rebuilt at least twice, which had stood there for 150 years or more, 60 m, up the hill to the west and even built a massive moat and a 3 m-high palisade.

5 The Landscape of Power

Another way to substantiate the hypothesis that this place had an important strategic function is to look at the site in a larger perspective. The V-shaped moat at Erritsø is reminiscent of the somewhat later moat excavated at Kovirke beside the Danevirke fortification, near Hedeby, 111 km to the south,[13] which beyond doubt was made with the aim of stopping an invading enemy from the south from entering Jutland. Taken together with these other defensive works, one could imagine that the fortified hall at Erritsø played an important role within the strategic concept of a of defence-in-depth, functioning as a fall-back position. Defence-in-depth is a military strategy that deploys defenders across multiple sites, including well behind the front line to slow and weaken attackers, cutting off the supply lines while one may hide the actual army at nearby islands, evading a direct confrontation. It was often used to defend Jutland half a millennium later, because the land is so flat and difficult to defend.

In a recent paper by Jens Ulriksen, he points out that there are several prominent high points in the Little Belt area, from where one can make early warnings, as evidenced on Figure 12.3. Triangles of different shades indicate high points ranging from 19 m (light) to 30+ m above sea level (dark). Ulriksen's analysis suggests that the Little Belt is not easily accessible from the sea if anyone on land was watching.[14] For that reason there need not have been any sophisticated advanced warning system. The duty of raising the alarm could have been fulfilled by any peasant in the field, who according to the regulation of the clan was required to ignite a fire-beacon on some prominent point,

13 Hellmuth. H. Andersen, *Danevirke og Kovirke. Arkæologiske undersøgelser 1861–1993* (Aarhus: Moesgaard Museums Skrifter, 1998), p. 154.

14 Jens Ulriksen, "Navigating past Erritsø in the Viking Age," in *Aristocratic Residences in Northern Europe*, ed. Mads Ravn (Aarhus: University Press, 2024), pp. 246–262.

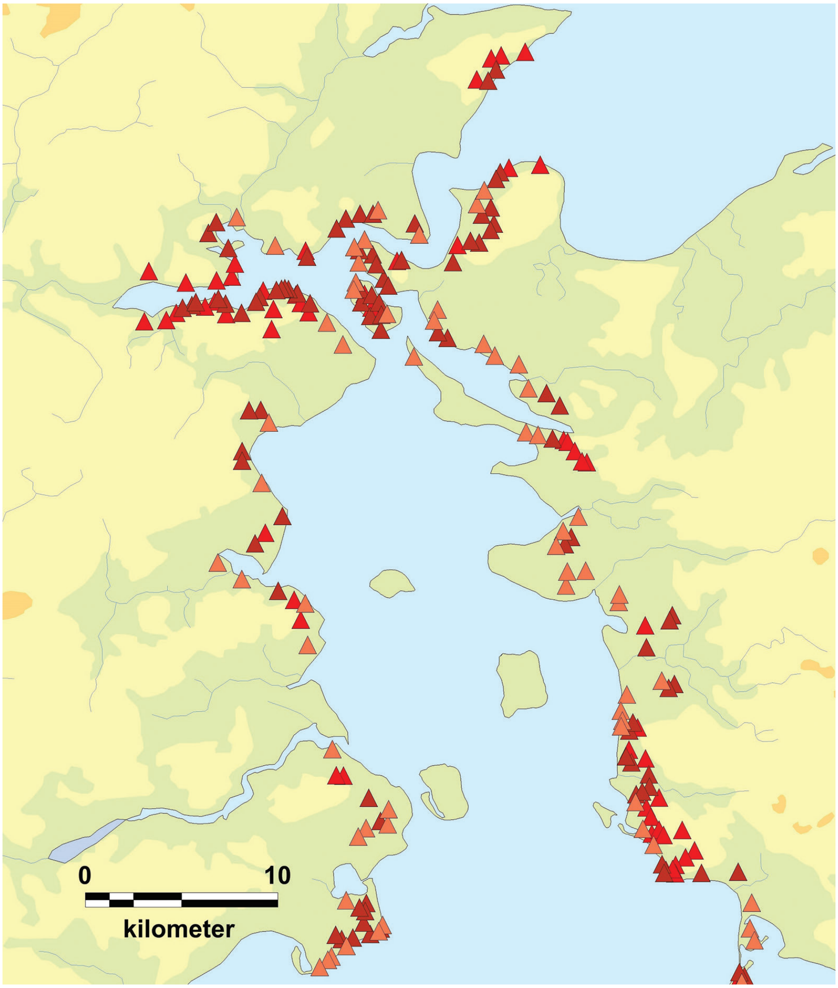

FIGURE 12.3 High points in the landscape along the coast of Lillebælt. Light triangle: 15–19 m above modern sea level (a.m.s.l). Darker triangle: 20–9 m a.m.s.l. last triangle: 30+ m a.m.s.l.
ILLUSTRATION BY JENS ULRIKSEN (BY PERMISSION); SEE ALSO ULRIKSEN 2024

using a similar method (albeit much less organized and militarized than in the 10th century), to that discussed by Lemm for the Schlei inlet.[15] Unlike Lemm's

15 Thorsten Lemm, "Protecting Hedeby – Reconstructing a Viking Age maritime defence system based on visual Communication," in *Early medieval waterscapes. Risks and opportunities for (im)material cultural exchange.* ed. Rica Annaert (Neue Studien zur Sachsenforschung) 8 (Braunschweig: Ulwe Krebs, 2019), pp. 101–14; Lemm, this volume.

study the Little Belt has far fewer place-names relating to beacons, although there are two lying close to the Erritsø site. However, Ulriksen has identified several natural landing sites in the area.[16]

Evidence that supports a defensive aspect to the Erritsø site is that it is located within a few kilometres of one of Elbo shire's highest points. This position provides excellent views into the southern Kattegat to the north and towards the funnel-shaped narrowing of the Little Belt to the east and south, given trees and present bridges were not numerous. GIS viewshed analysis shows that a person of 180 cm height would have been able to see several kilometres out into the inner seas of Denmark, the Kattegat, and over 10 km to the south through the Little Belt (Figure 12.4). To the south-south-west, there has also been a good view of the Stenderup peninsula and thus the entrance

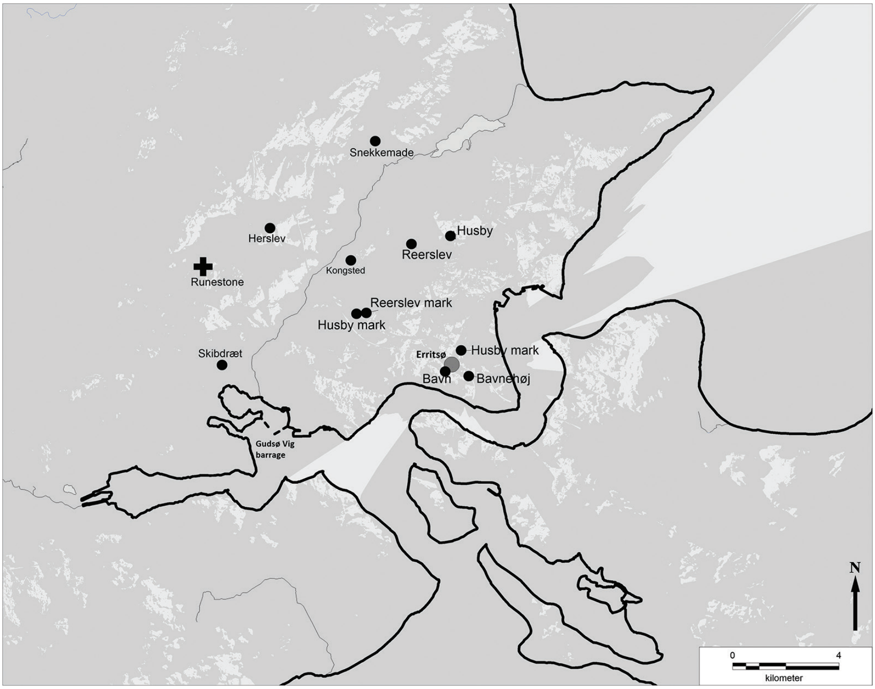

FIGURE 12.4 Viewshed analysis demonstrating the view of a person of 180 cm and how far he or she can look, provided there is not a lot of vegetation. The shade in the middle of the view towards north-east is due to present bridges, so they should be ignored. Also, several place-names suggest a concentration of power, war and royalty and ships.
GRAPHICS: AARHUS UNIVERSITY AND MOESGAARD MUSEUM'S IT DEPARTMENT

16 Ulriksen, "Navigating past Erritsø".

to Kolding fjord and Gudsø Vig where we assume a military, possibly a *leding* harbour was located. It is an obvious place for keeping a larger fleet, with its kettle-shaped bay, well-protected from the weather and placed below hills of 25 metres above mean sea level, as we will return to below. Furthermore, Anne Nørgaard Jørgensen has claimed that Gudsø Vig exhibits "all the features that are logistically and strategically important to a fleet-mustering locality".[17]

Almost midway through the Little Belt, south from Erritsø a small bay at *Hejlsminde* provides a well-protected natural haven, surrounded by several prominent points. Here, a landing site with sunken featured buildings from the Viking Age has been partly excavated.[18]

This analysis seems to support the contention that the site was optimal as a place from where the inhabitants with the help of large beacons on high mounds along the coast could quickly muster a defence within a radius of several hundred kilometres. Compared with the nearby Schlei region, where it has been argued a complex system of communications existed in the 10th and 11th centuries,[19] there is a dearth of beacon place-names around Erritsø. Perhaps this due to there being a less organized and stratified society in the 8th and 9th centuries, for which dynamic, bottom-up and less-centralised systems of communication sufficed. Perhaps, this also reflects the nature of the terrain. The Little Belt with its funnel shape was by nature very easy to defend, so there was less need of a centralized initiative.[20]

In addition, the inhabitants of the catchment area would be able to retreat behind the moat and palisade in Erritsø to defend themselves, while ships and auxiliary troops could hide on the Funen side, as described in the Royal Frankish Annals. There is a possible beacon hill 300 m from Erritsø on the coast to the Little Belt, being the second largest peak in the area, surpassed only by the hill upon which the 9–10th century hall is located.

With regard to the visibility from Erritsø, pollen analyses from the moat suggest that vegetation in the area did not consist of many trees,[21] meaning that

17 Anne Nørgaard Jørgensen, "Danish naval complexes in the Late Iron Age and Viking Age. The Gudsø Vig barrage in perspective," in *The Martial Society. Aspects of warriors, fortifications and social change in Scandinavia*, eds. Lena Holmqvist Olausson and Michael Olausson (Stockholm: Stockholm University, 2009), p. 82.

18 Anders Hartvig and Mette Sørensen, "Et indblik i den ældre og højmiddelalderlige bebyggelsesstruktur i Sønderjylland," in *Landbebyggelsens struktur Middelalderens rurale Danmark*, eds. Mette Svart Kristiansen and Lars Christian Bentsen (Aarhus: Jysk Arkæologiske Selskabs skrifter, 2021), pp: 33–50.

19 Lemm, "Protecting Hedeby," pp. 101–14; Lemm, this volume.

20 Ulriksen 2024.

21 Ravn et al., "*Erritsø* – new investigations"; Juel and Ravn, "*Erritsø* – a fortified Early Viking Age manor".

one could see much further in the past than today, when trees and two modern bridges obscure the view.

The strategic and defence-in-depth location of the Erritsø halls underlines the landscape of power in the early Viking Age. High points at a distance from the sea along the entire Little Belt, command good views at sea and inland and provide a means of defence, as perfect, strategic locales. Similar sites with a focus on the inland and defence have recently been found in Central Jutland.[22] But the intersection of both land and the sea is in Denmark only seen exactly at Erritsø, which in terms of defence makes this site unique. This may be why the site features defensive structures (a moat and palisade), which are not found at otherwise similar sites in Zealand. Political events like those in A.D. 815 shaped this defensive calculation, which only became more important in historic times. The Erritsø site, which within a few kilometres is the highest point in Elbo shire, meets all strategic requirements. It is also located in the middle of modern-day Denmark, at a node for all transport by sea, north-south via the Little Belt, and by land, east-west between Funen and Jutland, where the later ferry crossing from Middelfart to Snoghøj continued at least from the High Middle Ages until 1935. Indeed, the ferry berth of Snoghøj is situated just 2 km from Erritsø and was most likely already a crossing point in the Viking Age, although we have not found any clear traces in Snoghøj or Middelfart yet (see Figure 12.1, no. 2). In addition, the ancient country road from Snoghøj towards Kolding passes 70 m south of the fortified Viking Age hall, funnelling into a narrow, possibly wet passage at Gudsø close to where the name *Skibdræt* is in Figure 12.1.

The defensive dimensions of the site are further supported by the local terrain. The Elbo valley of the Spang stream to the north-west acts as a barrier, making Elbo shire very island-like. From the north-west one cannot easily cross the swampy Elbo valley, with hills of up to 40 m all the way up to Rands fjord (Figures 12.1, 12.4 and 12.5). Spang stream today looks unimpressive, but by adding layers of landscape data together with modern LiDAR data and comparing these with military maps of the 18th and 19th centuries, we get an idea of its potential for defence: the area was easily defensible with few troops from the landward side because wetlands make passage very difficult.

Maps from the 17th century when Swedish forces invaded Denmark during the Thirty Years' War, show that Elbo shire only had three passages over the

22 Mads Dengsø Jessen and Kamilla Fiedler Terkildsen, "Towering above: an interpretation of the Late Iron Age architecture at Toftum Næs, Denmark," *Danish Journal of Archaeology* 5 (2016), pp. 52–71. https://doi.org/10.1080/21662282.2016.1248592.

Sprang stream. These military maps suggest that one only had to place a few troops at these focal passages to defend them. Figure 12.5 depicts a base camp of troops at Bredstrup that controls the road crossing the Spang stream. Swedish troops were also present at Bredstrup and Kongsted ('King's place'), where there is a possible crossing, and near Gudsø (probably comprising the nouns 'god' and 'lake'), where the only narrow, passable road south to Kolding is located.

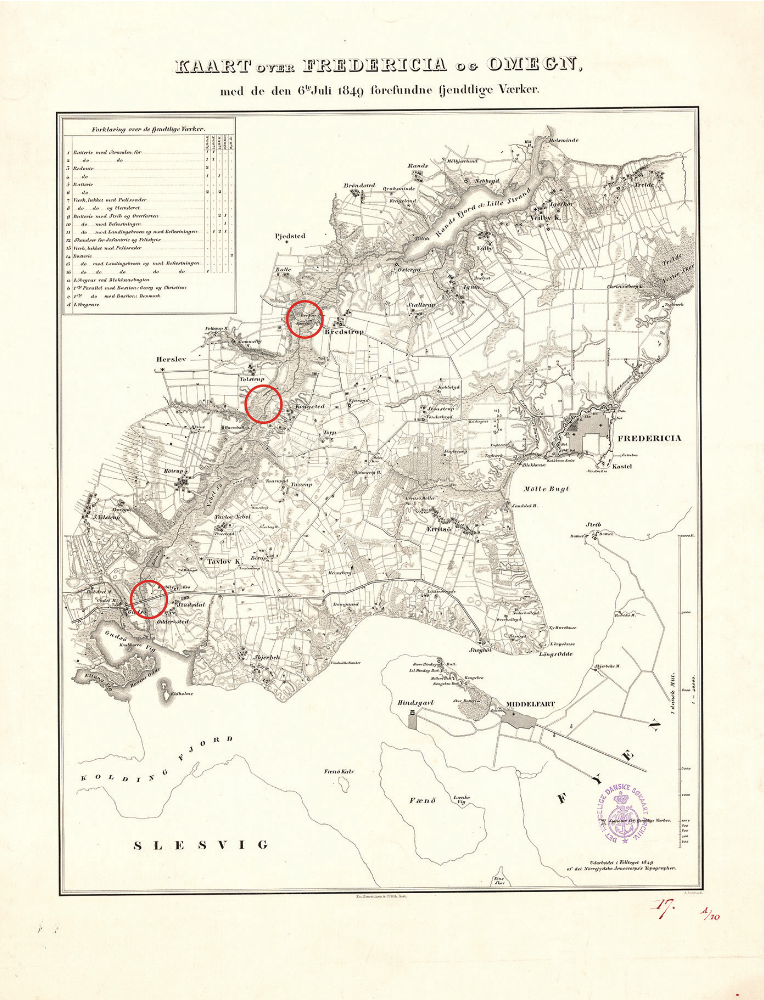

FIGURE 12.5 A 19th-century military map, showing the garrison town of *Fredericia* and one of the focal transition points at Bredstrup where the Swedes had their basecamp. Possibly, another focal point was at *Kongsted* and at Gudsø at the cove, making it possible to defend the west with few troops.
ILLUSTRATION: VEJLE MUSEUMS

We have suggested above that Gudsø was the location of a naval harbour. Old maps and LiDAR data suggest that it may have been possible to pull the ships up from there along the Spang stream, as before it was drained, the stream was significantly wider. Place-names support this idea. The maps show a place-name *Schiptrupmuhl*, today called Skibdræt, both of which have the prefix *schip* or *skib*, meaning 'ship'. Further indications for a possible marine workshop are suggested further north along the stream by the place-name Snekkemade, *snekke* being suggested by other research to have been related to ships.[23]

In sum, there seems to be at least a 1000–year continuity for this area functioning to stop invading armies from the dutchies of Schleswig and Holstein marching along one of the few dry roads of Jutland past Kolding. Erritsø needed to be placed where it was to stop any forces breaking through the Danevirke 111 km to the south from moving further north. Those who controlled this area also controlled the passage to Funen and the rest of Denmark. One could only enter this way if one had a substantial navy. Additionally, as in the wars in 1849 and 1864, one could attack the enemy in the flank if they decided to move on northwards up into Jutland, making the Erritsø location key to a national defence. The weakness of Jutland and its strategic importance is even seen in recent invasion plans from the Cold War.[24] This recent revelation exposes the all-time landscape-given weakness of defending Jutland, an imperative that demands a defence-in-depth strategy where the area exactly around Erritsø played the role of a second, strategic fall-back position.

6 Place-Names Indicating Royalty and Power

The defensive dimensions of the area are also suggested by place-names. Although place-names are problematic to date, several onomasts have pointed out that place-names like Herslev, 'a place for the (DA *hær*) army' and Kongsted, the 'King's place', emphasise Elbo shire's significance in terms of defence and power. In addition, place-name researchers have also confirmed that one of the well-known *husebyer* is found in the area (see Figure 12.1).[25] Locations

23 Bente Holmberg and Jan Skamby Madsen, "Da kom en snekke … Havnepladser fra 1000- og 1100-tallet," *KUML* 1997–98 (1998), pp. 197–225.

24 https://coldwarsites.net/country/denmark/ Accessed 2025 Oct 17.

25 Christensen, "Husebyer in Denmark," pp. 55–67.

bearing such a name in other parts of Scandinavia have been associated with the presence of royal elite.[26]

New research by Sofie Laurine Albris reinforces this impression.[27] She suggests that Erritsø may be associated with the royal name '*Erik*', which derives from the ON **aina-rīkiaʀ*. This word originally meant the 'almighty sovereign', i.e. a supreme king who is recognized by other kings. Stefan Brink has analysed a similar place-name on *Öland* in Sweden, called Eriksör.[28] Independent of Albris, he interpreted this name to mean: 'the hill where the paramount king lives'.[29] It is therefore reasonable to suggest a similar meaning for Erritsø,[30] that is 'the hill on which the almighty paramount king lives'. In this connection, one should remember as mentioned earlier that the Erritsø site is located at one of the highest points in Elbo shire.

7 The End of Erritsø

As indicated at the beginning of this chapter, we are also concerned with the dynamics between Jelling and the Erritsø site. Was there a relationship? Did the Jelling dynasty base its power by collecting tribute at the Little Belt, surely a very lucrative business for a king who must provide food and weapons for his army? Or is the place, as the architectural details in the house construction suggest, part of an East Danish hegemony? The similarity in details between the halls at Erritsø, Lejre and Tissø, the latter two both in Zealand, substantiates, we think, that it must be the same developer who is behind these sites; leaning towards the latter hypothesis. The most recent dating evidence, however points towards the former hypothesis, especially as the dates from the

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26 Thorsten Lemm, "Husby and the equestrian graves in Angeln and Schwansen – Different chronological stages in the development of a royal administration?" in *Aspects of Viking Age Urbanism, c. 750–1100. Ancient Centres, Special Economic Zones and – Restarteds*, eds. Lena Holmquist, Sven Kalmring and Charlotte Hedenstierna-Jonson (Thesis and papers in archaeology) B (Stockholm: Stockholm University 2016), pp. 97–113.

27 Sofie Laurine Albris, "Navnedannelser på – lev og jernalderens samfundsstruktur," *NORNA* 92 (2015), p. 26; see also https://arcnames.w.uib.no/2019/11/04/a-name-fit-for-a-king/.

28 Stefan Brink, "Social order in the early Scandinavian landscape." in *Settlement and Landscape*, eds. Charlotte Fabech and Jytte Ringtved (Højbjerg: Jysk Arkæologisk Selskab, 1999), p. 431.

29 Brink, *Social order*, p. 431. Here he also mentions Eriksgata, "a route a newly elected king in early Sweden had to travel to get acquainted with and accepted by peoples in different lands in this realm".

30 Christensen, "Husebyer in Denmark," pp. 55–67.

moat's youngest layer suggest that it was filled up in the 10th century. New investigations may change this hypothesis.

8 Conclusions

There are still many unanswered questions about the Erritsø site, and the Vejle Museums, together with the National Museum and Aarhus University look forward to carrying out more research on the many samples that have been collected. We also look forward to applying more small field surveys to confirm or reject some of the above observations and ask new questions for future surveys that could help to solve the 'Game of Thrones' of early kingdoms in Denmark, a 'game' in which we are certain this site played a vital role.[31] Also, a larger perspective on the entire defensive aspects of the landscape needs to be developed further than has been possible here.

We do not know if the king who came here was called Erik. There is, however, a rune stone 40 km to the south, on which an 'Erik' is named, supporting the idea that the name was in use already in the 8th century.[32] The sources suggest that kings named Horik I and II ruled for most of the 9th century, but this does not exclude that there was another named Erik, as the Royal Frankish Annals also reveal that there are several cases in this period where two kings ruled together.[33] Moreover, Saxo's account of Horik refers to him as Erik.[34] Whether this means that there is a grain of truth in Saxo's accounts, as the revelations of the Lejre halls seem to suggest, or that several foreign writers reproduced the names differently depending on how they heard about them second hand must for the time being remain uncertain.[35] Alternatively, it is the concept of supreme king that has formed the basis for the transmission of the place-name.

31 For a further substantiation of this we refer to the newly published book, backing up many of the proposed hypotheses only outlined here, see Mads Ravn eds, Viking Age Aristocratic Residences in Northern Europe. (Aarhus: Aarhus University Press 2024).

32 See Sofie Laurine Albris' blog: https://arcnames.w.uib.no/2019/11/04/a-name-fit-for-a-king/; see also Ravn & Juel 2024, p. 295, note 59 and 60.

33 See also Mads Ravn, "Roads to complexity. Hawaiians and Vikings compared," *Danish Journal of Archaeology* 7 (2018), pp. 119–32.

34 Saxo Grammaticus, *Gesta Danorum*, liber 9.6.0.http://wayback01.kb.dk/wayback/20100504153355/http://www2.kb.dk/elib/lit/dan/saxo/lat/or.dsr/9/6/index.htm.

35 See note 32.

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CHAPTER 13

Beacons and Ship-Levy Organisation in Western Norway in the Viking Age and Early Middle Ages

Marie Ødegaard

1 Introduction

Beacons or fire signals played a crucial role in alerting populations, mobilising military responses, and for communicating between places. Beacons—individually or as elements of a system—are attested across the world from ancient times and well up into the modern era.[1] Despite this, few beacon sites have been mapped, dated and studied in a regional and cross-national perspective. This means that beacons have unexplored potential to reveal past periods of war and militarisation in Europe and across the world, including aspects of civil defence and groups of people engaged and affected by it. Where were the beacons located in the landscape and how did the beacon organisation function in the communities?

To discuss this, I will use a case study from the Hardanger fjord region of western Norway, consisting of the historic regions of Sunnhordaland and Hardanger (Figure 13.1). The area around the inlet to the Hardanger fjord was the southern part of the historic *Horðafylki* (Sunnhordaland county), part of the Gulathing Law area in the Middle Ages, held to have been established in the early 10th century.[2] The region in the inner part of the fjord is called Hardanger and may have been a later inclusion in the law province, added perhaps as late as the late

1 E.g. Rolf Scheen, "Norges viter," in *Den norske leidangen* (Oslo: Sjøforsvarets overkommando, 1951); John Baker and Stuart Brookes, "Signalling Intent: Beacons, Lookouts and Military Communications," in *The Material Culture of the Built Environment in the Anglo-Saxon World*, eds. Maren Clegg Hyer and Gale R. Owen-Crocker (Liverpool: Liverpool University Press, 2015), pp. 216–34; Tiffany Earley-Spadoni, "Landscapes of warfare: Intervisibility analysis of Early Iron and Urartian fire beacon stations (Armenia)," *Journal of Archaeological Science: Reports* 3 (2015), pp. 22–30.; Daniel Walker Moore, "Proof Through the Night: Prepresentations of Fire-Signaling in Greek Historiography." *Histos* 9 (2017), pp. 108–27; Nagendra Singh Rawat, Tom Brughmans, Vinod Nautiyal and Devi Dutt Chauniyal, "Networked medieval strongholds in Garhwal Himalaya, India." *Antiquity* 95, no. 381 (2021), pp. 753–2.

2 Knut Helle, *Gulatinget og Gulatingslova* (Leikanger: Skald, 2001), p. 27.

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FIGURE 13.1 The case-study areas Hardanger and Sunnhordaland, marked on a map of Norway
ILLUSTRATION: MARIE ØDEGAARD

12th or early 13th century.[3] If so, this may provide an example of two regions cooperating across different law provinces. In all, 17 possible beacons are known from the area and will be discussed here.[4]

In Norway, the beacons were directed at attack from the sea and not land. The sea and waterways were the main roads for communication up to the 18th

3 Frode Iversen and Jan Brendalsmo, "Den tidlige kirkeorganisasjonen i Bergen bispedømme," *Collegium Medievale* (2022), pp. 43–44.

4 Olaf Olafsen, *Viter paa Sørlandet og Vestlandet i eldre tider* (Kristiania: Norsk Folkekultur, 1920), p. 26; Scheen "Norges viter," p. 289; Geir Atle Ersland, "Kongshird og leidangsbonde," in *Krigsmakt og Kongemakt 900–1814,* eds. Geir Atle Ersland and Terje H. Holm (Norsk Forsvarshistorie) 1 (Bergen: Eide Forlag, 2000), p. 58.

century.[5] When enemies were spotted and the beacons lit, their signals alerted the population in a ship levy-district – a so-called *skipreiða in* Old Norse (ON) – to summon the ships. In the Viking Age and early Middle Ages (c 950–1400), the beacon system was organised in relation to the maritime defence: the ship-levy organisation (ON *leiðangr*).[6] According to the saga of king Haakon the Good, he was responsible for organising the beacon system in Norway in *c* A.D. 950. This saga, written down in the 12th–13th centuries, describes a nationwide system that allow the whole country to be mobilised within seven days.[7] It is more likely that the system originally was arranged regionally under different chieftains before it became nationwide, perhaps sometime in the first half of the 12th century.[8] The antiquity of the system(s) is unknown.

Beacons and the ship-levy organisation had a symbiotic relationship in which both elements benefitted. The levy system was depended on the beacons to identify warships and threats. The provincial laws of the Gulathing, dating from the 11th to 13th centuries, required a sighting of at least five warships for lighting a beacon, and there were severe punishments for failing to light beacons when facing attacks.[9] Magnus the Lawmender's Laws of the Land (1274)[10] required three warships before lightning the beacon, but then the ships were larger and could take more men.[11] The ship districts were, in addition to being discharge and mobilisation units for the ship-levy, also judicial assembly districts.[12] As such, the levy and the beacon organisation were closely connected to the judicial assembly organisation, the *thing*. The king had to negotiate

5 Arnvid Nedkvitne and Per G. Norseng, *Middelalderbyen ved Bjørvika. Oslo 1000–1536* (Oslo: Cappelen forlag, 2000), p. 183.

6 Halvard Bjørkvik, "Skipreide," in *Kulturhistorisk leksikon for nordisk middelalder* XV (København, Helsingfors, Reykjavík, Oslo, Stockholm: Rosenkilde og Bagger, 1982), pp. 546–51; see also papers by Iversen, this volume; Lemm, this volume.

7 Snorre Sturluson, *Håkon den godes saga*, trans., Anne Holtsmark and Didrik Arup Seip (Norges kongesagaer) 1:1 (Oslo: Gyldendal Norske Forlag, 1979), ch. 20.

8 E.g. Ersland "Kongshird og leidangsbonde," p. 56.

9 *Gulatingslovi*, trans. Knut Robberstad (Norrøne bokverk) 33 (Oslo: Det Norske Samlaget, 1969), chap. 311; *The Older Gulathing Law*, trans. Eric Simensen (Medieval Nordic laws) (London and New York: Routledge, 2021).

10 Also called Code of the Norwegian Realm, the National Law, or The Landslov.

11 *Magnus the Lawmender's Laws of the Land*, trans. Jóhanna Katrín Friðriksdóttir (London: Routledge, 2024); Magnus Lagabøtes Landslov, trans., Jo Rune Ugulen Kristiansen (Oslo: Nasjonalbiblioteket, 2024).

12 Sarah Semple, Alexandra Sanmark, Frode Iversen and Natascha Mehler, *Negotiating the North. Meeting-Places in the Middle Ages in the North Sea Zone* (The Society for Medieval Archaeology Monograph) 41 (Routledge; London and New York, 2020): pp. 140 and 170, and *passim.*

with the farmers of their contributions to the ship-levy at *thing* meetings.[13] The beacon system is thus connected to administrative districts and fixed sites with multifunctional elements. This will be investigated further in the paper.

Together, documents, place-names and landscape archaeology makes it possible to reconstruct elements of the signalling and sighting systems and to define the spatial extents of these military networks. It is important to identify the main and local beacons, and if there were changes in their locations. The aim here is to study their distribution and signalling, and the way in which they operated within the ship-levy system of the local communities.

2 Background and Method

How the beacon systems worked is described in various Scandinavian legal sources from 1150–1604, in 13th-century prose (sagas), late medieval military records, and historical maps. The beacons consisted of massive timber logs put up in a cone form (Figure 13.2).[14] In addition, the beacon sites consisted of guardhouses and perhaps wind breaks. These houses are mentioned in Magnus the Lawmender's Laws of the Land from 1274.[15] Few traces can be found at beacon sites today, and even fewer are excavated and dated.

Place-names are an important source for plotting the distribution of beacons and can sometimes give a relative age to the site. There are approximately 800 place-names suggested to relate to beacons in Norway,[16] however, this list includes younger place-names and sites based on oral tradition, thus sites that may not be beacons at all.[17] To investigate this, it is important to know the difference between the place-names that might refer to beacons in Norway.[18] The ON word for beacons is *víti* (modern Norw. *vete*) and these sites may be from the Viking Age (A.D. 800–1050) or the following medieval period.

13 Per Sveaas Andersen, "Ting," in *Kulturhistorisk leksikon for nordisk middelalder* XVIII (København, Helsingfors, Reykjavík, Oslo, Stockholm: Rosenkilde og Bagger, 1982), pp. 350–59.

14 Fredrik Kvarme Skoglund, *The coastal defence in Scandinavia: The role and composition of the military organisation in the Viking and Early Middle Ages*. Unpublished MPhil Thesis (University of St Andrews, 2003), p. 53; see below.

15 *Magnus Lagabøtes Landslov,* chap. VII, § 4.1; *Magnus the Lawmender's Laws of the Land,* Land defence section.

16 Scheen "Norges viter".

17 See also Iversen this volume.

18 See also the Introduction to this volume, as well as articles by Lemm this volume and Iversen this volume.

FIGURE 13.2 The reconstructed Olberg beacon in Valdres
PHOTO: KATHARINA SPARSTAD/VALDRES NATUR- OG KULTURPARK

In Christian IV's Law from 1604, however, there was a mix-up in. The Danish scribes did not understand the term for the 'beacon watchmen' (*vita vorðu*), which originally was a term for the men manning the beacons and not the construction itself, and they translated it into a "wood cairn" (ved varder).[19] Thus, the ON word *vörðr* is mixed in and complicating modern interpretations. This word has several meanings, including "to guard".[20] After this, a beacon is termed *varde*, from the ON *várda*, which is, among other things, names for piles of stones or stone markings, which are used to mark safe routes over land and sea.[21] A beacon (*vete*), on the other hand, refers specifically to a signal fire.[22] It is likely that several *-vard* names are young and refer to directional markers, but examples are known where these names have replaced older *-viti* names. This must be investigated in each individual case. In addition, there are some names that are compound with other watch-keeping place-name

19 *Kong Christian den Fjerdes norske Lovbog af 1604* [Christian IV's Law of 1604], eds. Frederik Hallager and Frederik Brandt (Det akademiske Kollegium ved Det Kongelige Norske Frederiks Universitet. Christiania: Carl Werner, 1855), chap. II, § IV.

20 Johan Fritzner, *Ordbog over Det gamle norske Sprog*, 3 vols (Kristiania: Feilberg & Landmark), 1886, no. 1, p. 973.

21 Fritzner, *Ordbog* 2; Christer Westerdahl, "Ancient Sea Marks. A Social History from a North European Perspective," *Deutsches Schiffahrtsarchiv* 33 (2010), pp. 131–132.

22 Fritzner Ordbog 1: p. 973; Skoglund, *The coastal defence*, pp. 46–47.

elements, such as 'watch', 'fire', 'burn',[23] which are difficult to date, but can be medieval or maybe from the Viking Age or even older.[24]

3 Case Study: the Beacon- and Levy Organisation of Sunnhordaland and Hardanger, Western Norway

To discuss how the beacon systems operated in local communities, I will use the region of Hardanger, western Norway, as a case-study. Place-names, beacons and ancillary structures are mapped in a GIS for visual analysis. Other components of a military system, such as mustering sites, boathouses[25] (naust), assembly sites and medieval churches can provide information about the scales of communication. It may also give indirect evidence for the age of the system. As mentioned, beacons were organised in relation to the ship-levy system. The known medieval administrative areas can thus be used to shed light on the districts for the people manning the beacons and being responsible for supplies and equipment for the levy and watchmen.

The Hardanger fjord region is mountainous, with settlements mainly located along the branching fjord – an important line of communication. In all, 17 possible beacons are recorded in the region in the 18th and early 19th century (Table 13.1). The beacon organisation was updated, repaired and remanned from the 17th to the early 19th century due to several wars, and many new beacons were added.[26] Thus, these beacons may not have been part of an older system dating back to the Viking Age. Seven beacons are mentioned as main beacons,[27] extending from the coast into the Hardanger Fjord (Table 13.1, nos. 1–7). Of these, five have *viti*-names (nos. 3–7) suggesting they might go back to the Viking Age. Two has the name of a mountain (nos. 1 and 2), one

23 See Skoglund, *The coastal defence*, p. 70, table 1.

24 Ersland "Kongshird og leidangsbonde," p. 58.

25 Boathouses were timber-built constructions intended to shelter warships and had horse-shoe-shaped ramparts of earth and stone for external protection. See e.g. Bjørn Myhre, "Boathouses as Indicators of Political Organization," *Norwegian Archaeological Review* 18, no. 1–2 (1985), pp. 36–58; Bjørn Myhre, "Boathouses and naval organization," in *Military Aspects of Scandinavian Society in a European Perspective, A.D. 1–1300*, eds. Anne Nørgard Jørgensen and Birte L. Clausen (Copenhagen: National Museum, 1997), pp. 169–83; Grimm, *Grosbootshaus-Zentrum".*

26 Olaf Olafsen, *Viter paa Sørlandet og Vestlandet i eldre tider* (Kristiania: Norsk Folkekultur, 1920), p. 26; Scheen, "Norges viter," pp. 256–57.

27 There were main beacons and ancillary beacons as part of the same system, but where the latter often is unmanned and used for retransmitting alerts further afield and to local communities. See also Iversen this volume.

TABLE 13.1 Possible beacons in the Hardanger region

No.	Beacon name	Alternative name	Location	District/County	Beacon type	Sources	Reference
1	Siggjo	Vardefjellet, Siggen, Sigga	Bømlo	Sunnhordaland	Main	*written sources* 1807, 1808	O.Olafsen 1920; Scheen 1951
2	Borgundnuten	Borgundfjellet	Bordundøy	Sunnhordaland	Main	*written sources* 1807, 1808	O.Olafsen 1920; Scheen 1951
3	Veten	Vitefjeldet	Etne	Sunnhordaland	Main	*written sources* 1807, 1808	O.Olafsen 1920; Scheen 1951
4	Veten	Snilstveitviten, Snilstveitøyen	Kvinnherad	Sunnhordaland	Main	*written sources* 1807, 1808	O.Olafsen 1920; Scheen 1951
5	Veten	Varaldsøy	Varaldsøy	Sunnhordaland	Main	*written sources* 1807, 1808	O.Olafsen 1920; Scheen 1951
6	Bjørkeveten	Vardefjeld, Bjørke	Øystese	Hardanger	Main	*written sources* 1807, 1808	O.Olafsen 1920; Scheen 1951
7	Veten	Oksen		Hardanger	Main	*written sources* 1807, 1808	O.Olafsen 1920; Scheen 1951
8	Vardahaugen	Skaarefjeldet	Eidsfjord or Ulvik	Hardanger	Local?	Local tradition 1920s	O.Olafsen 1920; Scheen 1951
9	Samlahovd	Samlanuten Samlen	Herand	Hardanger	Local?	Local tradition 1920s	O.Olafsen 1920; Scheen 1951
10	Vikanuten	Vikafjellet, Gullberget	Jondal	Hardanger	Local?	Local tradition 1920s	O.Olafsen 1920; Scheen 1951
11	Ryvarden	Ryvarden lykt	Sveio	Sunnhordaland	None	Place-name	Scheen 1951
12	Vitahaugen	Varhaug	Mosterhamn	Sunnhordaland	None	Place-name	Olafsen 1915; Scheen 1951

TABLE 13.1 Possible beacons in the Hardanger region (*cont.*)

No.	Beacon name	Alternative name	Location	District/County	Beacon type	Sources	Reference
13	Varanes	Ænes	Kvinnherad	Sunnhordaland	None	Place-name	Scheen 1951
14	Børvehovden		Ullensvang	Hardanger	None	Place-name	Scheen 1951
15	Vardafjellet		Bremnes	Sunnhordaland	None	Place-name	Scheen 1951
16	Vardafjell		Bremnes	Sunnhordaland	None	Place-name	Scheen 1951
17	Prestevarden		Stord	Sunnhordaland	None	Place-name	Scheen 1951

of them also with an alternative name containing a *vard* element (no. 1). The age of these sites is uncertain. In addition, three beacons are known from local tradition (Table 13.1, nos. 8–10) and their age and function are uncertain. An additional seven beacons have been identified through place-names, located on the coast and on mountains along the Hardanger Fjord (Table 13.1, nos. 11–17) (Figure 13.3).[28] The question is which beacons were part of the system and what their function was.

Of the seven beacons identified from place-names (Table 13.1, nos. 11–17; see Figure 13.2), six are *vard*-names, one is a *viti*-site (no. 12), and the last one (no. 14) is the name of a mountain, which also contains an Early Iron Age hillfort. Except for maybe no. 12 with a *veti*-name, the names of these sites suggest they refer to sea- or landmarks for direction. An example is Ryvarden (no. 11), located on a coastal island that today is the site of a modern lighthouse. It is thus likely that this was an older sea mark. When it comes to the beacon Vitahaugen (no. 12), it is mentioned as a local beacon and is based on place-name (*viti*).[29] However, it is only approx. 5.5 km between that beacon and the main beacon at Siggjo along the main coastal beacon chain, thus, this beacon is not needed, not even as a local beacon (Figure 13.3). It is thus likely that the name does not in fact refer to a beacon site.

28 Scheen, "Norges viter," p. 289.

29 Olaf Olafsen, "Viter eller Varder i Hordaland," *Hardanger Historielag, Hardanger Tidsskrift* (1915), pp. 21–36.

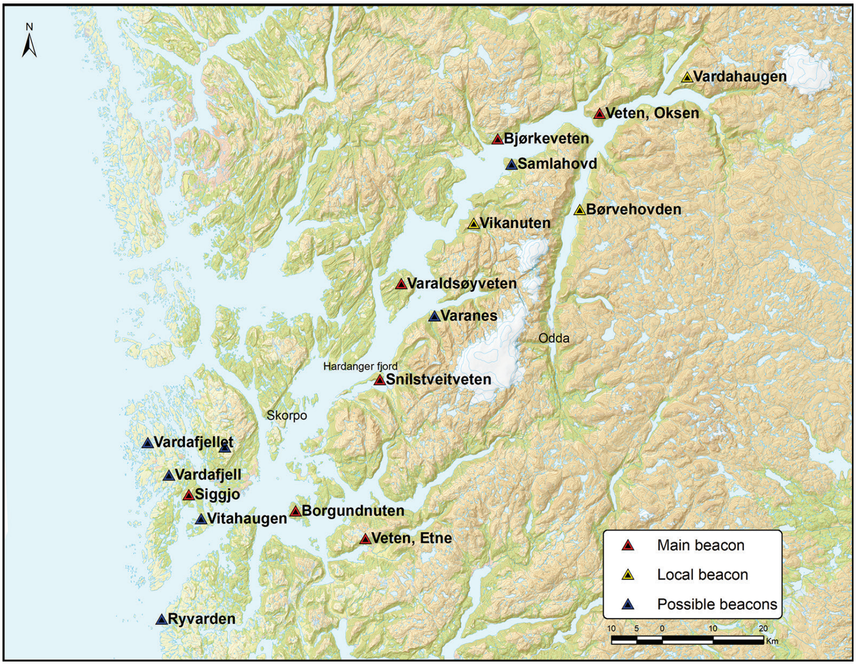

FIGURE 13.3 Map of the location of the 17 possible beacons in the Hardanger region and place-names mentioned in the text
ILLUSTRATION: MARIE ØDEGAARD

If we look at the location of the main beacons (no. 1–7), they form a chain from the coast and along the Hardanger Fjord at a relatively equal distance of 20 km (Figure 13.3). One exception is between the beacon at Varaldsøy (no. 5) and Bjørkeveten (no. 6), suggesting that Vikanuten (no. 10) was in fact a main beacon. The beacon on Samlahovd (no. 9) is thus not necessary in a beacon chain. It may be that this represents some changes in the system over time or that the identification is based on it being cairns or sea marks for directions.

I conducted a so-called viewshed analysis, which illustrates the areas that are visible in the terrain from the beacons (Figure 13.4). The green areas can only be observed from one beacon, the brown from two beacons and the red from three. This means that the darker the colour, the more visibility there is in a given area. In any case, it is clear from the analysis that the beacon chain could have notified the residents in Hardanger within a short amount of time. As Figure 13.4 illustrates, it is not possible to signal from Veten on Oksen (no. 7) all the way to Odda. This means that the beacon on Børvehovden (no. 14) most likely was part of the beacon system, likely a local beacon signalling into the smaller fjord towards Odda (see Figure 13.3). From Veten at Oksen (no. 7), it is not possible

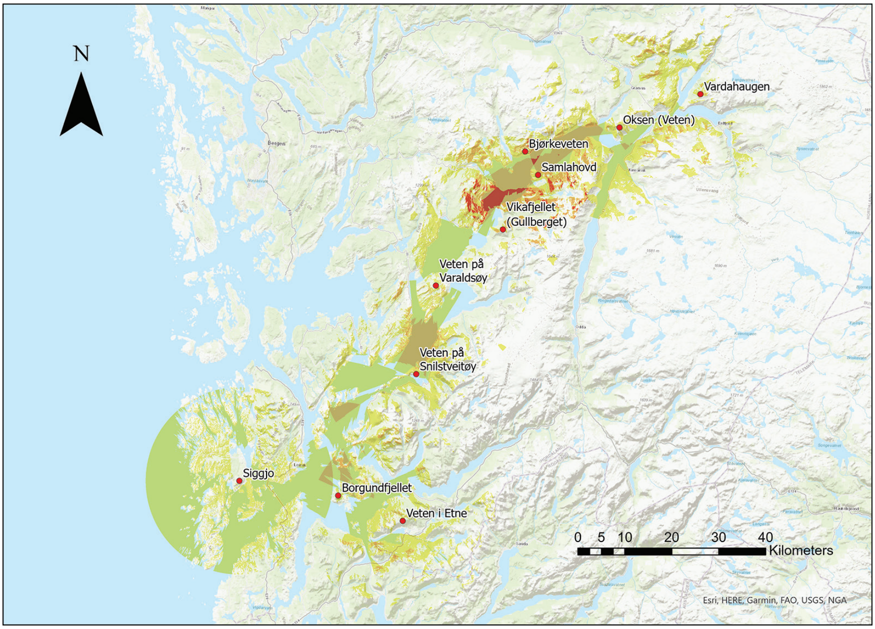

FIGURE 13.4 Intervisibility analysis of the beacon chain going from the coast into the Hardanger Fjord
ILLUSTRATION: MARKUS NILSEN

to see the settlements in northeast either, thus a beacon was likely necessary to alert the local population there. A beacon located at Vardahaugen (no. 8), would fit well for signalling to people northeast in Hardanger.[30]

There are approximately 30 km between the beacon on Borgundnuten (no. 2) and Snilstveitøy (no. 4), suggesting there may be a missing beacon in between these sites. A possible location for signalling into Snilstveitøy (no. 4) which is located east in the fjord, may be on the western side of the Hardanger Fjord, on the island of Skorpo (see Figure 13.3).[31] The conclusion must be that 11 beacons were part of the beacon chain along the Hardanger fjord: eight or nine main beacons and two local beacons (Table 13.2; see Figures 13.3 and 13.4). These sites may be old, at least from the Middle Ages or even going back to the Viking Age.

30 i.e. Eidsfjord and Ulvik ship-districts, see below.

31 See also Jostein Aksdal, "Vetene i Hardanger," *Hardanger historielag årbok* (2014), pp. 85–105.

TABLE 13.2 Beacons along the Hardanger fjord, with ID-number referred to in the text, location in ship-district and type of beacon

ID	Beacon name	Alternative name	Hardanger ship-district	Beacon type
1	Siggjo	Vardefjellet, Siggen, Sigga	Føn	Main
2	Borgundnuten	Borgundfjellet	Fjellberg	Main
3	Veten	Vitefjeldet	Etne	Main
4	Veten	Snilstveitviten, Snilstveitøyen	Kvinnherad	Main
5	Veten	Varaldsøy	Hamn	Main
6	Bjørkeveten	Vardefjeld, Bjørke	Øystese	Main
7	Veten	Oksen	Kinsarvik	Main
8	Vardahaugen	Skaarefjeldet	Eidsfjord	Local
10	Vikanuten	Vikafjellet, Gullberget	Jondal	Main
14	Børvehovden		Ullensvang	Local
18	Missing beacon, somewhere on Skorpo?		Opdal?	Main?

3.1 *Ship-Districts of Sunnhordaland and Hardanger*

To further understand the signalling and organisation of the system, it is necessary to study the beacons' location in the administrative districts and connection to other types of ancillary structures that was part of the system. According to the will of king Magnus the Lawmender from 1277, Sunnhordaland consisted of 11 ship-districts: Våg, Strandvik, Føn, Førde, Fjelberg, Etne, Skånevik, Kvinnherad, Opdal, Strandvik and Strandebarm (Figure 13.5).[32] Våg and Strandvik are not connected to the Hardanger Fjord and will not be considered further here.

Hardanger on the other hand, has more ambiguous sources for the medieval administrative divisions, and the definition of the districts is often confused.[33]

32 Edvard Bull, *Leding. Militær- og Finansforfatning i Norge i ældre tid* (Steenske Forlag: Kristiania og København, 1920), pp. 125–26.

33 Bull, *Leding*, pp. 126–28; Asgaut Steiness, *Gamal skatteskipnad i Noreg. Andre luten* (Det norske Videnskaps-Akademi i Oslo) II (Historisk-filosofisk klasse) 3 (Oslo: Jacob Dybwad, 1933), pp. 148–49; Oliver Grimm, *Grosbootshaus-Zentrum und Herrschaft: Zentralplatzforschung in der nordeuropaischen Archaologie (1.–15. Jahrhundert)* (Ergänzungsbände zum Reallexikon der germanischen Altertumskunde) 5 (Berlin: W. de Gruyter, 2006),

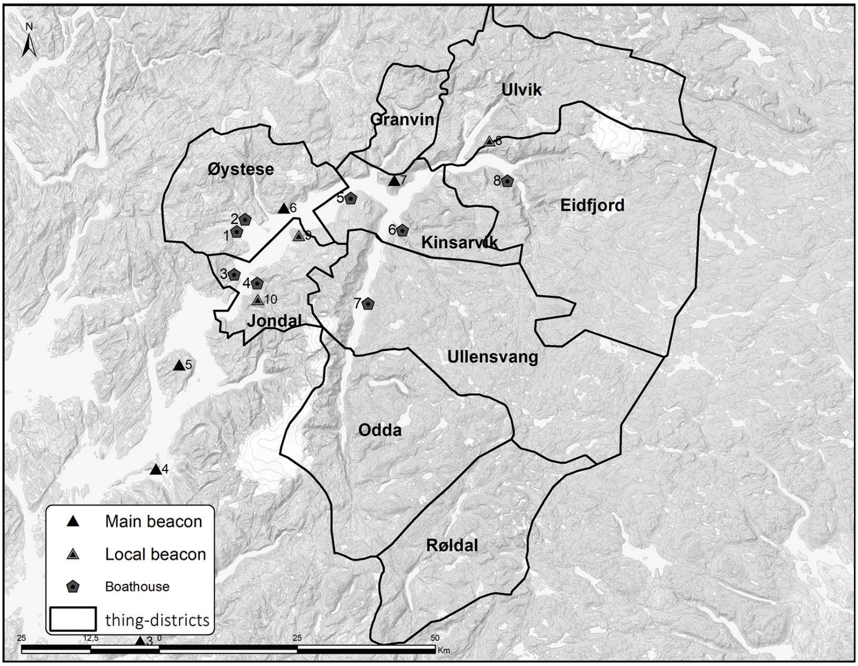

FIGURE 13.5 The medieval ship-districts of Sunnhordaland and Hardanger
ILLUSTRATION: MARIE ØDEGAARD

The historian Asgaut Steinnes has investigated the contribution of levies from Hardanger and argues that the economic capacity of the area equals that of five average ship-levy districts in the Gulathing law province.[34] Following this line of argument, Hardanger should provide five ships for the levy fleet. This fits well with the agrarian capacity of the area.[35] A later historical source from the first half of the 17th century mentions five ship-districts: Granvin, Ulvik, Ullensvang, Kinsarvik and Øystese.[36] However, an interesting and relatively early source from 1521 mentions eight so-called thing-districts,[37] which

pp. 126–8, 218 and 293; Haldis Hobæk, "Tracing Medieval Administrative Systems: Hardanger, Western Norway," in *Debating the Thing in the North*, eds. Alexandra Sanmark, Frode Iversen, Natacha Mehler and Sarah Semple, *Journal of the North Atlantic* (Special Volume) 5 (2013), pp. 64–75.

34 Steinnes, *Gamal skatteskipnad*, pp. 148 and 156.

35 See Hobæk, "Tracing Medieval," pp. 64–75.

36 See also Bull, *Leding*, pp. 126–27.

37 *Norske Regnskaber og Jordebøger fra det 16de Aarhundrede*, ed. H.J. Huitfeldt-Kaas (Det Norske historiske Kildeskriftfond, Christiania, 1905), II, pp. 133–56.

may be ship-levy districts.[38] These districts, however, are smaller, both economically and in terms of population, than the normal ship-levy districts of the Gulathing law province, and there has therefore been some reluctance to accept these.[39]

Nevertheless, it is not a one-to-one relation between the number of ship-districts and the number of ships the different areas were supposed to man.[40] The number of ships is generally larger than the number of ship-districts. The Gulathing Law,[41] dating from the 11th to 13th centuries and valid for western Norway, states that if there are not enough men from one ship-district, two districts can merge.[42] If the thing-districts of 1521 constitutes the ship-districts, some of them may have cooperated to man the warships from Hardanger. Another factor that supports this is that the people of Øystese ship-district paid three times the tax of Granvin, and the mountain area of Røldal was sparsely populated and had low taxes.[43] The population of Odda and Røldal was small,[44] and they were probably connected with the more populated Ullensvang.[45] For now I will accept the thing-districts as possible ship-districts, and investigate if the location of beacons and ancillary structures can shed light on the administrative organisation. If the thing-districts are areas for the ship-levy, what districts could have been fused in cases of attack and war? And how was the defence organised in the local communities?

3.2 *Organisation of the Beacon System and the Naval Defence*

When the beacons were lit on fire, the population had to mobilise and get the ships out to meet the enemy. A "message baton" (budstikke) was sent out,[46] an 'iron baton' went along the main beacon chain along the coast, from one royal bailiff to the next, while another baton made of wood were sent into the fjords and passed between farmers. There were severe penalties for stopping and not

38 Hobæk, "Tracing Medieval".
39 Steinnes, *Gamal skatteskipnad*, p. 148; Hobæk, "Tracing Medieval".
40 Bull, *Leding.*
41 *The Older Gulathing Law*, no. 301
42 Ersland, "Kongshird og leidangsbonde," p. 82.
43 Steinnes, *Gamal skatteskipnad*, p. 148.
44 See e.g. Steinnes, *Gamal skatteskipnad*, p. 148; Olav Kolltveit, *Odda, Ullensvang og Kinsarvik i gamal og ny tid* (Bygdesoga) 1 (Odda: Odda, Ullensvang og Kinsarvik Bygdeboknemnd, 1963), p. 367.
45 In historical times at least, Odda, Ullensvang and Kinsarvik were organised together, secularly and ecclesiastically. Bull, *Leding*, p. 127; Lars Kiærland and Lars Hamre, "Fra Samlen til Seljestad," in *Odda, Ullensvang og Kinarvik i gamal og ny tid* (Bygdesoga) 1, ed. Olav Kolltveit (Odda: Odda, Ullensvang og Kinsarvik Bygdeboknemnd, 1963), p. 17; Kolltveit, *Odda, Ullensvang,* p. 367.
46 A '*budstikke'* is a stick or cylinder used for carrying messages from one farm to the next.

passing the baton.[47] According to the Gulathing Law, a man should be called to the levy from every seventh head over the age of three,[48] suggesting approximately 14 % of the population was included in the defence.[49]

The ship,[50] boathouse,[51] sail[52] and fittings, such as anchor and rope,[53] were to be built by the community of the ship-districts. In the Middle Ages, the sails[54] and other equipment were to be kept in the church closest to the boathouse belonging to the levy warship,[55] indicating that the church and boathouse should be located close to each other, a discussion I will return to below. The Gulathing Law required that all free, fully grown men should have either a sword or axe and a spear and shield. In addition, bows and arrows were added as ship equipment.[56] The farmers' weapons were inspected once a year at the assembly by the district's royal official.[57] Thing meetings or assemblies were often held outside churches in the Middle Ages.[58] Thus, these sites were multifunctional, with military, socio-judicial and religious functions. To understand the organisation, it is crucial to know where the boathouses and nearby churches were located.

In all, 44 medieval churches[59] are located within the study area (Figure 13.6). A total of 22 boathouses that may be connected to the naval defence organisation are known from the case study area: 14 in Sunnhordaland and 8 in Hardanger (Table 13.3; Figure 13.6).[60] One problem is that few of the boathouses

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47 *The Older Gulathing Law*, no. 312.

48 *The Older Gulathing Law*, no. 296 and 297.

49 Steinar Imsen and Harald Winge, *Norsk historisk leksikon. Kultur og samfunn ca.1500 – ca. 1800* (Oslo: Cappelen Akademiske Forlag, 1999).

50 *The Older Gulathing Law*, no. 306; *Frostatingslova,* trans. Jan Ragnar Hagland and Jørn Sandnes (Oslo: Det Norske Samlaget, 1994), VII, § 1–2.

51 *The Older Gulathing Law*, no. 307; *Frostatingslova,* VII, § 3.

52 *The Older Gulathing Law*, no. 308; *Frostatingslova,* VII, § 5.

53 E.g. *The Older Gulathing Law*, no. 309; *Frostatingslova,* VII, §§ 4, 13, 15.

54 *The Older Gulathing Law*, no. 308.

55 *The Older Gulathing Law*, no. 305; see also *Magnus Lagabøters landslov*, chap. III, § 14; *Magnus the Lawmender's Laws of the Land*, Land defence section.

56 *The Older Gulathing Law*, no. 309.

57 *The Older Gulathing Law*, no. 309.

58 E.g. Alexandra Sanmark, *Viking Law and Order. Places and Rituals of Assembly in the Medieval North* (Edinburgh: Edinburgh University Press, 2017); Marie Ødegaard, "Thing sites, cult, churches, games and markets in Viking and medieval southeast Norway, AD *c.* 800–1600," in *Temporary Places, Gatherings and Assemblies*, ed. Sarah Semple. *World Archaeology* 50, no. 1 (2018), pp. 150–64.

59 The Christianisation process of Norway took place from the end of the 10th century, and most medieval churches were built between the 11th and 13th century.

60 Myhre, "Boathouses and naval organization," p. 170; Grimm, *Grosbootshaus-Zentrum,* p. 414.

TABLE 13.3 The names, location, size and date of the boathouses that may belong to the naval organisation along the Hardanger fjord. Boathouses in Os and Våg ship-districts are not included.[a] ID refers to identification number in the National Monuments and Sites records (Askeladden.ra.no)

No	Name	Place-name boathouse	Localisation	Ship district	ID	Size (m)	Date
1	Bjelland		Stord		276460	27 × 5 m	EIA (200–340 CE)
2a	Setberg		Lund/Kvinnherad	Kvinnherad	94665	30 m × 6 m	EIA
2b	Seim		Lund/Kvinnherad		94658	Less then 20 m	EIA
3a	Vang		Rosendal	Kvinnherad	282309	20 × 5 m	EIA
3b	Nes	*Klypestøo*	Rosendal	Kvinnherad	94625	30 m	EIA
4	Sjo		Halsnøy	Kvinnherad		30 × 6 m	EIA
5	Halsnøy		Halsnøy	Fjellberg	94613	25 × 5 m	EIA
6	Vik		Kvam	Øystese	97505	30 × 16 (18,5 × 8,5[b])	IA
7a–b	Augstad	*Skipreidetufti*	Kvam	Jondal[c]	97341 97501	20 × 5–6 < 18 × 8	EIA (VA-MA[b]) IA/MA
8	Vik		Jondal	Jondal	112445	25 × 12 (33 × 18[b])	IA/MA
9	Lote		Ullensvang	Kinsarvik	101000	20 × 10	IA
10	Kinsarvik	*Skiparsto*	Ullensvang	Kinsarvik	100973	35 × 13	IA/MA
11	Vik	*Skipatufti*	Eidfjord	Eidfjord	110230	'large', width >8	IA/MA
12	Sekse		Ullensvang	Ullensvang	101096	> 15 ?	?
13	Økland		Stord		35512	Longer than 12 m	?
14	Valland		Kvam	Øystese	97480	32 × 15,5	MA
15a–b	Haugen		Etne	Etne		25 × 10 m/"large"	MA

16	Sæbø	*Snekkjetufto*	Borgundøya	Kvinnherad	45437	> 15 m	MA
17	Skåla	*Skipadalen*	Rosendal	Kvinnherad	55170	30 × 12 m	MA
18	Kårevik		Stord	Kårevik	35509	30 × 8	1000–1160 CE
19	Rommetveit		Stord		45542	28 × 15 m	MA
20	Våge		Tysnes		60632	less then 25 × 10 m	MA
21	Hamn	*Skipartufti*	Kvam		105686	35 × 14	1400–1440 CE
22	Nordhus		Fjeldbergøya		112152	17 × 6 m	MA?[d]

a The table is modified after: Myhre, "Boathouses and naval organization," p. 172; Grimm, *Grosbootshaus-Zentrum*.
b The stated size in Askeladden.
c This area belonged to Kvam parish (part of Øystese), however, it belonged to Jondal thing-district and thus perhaps ship-district.[e]
d Found in 2005, and not part of Myhre and Grimms lists.
e Hobæk, "Tracing Medieval."

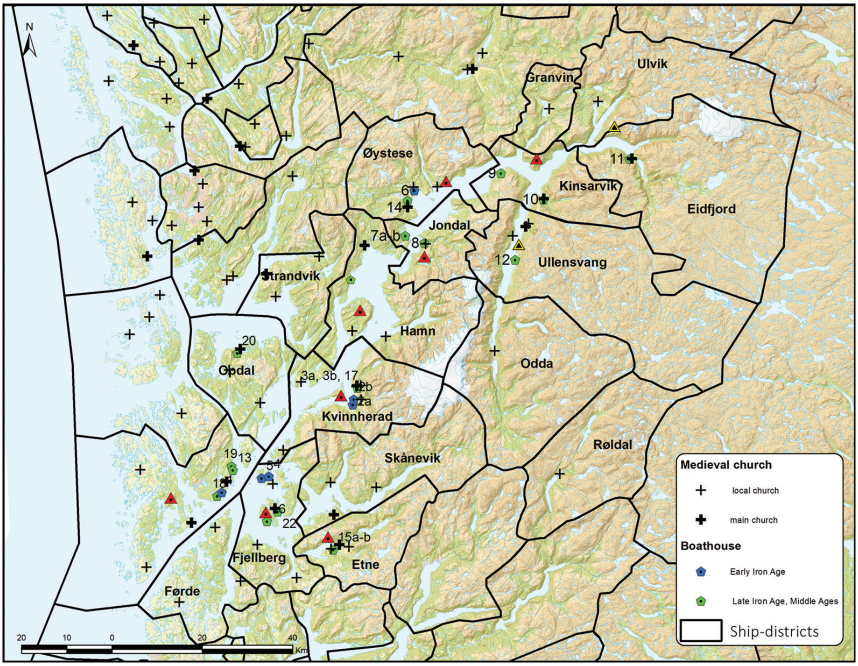

FIGURE 13.6 Possible boathouses and beacons in the *thing*-districts in Hardanger. Numbers refer to table 2
ILLUSTRATION: MARIE ØDEGAARD

are excavated to modern archaeological standards, and few are dated. Identification and date are therefore based mainly on their form and position relative to former shorelines, which have moved through time because of sea-level changes.[61] In general, they can only be dated broadly to two periods: Early Iron Age or Late Iron Age and Middle Ages (Table 13.2). It is also difficult to discern boathouses that belonged to the ship-levy from those that did not. There are, however, differences in the size of the boathouses: the buildings up to the Viking Age were long (20–40 m) and narrow (3–7 m), while the medieval boathouses were considerably broader—up to 15 m in width.[62]

As Figure 13.6 illustrates, 17 of the 22 boathouses are directly connected to a medieval church, distributed in nine districts (Føn, Opdal, Fjellberg, Kvinnherad, Jondal, Øystese, Kinsarvik and Eidfjord). All ship-districts with a beacon contains at least one boathouse. As mentioned, ideally the boathouse and church should be located close to each other. However, in five districts, there is no connection between a boathouse and a church: Lote (Table 13.3; no. 9)

61 See Myhre, "Boathouses as Indicators", pp. 39–49.
62 Myhre, "Boathouses as Indicators".

in Kinsarvik ship-district, Sekse (no. 12) in Ullensvang, and Augstad (no. 7a-b) in Jondal and Hamn in Kvam (no. 21). The boathouses in Føn ship-district are located approximately 2 and 3 km in either direction of the church (see Figure 13.6).

Many ship-districts contains several boathouses (Table 13.3), and it can suggest changes in the location of boathouses over time. It may also be that some of these boathouses did not belong to the levy, and because so few sites have been dated, it is difficult to know which ones did – a point on which researchers disagree.[63] What is clear is that all ship-districts with a beacon contains one or several boathouses—and the others does not.

Figure 13.6 illustrates the location of beacons, medieval churches and boathouses in the ship-districts. There are no beacons in the ship-districts of Førde, Skånevik, Opdal, Strandvik, Granvin, Ulvik, Odda and Røldal.[64] Of these, only one – Opdal – had a boathouse (no. 20). That boathouse is located on the north side of the ship-district and towards another landscape zone, thus it is likely that the settlement there was not organised in relation to the beacon chain into Hardanger. If we look at the distribution of boathouses, churches and beacons, there is a close connection within the ship-districts that include all of these functions, especially in Fjellberg, Etne and Kvinnherad. There are several churches in this region, situated on different levels within the ecclesiastical hierarchy,[65] And most of the boathouses are located next to the main churches (see Figure 13.6).

The Gulathing Law does not specify what administrative level that was responsible for organising the watch. The fact that not all ship-districts had a beacon and boathouse may suggest that the organisation of the watch was done on a higher administrative level than that of the ship-districts. In the Gulathing area, that suggests they were organised on the level of the so-called 'quarter' (ON *fjorðungr*) of a 'county' (ON *fylki*).[66] The main churches for the quarter in Sunnhordaland and Hardanger was Skåle in Kvinnherad and Kinsarvik in Kinsarvik ship-district respectively.[67] These sites held military, socio-judicial and religious functions for quarters that consisted of several ship-district. In addition, several of the boathouses, like the one in Kinsarvik (no. 10) and Vik

63 Myhre, "Boathouses and naval organization," p. 176; Grimm, *Grosbootshaus-Zentrum,* p. 414; Ersland "Kongshird og leidangsbonde," p. 53; Hobæk, "Tracing Medieval".

64 There are possible beacons in Strandvik, however, they are not included here since they located to the west and towards the Bjørnafjorden, thus they most likely were not part of the "first line of" defence and the beacon chain going in Hardanger.

65 A discussion of the church hierarchy, see Iversen and Brendalsmo, "Den tidlige kirkeorganisasjonen".

66 Knut Robberstad, *Samfund og lov i Vest-Noreg i gamal tid* (Vestlandske bondestemna) 37 (Bergen: Vestlandsbygdene, 1952), p. 325; Semple *et al.*, Negotiating the North, p. 300.

67 Hobæk, "Tracing Medieval,"; Iversen and Brendalsmo, "Den tidlige kirkeorganisasjonen".

(no. 6) in Øystese, was so large that they had room for two ships.[68] There are also examples of ship-districts that cooperated to provide ships.[69] The Laws of the Land of 1274 states that it was very important within the communities that everyone contributed in equal measures.[70] This means that even if some ship-districts had no beacons and boathouses, they still had to contribute to the organisation and watch.

The boathouses of different date and location can indicate changes in the system, maybe due to changing local power structures or settlement demographics over time. This suggest that the system could adapt to changing social and political circumstances. How far back in time the naval defence existed is unknown, but it is generally assumed to have become increasingly supraregional from the end of the Viking Age, nationwide at least from the 13th century, and important up to modern times.[71] The boathouses from the Early Iron Age must thus be related to local and regional defence systems. These local defences were probably built against smaller-scale raiding incursions. The origin of the naval defence can be found in local chieftains and their retinue, holding warships used for protection of one's area.[72]

As mentioned, Sunnhordaland and Hardanger were not part of the same law area before the 12th–13th century, and Hardanger seems to have been a later incursion to the law area and the kingdom of western Norway.[73] According to Sverre's saga, the people of Hardanger and Sunnfjord fought under the same commander, a royal representative, in a *leiðangr* army in the 12th century.[74] The people from Hardanger thus seems to be supporting the kingdom, however, they did not yet cooperate in the formal part of the law province.

68 Myhre, "Boathouses and naval organization," p. 176; Grimm, *Grosbootshaus-Zentrum,* p. 414; Ersland "Kongshird og leidangsbonde," p. 53; Hobæk, "Tracing Medieval".

69 *The Older Gulathing Law*, no. 301; Marie Ødegaard, *Rettens landskap. Tingsteder og rettskretser i Viken i jernalder og middelalder* (Oslo: Cappelen Damm Akademisk, 2021), p. 164.

70 The laws also state that this should be according to economic ability and land holdings. *Magnus Lagabøters landslov*, chap. III, 6 and 7; *Magnus the Lawmender's Laws of the Land*, Land defence section.

71 What happened with the beacon organization in the aftermath of the Black Death (from 1350) and towards their revival in the early 17th century under King Christian IV is unknown, but it is likely they were in use in wartimes. The naval defence went out of use in the 14th – early 15th century. The beacons went out of use in Norway in 1814.

72 Niels Lund, *Lid, leðing og landeværn. Hær og samfund i Danmark i ældre middelalder* (Roskilde: Vikingeskibshallen, 1996); Ersland "Kongshird og leidangsbonde," p. 50.

73 Iversen, "Tinget – lov og rett".

74 *Sverres saga,* trans. Dag Gundersen (Norges kongesagaer) 2 (Oslo: Gyldendal Norske Forlag, 1979), chap. 19, and 49–50.

Therefore, it is likely that Hardanger had their own administrative divisions and judicial system. Nevertheless, the beacon chain must have gone all the way into Hardanger, and the two regions had a common defence. This indicates cooperation between the local communities crossing the borders of the law province. The king had to be elected at the main assemblies of every law province.[75] At the assemblies, the king meet the inhabitants of an area and negotiated, amongst others about the area's contribution to the naval defence.[76] The people of Hardanger may have had their assembly with the king at Kinsarvik, which was the main assembly from the Viking Age onwards. These negotiations would have had a different starting point than the areas that were part of the law province, and might have resulted in specific privileges for that area. Such privileges are known from different regions well into later periods.[77]

The beacons testify to the need for common defence and show how people co-operated across law areas and through changing circumstances. To ensure survival, people develop strategies of defence to protect themselves, immediate kin, and communities. One such strategy is systems of early warning of danger.[78] In the Viking Age and Middle Ages in Norway, there were no villages, as is known in Denmark and further south. People mostly lived on

75 Absalon Taranger, "Om kongevalg i Norge i sagatiden," *Historisk tidsskrift* 30 (1934–36), pp. 112 and 291; P. S. Barnwell, "Political Assemblies: Introducion," in *Political Assemblies in the Early Middle* Ages, eds. P. S. Barnwell and Marco Mostert (Studies in the Early Middle Ages) 7 (Turnhout: Brepols, 2003), pp. 1–10; Alexandra Sanmark, "The communal nature of the judicial systems in early medieval Norway," *Collegium Medievale* (2006), pp. 31–64; Semple *et al.*, *Nogotiating the North*, pp. 3–4, 116–30 and *passim*.

76 Sveaas Andersen, "Ting," pp. 350–59. In 1293, duke Håkon Magnusson was at Hamar and negotiated with the local population, amongst others the obligations for the *leiðangr* for the regions of Hedmark and Toten (*Norges gamle love indtil 1387*, trans. Rudolf Keyser and Peter Andreas Munch (Christiania: Chr. Gröndahl, 1849), III, pp. 19–23; *Regesta Norvegica. Kronologisk Fortegnelse over Dokumenter vedkommende Norge, Nordmand og den norske Kirkeprovins, Christiania: Norsk historisk kjeldeskriftinstitutt/Riksarkivet, 1898–present,* II, no. 721.

77 This often resulted in various benefits and taxes that had to be paid to the state. See e.g. Asgaut Steinnes, *Leidang og landskyld* (Skrifter utgitt av Det norske Videnskaps-Akademi i Oslo) II (Hist.-Filos. Klasse) 9 (Oslo: Jacob Dybwad, 1927); Steinar Imsen, "Konflikt og konfliktløsning i den gammelnorske staten," *Collegium Medievale* 2 (2019), pp. 31–57; An example is from King Magnus Erikson letter describing the rights and duties of the people of the town of Oslo, see: *Regesta Norvegica,* IV, no. 843; jf. *Norges gamle love,* III, pp. 165–67; *Norges gamle love indtil 1387*, IV, trans. Gustav Storm (Christiania: Chr. Gröndahl, 1885), pp. 375–76.

78 Paul Hill and Julie Wileman, *Landscapes of War. The Archaeology of Aggression and Defence* (Gloucestershire: Tempus, 2002), pp. 51–52.

single farms, scattered throughout the landscape.[79] Very few fortifications are known from Norway. Strategies of early warning signalling by beacons were rational and fitted in well with the landscape of high mountains, valleys, and a long coastline. Strategies of civil defence, that includes all members of society like the beacon system did, include a range of emergency measures—military and non-military—a society takes to protect the inhabitants and the communities from natural disasters or hostile attacks and retaining the present civilian and economic structures.[80] In larger communities, multifunctional sites will develop, in which their form and meaning can derive from military exigency.[81]

4 Conclusion

In this article, I have shed light on the beacon system in Sunnhordaland and Hardanger, western Norway, in the Late Viking Age and Middle Ages. The beacons were placed on high mountains along the coast and the fjord, so that they could signal from one to the next. The beacon system was closely connected to the naval defence and the judicial system with assembly sites. This was an intricate system of defence, in which all members of society participated.

Eleven beacons were part of a chain going from the coast and into the Hardanger Fjord. Their location within the ship-districts were identified and mapped. There seem to be a close connection between beacons, boathouses and medieval churches along the Hardanger Fjord. Most of these churches were main churches, and had military, religious and judicial functions for their respective districts.

The case study from Sunnhordaland and Hardanger in western Norway is a good illustration to what constant threats and war can do to a society and how people take measures to survive. Beacons were part of early warning systems and connected people from different places in the defence of their district and land. Multifunctional sites such as the thing- and church sites where the sails were kept and people mustered, became the social focal point of the communities.

79 Ingvild Øye, "Landbruk under press 800–1350," in *Jorda blir levevei: 4000 f.Kr.-1350 e.Kr.*, eds. Bjørn Myhre and Ingvild Øye (Norges landbrukshistorie) 1 (Oslo: Det norske samlaget, 2002), pp. 215–414.

80 David Alexander, "From civil defence to civil protection – and back again," *Disaster Prevention and Management* 11 (2002), no. 3, pp. 209–311; John Baker and Stuart Brookes. *Beyond the Burghal Hidage. Anglo-Saxon Civil Defence in the Viking Age* (History of Warfare) 84 (Leiden: Brill, 2013), p. 10.

81 Hill and Wileman, *Landscapes of War,* pp. 51–52.

The beacons attest to a high level of social and military organisation, capable of building and manning a large-scale organisation with a chain of beacons and associated naval defence mechanisms.

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CHAPTER 14

An Archaeological Experiment on a Large Scale: in Search of the Viking Age Lines of Communication in Central Denmark

Mads Runge and Mette Stauersbøl Mogensen

1 Introduction

In the research and dissemination project, *From Central Space to Urban Place*, north-eastern Funen[1] was defined as a unified military system comprising a number of different elements in the Late Viking Age (A.D. 950–1100). To enable this system to function in a coherent manner, it was necessary for the involved locations to be able to communicate with each other quickly and efficiently. This communication was probably based on a system of beacons, but as this kind of structure leaves few visible archaeological traces in the landscape, it was necessary to research the issue in other ways to identify potential beacon sites. One approach was to use place-name research and computer visualisation models. It was then the project's ambition to test the defined beacon system in real time. The event took the form of a large-scale archaeological experiment. Fires were lit at the potential beacon sites and the results were then disseminated to the public in a project involving local participants.

The present paper presents the military system in north-eastern Funen during the Late Viking Age and the possible communication lines between the system's components. Next, the test of the communication system is described and evaluated, assessing whether this approach can contribute to understanding something as elusive as a thousand-year-old form of communication.

2 Urban Growth Factors and Urbanisation Processes in the Late Viking Age

The project *From Central Space to Urban Place* was supported by the VELUX FOUNDATION and carried out during 2017–21 with the participation of several

1 An island in central Denmark.

DOI:10.1163/9789004749702_015

Danish museums and universities.[2] The aim of the project was to investigate the earliest urbanisation processes in Denmark by comparing the development of the towns Aalborg and Odense (Figure 14.1). Both towns are located in the central parts of a large fjord systems and share a number of common features, but they differ in terms of, for example, local topography and traditions. The title of the project refers to the fact that the investigated period represents a development from the geographically scattered organisation of central elements of society ('spaces'[3]) in the Iron Age and Early Viking Age to the

FIGURE 14.1 A–C The two study areas and their hundreds. Detailed map of the primary area of the hundreds in this article, Funen
GRAPHICS: MADS RUNGE

2 Museum Odense (project leader), the Museums of Eastern Funen, the Museums of Northern Jutland, Moesgaard Museum, the National Museum of Denmark, as well as the universities of Odense, Aarhus and Copenhagen.

3 An idealised form of organisation of societies into 'spaces' is shown in Stefan Brink's paper on 'place name environments'; Stefan Brink, "Social order in the early Scandinavian landscape,"

concentration of central elements in and around the towns of the Late Viking Age ('places'). This process indicates the materialisation of a more centralised form of government.

The urbanisation of Aalborg and Odense was studied by adopting a spatial framework covering several administrative areas called hundreds around the two towns and a chronological framework covering the period A.D. 400–1100. Within this period, a number of growth factors such as trade, crafts, military and religion were analysed to assess which conditions determined the town formation, and whether the development was the result of 'bottom-up' or 'top-down' processes. The conclusion of the analysis was that the urbanisation of the two towns occurred at approximately the same time, around A.D. 900, but that the two processes followed very different trajectories.[4]

Aalborg must be defined as a coastal town, and the most dominant growth factors in the area are trade and specialised crafts. The town is orientated outwards, and the royal power is an important factor, at least from A.D. 900 with a town ditch and a parcelled-out market area. Aalborg has a short time depth as central place.[5] Despite its location in the inner part of a major fjord system, it was not possible to reach Odense with larger watercraft.[6] Instead, the town had a central position in relation to land traffic across Funen, and it was orientated towards the local and regional hinterland. Odense had a long history as a religious and possibly also administrative centre, and military elements played a large role in the urbanisation process. Trade and specialised crafts, on the other hand, were less important factors to the town formation. Odense appears to have developed through 'bottom-up' and internal processes.[7] In the following the focus is on Odense and its hinterland.

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4 Mads Runge, Malene Refshauge Beck, Mikael Manøe Bjerregaard and Torben Birk Sarauw, eds. *From central space to urban place. From the central spaces of the Iron Age to the cities of the Middle Age* (Kulturhistoriske studier i centralitet – Archaeological & Historical Studies in Centrality) 5 (Odense: University Press of Southern Denmark, 2021).

5 Mads Runge, "From central place to town – dynamics and drivers in the early urbanisation process," in *From central space to urban place. From the central spaces of the Iron Age to the cities of the Middle Age,* eds. Mads Runge, Malene Refshauge Beck, Mikael Manøe Bjerregaard and Torben Birk Sarauw (Kulturhistoriske studier i centralitet – Archaeological & Historical Studies in Centrality) 5 (Odense: University Press of Southern Denmark, 2021), pp. 312–15.

6 Mads Runge and Mogens Bo Henriksen, "The origins of Odense – New aspects of early urbanization in southern Scandinavia," *Danish Journal of Archaeology* 7 (2018), pp. 4–6.

7 Runge, "From central place to town," pp. 312–15.

3 The Development of Military Elements in North-Eastern Funen during the Period A.D. 400–1100

The long history of Odense as a regional centre is partly based on the town's central location in the system of major roads. It is possible to reconstruct the road network of that time by using historical maps from the period 1762–1820, landscape reconstruction and archaeological sources such as lines of prehistoric barrows, ancient roads and location of runestones, and it has been suggested that the road system may date back as far as at least the Viking Age.[8] The town's position as a pagan cult centre is indicated by its name, which means 'Odin's ví', a sacred grove dedicated to the principal god of the Norse religion. It is possible that the place of worship was located at the centre of the present city, near the obvious ford across Odense River, and it may correspond to a cult site such as is known, for example, from Lejre. This 'ví' may date back to the Late Iron Age or Early Viking Age (A.D. *c.*550–900).[9] Odense had become the main administrative centre for Funen no later than the 11th century.[10]

The time depth of Odense as a central place explains why the town gradually developed into the centre of a large military system over the period focused on in this project. As mentioned below, in the Late Viking Age Odense and its hinterland were characterised by the presence of several military elements consistent with a strategic position in relation to controlling the land around the town and the central waterways. The construction of King Harald Bluetooth's ring fortress, Nonnebakken, around A.D. 980 emphasises the town's military and strategic importance.[11] Odense's strategic importance, and the development of the military system, may be described as a three-phased process:

8 Per Grau Møller and Niels Haue, "Road networks," in *From central space to urban place. From the central spaces of the Iron Age to the cities of the Middle Age*, eds. Mads Runge, Malene Refshauge Beck, Mikael Manøe Bjerregaard and Torben Birk Sarauw (Kulturhistoriske studier i centralitet – Archaeological & Historical Studies in Centrality) 5 (Odense: University Press of Southern Denmark *2021*), pp. 50–68.

9 Olaf Olsen, *Hørg, Hov og Kirke. Historiske og arkæologiske vikingestudier* (København: Herm. H.J. Lynge & Son, 1966), pp. 103–12; Tom Christensen, *Lejre bag myten. De arkæologiske udgravninger* (Aarhus: Jysk Arkæologisk Selskab, 2015), pp. 173–79; Runge and Bo Henriksen, "The origins of Odense," pp. 42–43.

10 See the entry 'landsting' in the *Den Store Danske* online lexicon, https://denstoredanske.lex.dk.

11 Mads Runge, Malene Refshauge Beck, Mikael Manøe Bjerregaard and Torben Birk Sarauw, eds, *From central space to urban place. From the central spaces of the Iron Age to the cities of the Middle Age* (Kulturhistoriske studier i centralitet – Archaeological & Historical Studies in Centrality) 5 (Odense: University Press of Southern Denmark, 2021).

Only a small number of military finds and structures are known from the first phase, A.D. 400–550, including first and foremost, weapons graves, weapon deposits in relation to houses, etc. Apart from a couple of possible strongholds, no proper military structures are known.

A number of military elements around the centres Glavendrup, Ladby and Rosenlund/Rønninge,[12] all located app. 20 km from Odense to respectively the north, northeast and east are datable to the second phase, A.D. 550–950. The phase might in some spheres of growth be subdivided in an early and a late part. As for the military elements the bigger features are placed in the late part of phase 2. The military elements include richly furnished weapons graves and reference to a warrior on the Rønninge rune stone and to a thegn (i.e. head of the kings 'bodyguard') on the Glavendrup rune stone. The three localities are placed in generally wealthy environments, which suggests that they were not associated with the ordinary warrior class. A number of strongholds are supplemented by actual military structures, such as the palisade at Munkebo Bakke.[13] This structure is dated to *c.*600–700, whereas other military elements of the site, such as weapons, covers the period 600–1000.

The third phase, A.D. 950–1100, represents the transition from the loose structure of Phase 1 and the 'space' organisation from Phase 2 to the contours of a 'place' organisation, with the Viking Age fortress Nonnebakken as the focal point, centrally placed in the hinterland of a complex military system, which may have covered all of north-eastern Funen.[14] The main military elements of this system are described below (Figure 14.2).

4 The Main Military Structures in North-Eastern Funen in the Late Viking Age

4.1 *The Viking Age Fortress Nonnebakken*

Nonnebakken is one of five Danish Viking Age ring fortresses that were erected around A.D. 980 by King Harald Bluetooth. It is thought that a sixth fortress,

12 Runge and Bo Henriksen, "The origins of Odense," pp. 6–9.

13 Malene Refshauge Beck "Vikinger på Munkebo Bakke," *Cartha 2016 Årsskrift for Østfyns Museer* 2015/16 (2016): 39–58.

14 Mads Runge, "Revitalizing the Danish Viking Age ring fortress Nonnebakken." *Landscapes* 20 (2021), no. 2, pp. 12–13.

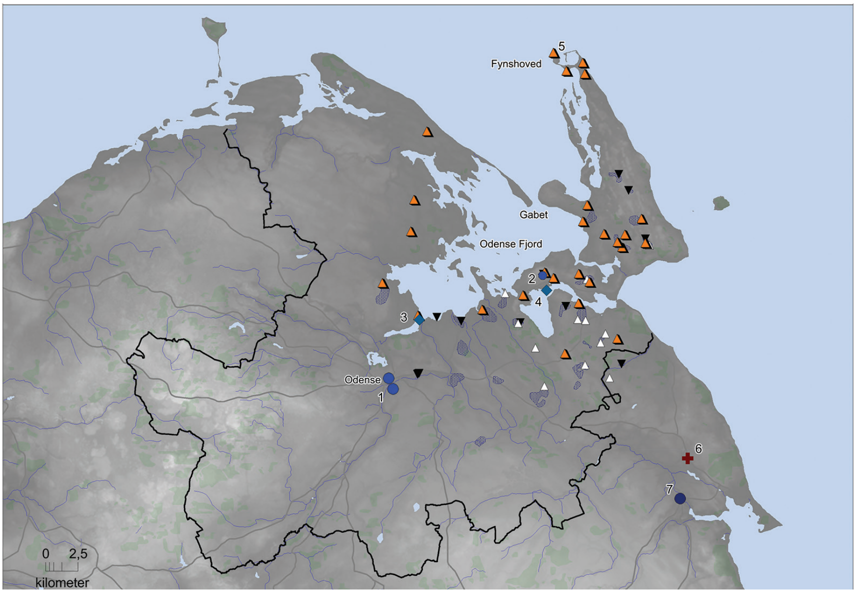

FIGURE 14.2 Sites with military elements in north-east Funen A.D. 950–1100. 1: Odense and Nonnebakken. 2: Munkebo Bakke. 3: Stige/Steeke (barrage). 4: Kertinge Nor (barrage). 5: Fyns Hoved. 6: Hjulby. 7: Gammelborg. Black triangle: Weapon accessories (Viking Age). White triangle: Weapon accessories (early Mediaeval period). Orange triangle: Sites with beacon names. Metal-rich sites are highlighted with blue hatching. The extent of the sea and forested areas is also shown

DRAWING: MALENE R. BECK

Borgeby near Lund in Sweden, may also belong to this group,[15] while Trelleborg in southern Sweden does not.[16]

15 Frederik Svanberg and Bengt Söderberg, *Den vikingatida borgen i Borgeby* (Arkeologiska studier kring Borgeby och Löddeköpinge) 1 (Lund: Riksantikvarieämbetet, 1999).

16 Bengt Jacobsson, "Trelleborg and the Southern Plain during the Iron Age. A Study of a Coastal Area in South-West Scania, Sweden," in *Centrality – Regionality. The Social Structure of Southern Sweden during the Iron Age,* eds. Lars Larsson and Birgitta Hårdh (Uppåkrastudier) 7 (Lund: Wallin & Dahlholm, 2003), pp. 191–221; Martin Borring Olesen, "Trelleborg eller ej? – om den skånske trelleborgs tilknytning til de danske ringborge" *KUML* (2000), pp. 91–111; Søren Michael Sindbæk, "Aggersborg og andre borge," in *Aggersborg i vikingetiden. Bebyggelsen og borgen*, eds. Else Roesdahl, Søren Michael Sindbæk and Anne Pedersen (Jysk Arkæologisk Selskabs Skrifter) 81 (Højbjerg: Jysk Arkæologisk Selskab, 2014), pp. 233–50; Else Roesdahl and Søren Michael Sindbæk, "Aggersborgs datering," in *Aggersborg i vikingetiden. Bebyggelsen og borgen,* eds. Else Roesdahl, Søren Michael Sindbæk and Anne Pedersen (Jysk Arkæologisk Selskabs Skrifter) 81 (Højbjerg: Jysk Arkæologisk Selskab, 2014), pp. 251–60.

FIGURE 14.3 Reconstruction drawing of the ring fortress Nonnebakken
GRAPHICS: 7REASONS

The fortresses are very similar in construction, with an outer ditch, a flat area – a berm—and a rampart. They have a gate at each cardinal point, connected by two axial roads and there is a block of buildings in each quadrant of the fortress. The fortresses are impressive constructions and Nonnebakken has a diameter of 180 m between the opposed outer edges of the ditch (Figure 14.3).

Harald Bluetooth's ring fortresses are all presumed to have been very short-lived, with a period of use of only 10–15 years. They are distributed evenly across Denmark—especially when the royal power-centre Jelling and the fortified town of Aarhus are considered alongside the fortresses—and they were central to Harald's unification of Denmark.

Nonnebakken is situated on a promontory on the southern side of the Odense Å river near the natural crossing of the waterway. The town of Odense was situated on the northern side of the river.[17] With a location immediately next to an existing town, Nonnebakken is distinctive from the other ring fortresses that are in more isolated positions. However, the factor that decided where the fortress was to be built was actually the site's location in relation to the road network, and in this respect Nonebakken is similar to Harald Bluetooth's other fortresses that were also located strategically in relation to the local infrastructure.

Nonnebakken's defensive role is emphasised by its position atop a promontory that is surrounded to the north by wetlands and the Odense Å river. To the south what appears to have been an open area kept clear of vegetation covers

17 Runge and Bo Henriksen, "The origins of Odense," pp. 14–15.

a semi-circular area with a diameter of *c.*1 km. The area might have had a function in the defence of Nonnebakken as an area that was easily overlooked from the fortress.[18]

4.2 *Odense as a Fortified Town?*

In the planform of the town, the curved delineation of two streets east and west of Viking Age Odense could suggest that the settlement was once protected by an outer ditch and rampart.[19] The total extent of the enclosed area would then have been *c.*400 m E/W and 200 m N/S, corresponding to *c.*8 ha. However, there is as yet no archaeological evidence of these defensive elements. Coring in the area in March 2023 did not give any evidence of a ditch or rampart here.[20]

4.3 *The Town's Maritime Defence*

As mentioned above, it may have been impossible for larger vessels to reach Odense, which means that the town probably had a harbour closer to the open sea. There may have been a naval base[21] by Kertinge Nor/Kerteminde Fjord on the shore of the Great Belt (see Figure 14.2).[22] It is possible that this area functioned as a harbour for Odense during most of the medieval period. The possibility that this harbour existed as early as the Viking Age is supported by the discovery of a number of naval barrages in Kertinge Nor/Kerteminde Fjord.

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18 Mads Runge, "New archaeological investigations at Nonnebakken, a Viking Age fortress in Odense", in *The Fortified Viking Age. 36th Interdisciplinary Viking Symposium*, eds. Jesper Hansen and Mette Bruus (Odense: Odense City Museums and University Press of Southern Denmark, 2018), pp. 44–59; Runge, "Revitalizing the Danish Viking Age," pp. 1–22.

19 Aage Lauritsen. "Volden omkring vikingetidens Odense," *Fynske Minder* (1974), pp. 140–54.

20 Runge and Bo Henriksen, "The origins of Odense," p. 45.

21 The term 'naval base' may be an anachronism. It is possible to trace the term *ledingsflåde* (i.e. war fleet) back through Scandinavian written sources to the 11th century, and in Denmark the term *leding* is mentioned for the first time in 1085. (See: Rikke Malmros, "Leding og Skjaldekvad. Det elvte århundredes nordiske krigsflåder, deres teknologi og organisation og deres placering i samfundet, belyst gennem den samtidige fyrstedigtning" (*Aarbøger for Nordisk Oldkyndighed og Historie* 1985, 1986), p. 90). However, the archaeological sources suggest that maritime naval bases – and thereby a system that to some degree can be equated with the *leding* system – may have existed as early as the Late Iron Age and Viking Age (See: Anne Nørgård Jørgensen, "Naval Bases in Southern Scandinavia from the 7th to the 12th Century," in *Maritime Warfare in Northern Europe. Technology, organisation, logistics and administration 500 BC-1500 AD. Publications from The National Museum*, ed. Anne Nørgaard Jørgensen (Studies in Archaeology & History) 6 (Copenhagen. National Museum of Denmark, 2002), pp. 125–26.

22 Nørgård Jørgensen, "Naval Bases in Southern Scandinavia," pp. 130–33.

Of these, the only archaeologically investigated barrage in Kerteminde Fjord was found at a point where the fjord meets Kertinge Nor. Seismic surveys and marine-archaeological investigations have shown the presence there of a 3 m-wide and *c.*200 m-long construction consisting of driven-in posts or stakes. Radiocarbon dates show that the barrage must have been in use from the Late Viking Age to the Early Middle Ages.[23]

There are indications that other barrages may exist in the fjord system.[24] A likely barrage and landing place at Pughavn just off Fyns Hoved, the north-easternmost part of Funen, consisting of boulders and ship parts, has not been investigated in detail or scientifically dated.[25] The place-name Stige ('Steeke', dating back to A.D. 1300), refers to a small village in the northern part of Odense, and may describe a post and stake-based barrage.[26] If this is indeed the case, its position was well-suited to blocking the approaches to Odense. Place-names incorporating the Old Danish (OD) element *skib* ('ship') such as *Skibeng* ('ship meadow') and *Skibagre* ('ship field') near Biskorup *c.*4 km northeast of Odense may indicate the existence of other storage and landing places, but as yet have not been proven archaeologically.[27] On the northern side of Kerteminde Fjord is the locality of Snekkeled. The term 'snekke' may be associated with the repairing of ships as well as actual shipyards.[28] Also indicative is the place-name Dræby (from the OD *Draget* ('towing place')) 10.5 km northeast of Odense, which may refer to a portage between Kertinge Nor and Odense Fjord.[29]

4.4 *Lookouts*

The barrage of Kertinge Nor is situated immediately below Munkebo Bakke where archaeological excavations suggest the presence of a settlement with a

23 Nørgård Jørgensen, "Naval Bases in Southern Scandinavia," p. 150; three radiocarbon dates: K6829, Cal 1215 AD (1050–1265 AD Cal), K6830, Cal. 1010 AD (970–1030 AD Cal), K-6831, Cal 900–960 AD (880–990 AD Cal).

24 Nørgård Jørgensen, "Naval Bases in Southern Scandinavia," pp. 130–33.

25 Ole Crumlin-Pedersen, Erland Porsmose and Henrik Thrane, eds. *Atlas over Fyns kyst i jernalder, vikingetid og middelalder* (Odense: Odense Universitetsforlag, 1996), p. 193.

26 Bent Jørgensen, *Danske stednavne* (Copenhagen: Gyldendal, 2008), p. 273.

27 Crumlin-Pedersen, Porsmose and Thrane, *Atlas over Fyns kyst*, pp. 141 and 192.

28 Bente Holmberg and Jan Skamby Madsen, "Da kom en snekke … Havnepladser fra 1000- og 1100-tallet?" *KUML* 1997–98 (1998), pp. 197–225.

29 Sofie Laurine Albris and Lisbeth Eilersgaard Christensen, "Place names and centrality around Odense and Aalborg in the Iron Age and Viking Age," in *From central space to urban place. From the central spaces of the Iron Age to the cities of the Middle Age*, eds. Mads Runge, Malene Refshauge Beck, Mikael Manøe Bjerregaard and Torben Birk Sarauw (Kulturhistoriske studier i centralitet – Archaeological & Historical Studies in Centrality) 5 (Odense: University Press of Southern Denmark, 2021), pp. 38–49.

striking and well-chosen strategic position in terms of controlling the waters on either side of the Munkebo isthmus. The site has been radiocarbon-dated to A.D. *c.*600–1000 which makes its latest parts roughly contemporary with Nonnebakken. The site's central location, in conjunction with the discovery of weapons and a strong palisade, indicates that it may have had a military function. In addition, there are indications that the settlement may have been rich: there are several very large houses that might reflect exceptional status. The recovery of exquisite metal objects, and the location on a hilltop between two large burial mounds, also add to the impression of this being a high-status settlement. The character of the Munkebo Bakke settlement supports the suggestion that the natural harbour at Kertinge Nor may have been an important site in the Late Viking Age and early medieval period.[30] The importance of the area prior to this period is indicated by the presence of the rich Ladby burial from around A.D. 900.[31]

Another important lookout may have been located on Fyns Hoved, the north-easternmost point of Funen, as from this location it was possible to survey a large proportion of the sea around northeastern Funen. However, no traces of houses, structures or other features associated with a possible lookout have been found. Nevertheless, other evidence, such as the above-mentioned possible barrage at Pughavn, as well as a silver hoard dating to the beginning of the 11th century, suggests that the site may have had some importance.[32]

5 Communication and Relations between the Military Elements

5.1 *Beacons Suggested by Local Place-Names*

North-eastern Funen has many place-names that refer to beacons or warning functions, for example *bavne* 'beacon', and *warth* 'watch'. Most were recorded for the first time in the land registers of 1682. In several cases, though, it has been possible to demonstrate that the beacon or warning names and their functions can be extended further back into prehistoric times.[33]

30 Malene Refshauge Beck, "Vikinger på Munkebo Bakke," *Cartha 2016, Årsskrift for Østfyns Museer* 2015/16 (2016), pp. 39–58.

31 Anne Christine Sørensen, *Ladby – A Danish Ship-Grave from the Viking Age* (Ships and Boats of the North) 3 (Roskilde: Viking Ship Museum, 2001), pp. 160–71.

32 Mogens Bo Henriksen, "Vikinger på Fyns Hoved." *Fynske Minder* (1994), pp. 181–92.

33 Ole Crumlin-Pedersen, "Kystforsvaret," in *Atlas over Fyns kyst i jernalder, vikingetid og middelalder*, eds. Ole Crumlin-Pedersen, Erland Porsmose and Henrik Thrane (Odense: Odense Universitetsforlag, 1996), pp. 182–93; Jytte Ringtved, "The geography of power:

Place-names denote 20 locations as possible beacon hills or warning points in the study area of Funen. Their identification comes out of work on place-names from the near-coastal parishes analysed in connection with the project *Atlas of the coast of Funen in the Iron Age, Viking Age and Middle Age periods* ('Atlas over Fyns kyst i jernalder, vikingetid og middelalder').[34] The aim of the mapping for the *From the Central Space to Urban Place* project was exclusively to assess whether a warning system could have existed in the area between the mouth of Odense Fjord and the town of Odense.

The recorded sites are mainly concentrated around Fyns Hoved, in an area south of this promontory and along the moraine hills on the northern side of Kerteminde Fjord. On Fyns Hoved, beacon names are found in close association with the landing place, but also in locations from which it is possible in clear weather to see as far as the island of Samsø[35] and from which it is possible to control the entrance to Odense Fjord as well as the Great Belt. The beacon names south of Fyns Hoved are concentrated around a number of sites with rich metal detector finds as well as place-names relevant to an understanding of the central power in the area.[36]

5.2 *An Archaeological Experiment on a Large Scale*

One of the key elements of the project *From Central Space to Urban Place* was the dissemination of the research results in four major 'events'.[37] One of these projects aimed to shed light on the communication lines of the Viking Age by lightning beacons and register whether it was possible to look from one

South Scandinavia before the Danish kingdom," *Anglo-Saxon Studies in Archaeology and History* 10 (London: Oxbow Books, 1999), pp. 49–63; Lisbeth Eilersgaard Christensen, "Centralpladsrelevante stednavne og centrale pladser på Fyn – Nye fund og mulige strukturer," in *Navn og navnebærer. Rapport fra NORNAs 45. symposium i Skagen 1.-4. oktober 2014*, eds. Martin Sejer Danielsen, Birgit Eggert and Johnny Grandjean Gøksig Jakobsen (Uppsala: NORNA-förlaget, 2016), pp. 7–33; Lisbeth Eilersgaard Christensen, "Stednavne og arkæologi i Danmark," *KUML* (2017), pp. 155–76; Thorsten Lemm, "Zum Schutze Haithabus – Die Rekonstruktion eines auf visueller Kommunikation basierenden Verteidigungssystems an der Schlei,"*Arkœologi i Slesvig/Archäologie in Schleswig*, 16 (2016), pp. 27–48.

34 Crumlin-Pedersen, Porsmose and Thrane, *Atlas over Fyns kyst,* pp. 183–93.

35 Bo Henriksen, "Vikinger på Fyns Hoved," pp. 181–92.

36 Lisbeth Eilersgaard Christensen, "Centralpladsrelevante stednavne," pp. 7–33.

37 Mette Stauersbøl Mogensen, Line Borre Lundø, Nicolai Knudsen, Christian Vrængmose and Mads Runge,"Vikingehus, spøgelsesskibe og bål i lange baner. Kompleks formidling omsat til nærværende formidling." *Odense Bys Museer* (Odense: Forlaget Odense Bys Museer, 2021), pp. 124–35.

beacon to the next. The fires were lit and maintained by local school classes and organisations.[38]

Based on the local place-names, the organisers selected eight possible beacon sites in northeastern Funen (Figure 14.4). These sites were also selected on the basis of their visibility in the landscape. Permission to access the sites was obtained from the landowners. The sites were explored to see whether they

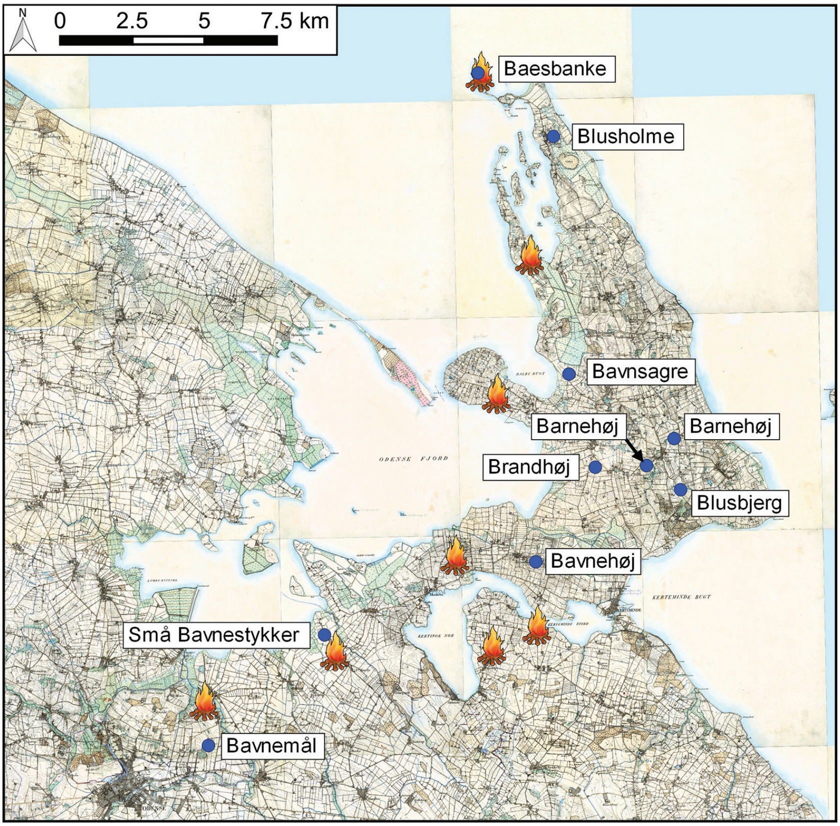

FIGURE 14.4 Beacon sites in north-eastern Funen. Blue circles: Beacon sites identified through place name research. Beacon symbols: Sites involved in the dissemination project
DRAWING: THOMAS LJUNGBERG AND THE JOURNAL *SKALK*

38 Torben Trier Christiansen, Lene Feveile, Nicolai Knudsen, Thomas Ljungberg and Mads Runge. "Lyskommunikation i vikingetiden," *Skalk* 5 (2018), pp. 3–7. The dissemination of the results from the'events' was carried out in collaboration with curators Lene Feveile, the Museums of Eastern Funen (now Ribe Viking Centre), Nicolai Knudsen, the Museums of Eastern Funen, Mette Stauersbøl Mogensen, Museum Odense, and Torben Trier Christiansen, the Museums of Northern Jutland.

were accessible by foot, and it was assessed whether the landscape had been altered since the Viking Age to a degree which may have made it more difficult to spot a beacon from neighbouring beacon sites. These changes included modern landscape elements like electric lights, new buildings, villages and towns.

It was possible to 'remove' some of these obstructions virtually through the use of computer-based viewshed analyses.[39] For example, trees and other forms of high vegetation, buildings, etc., were removed, making it possible to reconstruct a more realistic version of the landscape of the Viking Age and early medieval period.

As the burning of a beacon was intended to be a brief event, dry straw bales were used as fuel, allowing the fires to ignite quickly and burn out equally quickly. On the day, beacons atop protected burial mounds consisted of two mini-bales (held together by chicken-wire to prevent them from 'taking off' during the burning) that were placed in a large fire bowl, whereas those on open fields were built up of 5–10 loosely stacked straw bales.

The dissemination event was held from 5 pm on 8 November 2017, and lasted into the evening, a time when it was dark and where the likelihood of seeing the beacons over large distances was greatest.

The observations were carried out by the school classes and organisations responsible for the construction and maintenance of the individual fires. Prior to the event, the participating museums visited schools and organisations to explain the historical background, and arguments for a beacon system in the Viking Age. During the event, the school classes and organisations recorded their observations using a standardised form.

From the outset it was deemed important that the management and recording of the experiment was guided by the thoughts and observations of the participants and not the views of the archaeologists. In the days after the event, the pupils gathered their results and passed them on to the researchers, showing how and when they were able to see the signals from the beacons.

The inclusion of the general public in the event gave the participants a high degree of belonging and engagement, and it was perceived as important that the project created a connection of the participants to their local past. The ownership of the event was expanded further to embrace the local society at large, including parents and other local people who, deliberately or randomly, passed by on the day (Figure 14.5).

39 These analyses were carried out by Thomas Ljungberg, Department of Geoscience, Aarhus University.

FIGURE 14.5 Lit beacon at one of the sites near Odense Fjord
PHOTO: MUSEUM ODENSE

5.3 *The Limitations and Results of the Experiment*

The experiment was carried out when it became dark, because it was important to create a special atmosphere around the darkness and the fire. However, it is important to emphasize that the signalling system should function in both darkness and light. During the dark hours, the fire was clearly visible, whereas during the bright moments, the columns of smoke were visible.

In terms of the visibility of the lit beacons, modern light pollution was the greatest challenge. The most significant was the presence of the Lindø Shipyard which created a modern 'light barrier' across the area from the north-eastern point of Funen towards the city of Odense. However, streetlamps, electric lights from modern houses, cars, etc. all made it difficult to assess the beacons' visibility in the past. Moreover, although the project area is relatively sparsely built up, it was also a problem that there are now more houses and taller buildings than in the past.

It was also a challenge that several of the fires for practical reasons had to be relatively small and contained in fire bowls. Most of the prehistoric fires were probably larger and easier to spot over large distances. The situation was not made easier as, on the day, the weather was still, and as a consequence the straw bales only smouldered, unless the fires were fed extra oxygen by fanning. The still weather, and the resulting smouldering fires, also meant that notable vertical columns of smoke formed. As the beacons were lit just around dusk they were initially discovered due to the smoke columns. When darkness fell, the smoke columns were no longer visible at a distance, corresponding to the earlier mentioned assumption, that the beacons should function in both light and darkness.

Besides the light pollution and the relatively small fires in the experiment a third factor in the comparison between the reconstructed and the "original" beacon line was that the combined number of beacon sites in the project area may originally have been larger than the eight beacons (re)lit in our experiment.

Finally, it is also possible that the experienced beacon caretakers of the past, to whom a well-functioning beacon system may have been a matter of life and death, knew where to look and had a better eye in terms of spotting lit neighbouring beacons. In addition, they subsequently probably knew how to optimise the effectiveness of their own local beacon.

With the above-mentioned factors in mind, it is highly likely that the experiment represents a kind of 'minimum scenario' in terms of how the prehistoric reality may have been. It is therefore remarkable that the experiment was as successful as it was in terms of the visibility from one beacon to the next.

Thus, in seven out of eight cases, the observers were able to spot neighbouring lit beacons despite the fact that some were separated by as much as 12 km. However, several of the signals were vague and amounted to little more than small, flickering lights. The experiment resulted in the formation of a chain of light, from the obvious outlook on Fyns Hoved towards the north-east and the important locations Munkebo Bakke, and Ladby *c.*20–25 km towards the south. It was also possible to send a signal from Ladby to the eastern part of Odense, a distance of a further 15 km. In the latter case, the main challenge was a high degree of light pollution.

One of the more important aims of the experiment was to record how much time it would take a signal to be sent from one end of the system to the other. The beacons were therefore lit successively, starting with the beacon on Fyns Hoved, then moving south and finally west. The conclusion was that it only took a few minutes from the time a beacon was lit on Fyns Hoved until the signal had travelled through the line of beacons to Ladby.

6 Communication, Landscape and Military Installations

In the Late Iron Age and Viking Age, northeastern Funen was a relatively wealthy area. It has several large metal-rich settlements, as well as many place-names and excavated archaeological sites with indications of a central power, for which reason the area has been referred to as a 'gateway community'.[40] Odense's strategic location at the centre of the main road network, allowed the town to dominate Funen. And the presence of several natural harbours, coastal lookouts, and military locations scattered in the north-eastern part of Funen meant that a central power in Odense could also dominate the main waterways around northern Funen. An effective communication system linking these different elements was essential, and the system of beacons outlined above may have played an important role to that end.

The complete picture of a town and fortress at some distance from the coast, with a central location in relation to the main road network, combined with protected harbours and anchorages, strategically located lookouts and a fine-meshed network of beacons formed a unified system on a geographical scale, which we are usually not able to record archaeologically. The connections between the individual sites are still hypothetical, but they are supported by the area's topography, which has changed little since the Viking Age. The relatively flat topography of north-eastern Funen, with its natural harbours and several notable hills, formed a suitable natural framework for a combined system with functions relating to communication and defence.

As shown above, the investigation of large cultural landscapes offers several research opportunities. However, the large topographical scale of this project also had special advantages in terms of the dissemination of archaeological and historical information to the general public. The participants were given the opportunity to embrace the landscape in an entirely new manner, and the actual event received, due to its scale, a great deal of media attention, locally as well as nationally.

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40 Maria Panum Baastrup, "Continental and insular imports in Viking Age Denmark – on transcultural competences, actor networks and high-cultural differentiation," in *Northern Worlds – landscapes, interactions and dynamics. Research at the National Museum of Denmark. Proceedings of the Northern Worlds Conference, Copenhagen 28–30 November 2012*, ed. Hans Christian Gulløv (Studies in Archaeology and History) 22 (Copenhagen: University Press of Southern Denmark, 2014), pp. 353–67.

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CHAPTER 15

Anxious Sentries or Centuries of Anxiety? How the Landscape Enabled Medieval and Post-medieval Coastal Security on the Isle of Man

Andrew Johnson

1 Introduction

The author has previously considered the reoccupation of late prehistoric promontory forts on the Isle of Man as component places from which an organised medieval coastal watch-keeping system operated,[1] spurred in part by a similar suggestion voiced briefly by Marshall Cubbon.[2] Previously, the island's coastal defence had largely been contemplated from the perspective of documentary evidence from the 15th to the 18th century, focussing on its legal regulation, folk memory, social history, and the fragments of its organisation and officialdom that survive to the present day.[3] These earlier works offer little in the way of reappraisal of the evidence or of each other's conclusions.

The author's longer-term research interests lie in the landscape history of the Isle of Man, and these have gradually evolved to include the seascape of the Irish Sea and the encircling coastlines that rise and dip on the horizon, and contemplation of how islanders might interact with their surroundings: if the island's coastline defines what its people may directly control, then the ways those same people manage the coastline and utilise the topography can

1 Andrew C.C. Johnson, "A View from the Hills: some thoughts on the re-occupation of promontory forts and the possible origins of the Manx farmstead," *PIOMNHAS* 11 (2000), pp. 51–66; Andrew C.C. Johnson, "Watch and Ward on the Isle of Man: the Medieval Re-occupation of Iron Age Promontory Forts," in *Mannin revisited: Twelve Essays on Manx Culture and Environment*, eds. Peter Davey and David Finlayson (Edinburgh: Scottish Society for Northern Studies, 2002), pp. 63–80.

2 A. Marshall Cubbon, "The Archaeology of the Vikings in the Isle of Man," in *The Viking Age in the Isle of Man*, eds. Christine Fell, Peter Foote, James Graham-Campbell and Robert Thomson (London: Viking Society for Northern Research, 1983), pp. 18–19.

3 David Craine, "The Vigil of Man," *JMM* 3 (1935), pp. 16–17; William Cubbon "Watch and Ward in AD 1627," *PIOMNHAS* 3 (1930), pp. 258–65; William Cubbon, *Island Heritage* (Manchester: George Falkner & Sons, 1952), pp. 118–30; Basil R.S. Megaw, "A Thousand Years of Watch and Ward," *JMM* 5 (1941), pp. 8–13.

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provide them with the means to project that authority into the surrounding sea and beyond.

From this can spring a variety of forms of power, and this paper aims to show how this was manifested not simply in terms of defence, but in a range of interactions grading from the simple knowledge and observation of human comings and goings, through the policing of trade and the taxation of merchandise, to martial security. In adopting this more nuanced approach, this study also builds on previous work by exploring the physical characteristics of the watch-sites and their surrounding landscapes in more depth, as well as viewing them through the lens of the later medieval and post-medieval documentary and place-name evidence, with the aim of suggesting how the system could have evolved through time.

Note: place-names on the Isle of Man are mostly derived from Manx Gaelic (Mx), though some are from Old Norse (ON) or contain elements thereof; a few are English, or have been translated into English. Translations are provided where relevant.

2 Documentary Sources

2.1 *"A pfect Remembrance"*

The key to any study of early coastal defence on the Isle of Man is a brief document—*"A pfect Remembrance conteyning all the names of the Wardens both of the Day and Night Watches throghout the Isle of Man together with the names of evry Pishe and Place where the Watches are kept"*—dating from A.D. 1627. It was first published by William Cubbon,[4] and lists the island's sixteen coastal parishes, against which additional columns tabulate *wardens* for the day- and night-watches, the *hills for day watch*, and the *hills and ports for night watch* (Figure 15.1). It is the single, most complete, document known to survive that provides an understanding of the watch system in operation at that date by listing the sites, the roles, and the individuals who filled them.

2.2 *The "Vigil"*

The 1627 document is partially complemented by several incomplete lists from the period 1497–1500 recording individuals and the roles they filled within an unnamed, island-wide watch system. These lists are simply titled *vigil* ('guard'), leading David Craine[5] to coin the term, the *Vigil of Man*. Allowing for the

4 Cubbon, "Watch and Ward," pp. 258–65.
5 Craine, "The Vigil of Man," pp. 16–7.

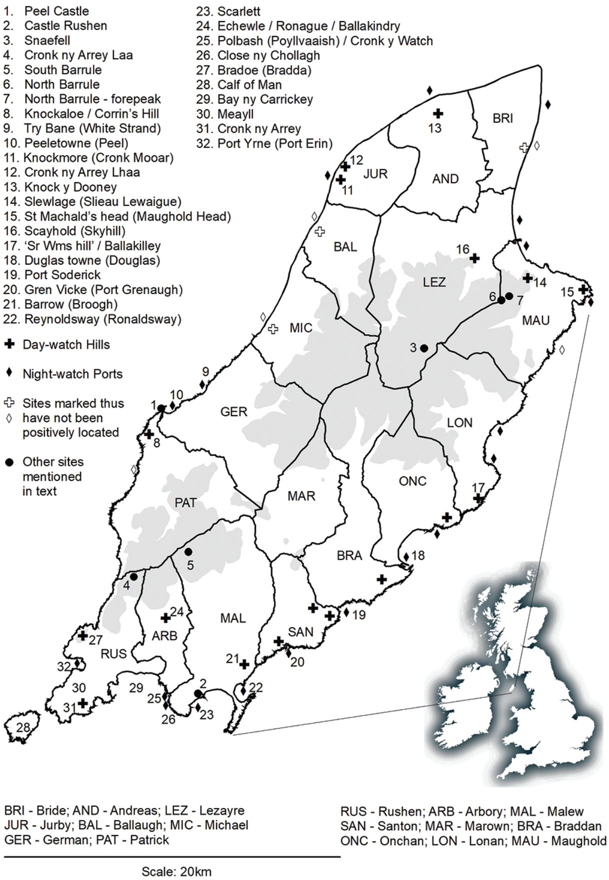

FIGURE 15.1 The Isle of Man: location of places mentioned in the text, 'hills of the day watch' and 'ports and hills of the night watch' as listed in 1627, together with other hills and ports used before and since; shaded ground above 180m; parish names abbreviated—see key; inset shows Isle of Man, Britain and Ireland

BASE MAPPING COURTESY ISLE OF MAN SURVEY, ANNOTATIONS BY AUTHOR

abbreviated early post-medieval Latin employed, there were three roles: that of *custos*, and of two others who had duties *p*(*er*) *diem* and *p*(*er*) *noctem*. The lists were included in a set of Manx legal records (*Liber Placitorum*, or Book of Pleas), though Cubbon[6] followed Craine in mistakenly assigning the source to another set of early Manx legal records, the *Libri Scaccari*.

6 Cubbon, *Island Heritage*, p. 119.

Craine interpreted *custos* as 'warden', and the others as 'lieutenants' for the day and night; in several cases, the *custos* also held one of the other roles. These lists do not indicate the disposition of these officers on a parish-by-parish basis, gathering them instead by *sheading*, a small administrative region comprising two or three parishes. Nevertheless, the way the names are grouped suggests a command structure functioning at parish level, an observation Craine used to identify the individuals named through reference to the lands they held a few years later in the oldest extant rent-books from the early 1500s. Cubbon[7] later summarised Craine's list, though with minor inconsistencies.

2.3 *Captains of the Parish*

Cubbon[8] noted that six of the twenty-nine wardens named in A.D. 1627 reappeared on another list, headed *"Captens of Pishes, 1627"*, which forms the final part of the *Remembrance* document. He later revised the number to seven, perhaps in error.[9] The title persists today, though is largely honorary.

Quarter of a century later, the military roles of the Captains and their officers were thrown into sharpest focus by the Manx involvement in the civil wars that wracked Britain and Ireland between A.D. 1639 and A.D. 1653. The Isle of Man had been held by its royalist lord, the Earl of Derby, but in A.D. 1651, in the face of invasion by a Parliamentary expeditionary force, the Manx rebelled under William Christian, hitherto a trusted official in the earl's service.

Christian's subsequent execution in A.D. 1663 was largely secured on the basis of statements given by his fellow conspirators—most of them the very officers charged with mobilising and leading the defence of the island—recalling events and actions more than a decade before.[10]

These depositions clarify that by A.D. 1651 each parish (together with Douglas, the largest settlement) came under the charge of a captain, supported by a lieutenant. These officers were responsible for mustering and leading the militia in support of the watch. The actual call to arms involved a curious process of passing an object, the *crosh vushtey* (Mx, 'mustering cross'), from household to household: both custody of the *crosh*, and the decision to commence its circulation, lay with the officers.

7 Cubbon, *Island Heritage*, p. 119.

8 Cubbon, "Watch and Ward," p. 264.

9 Cubbon, *Island Heritage*, p. 120.

10 See William Harrison, ed. *Illiam Dhone and the Manx Rebellion* (Edinburgh: Manx Society, 1877), pp. 4–27, for the most accessible assemblage of these statements, and, pp. 63–76, for the relevant passages from the *Mercurius Politicus*.

2.4 *The Crosh Vushtey*

Cubbon[11] describes the *crosh vushtey* as about 200 mm across, formed of two pieces of mountain ash (*Sorbus* sp.) mortised and dowelled together: his drawing shows it as an asymmetric shape providing space on one arm to grip it in the hand, such that the written and illustrated dimensions appear inconsistent with each other. Unfortunately, no example survives, and Cubbon's source regarding its form is unclear.

Cubbon compares the *crosh* to the 'war-arrow' of saga literature in terms of its circulation and the penalties for ignoring its summons, and also refers to Clague[12] whose collection of folk reminiscence of a time before A.D. 1800 from the south of the island briefly describes the circulation of a *crosh losht* (Mx, 'burnt cross') to rouse the population; Clague's account appears, however, to be the only reference to this 'burnt cross'. Cubbon[13] also recounts a picturesque tale of the last occasion the *crosh* was sent out—as a means of assembling a parish in A.D. 1843.[14] Cubbon also makes it clear, however, that as early as the beginning of the 17th century more conventional drums and church bells were also being employed to raise the alarm.

2.5 *Early Statutes and Unofficial Observations*

The very earliest written evidence for watch-keeping dates to the 1420s and can be found in the *Lex Scripta*:[15] by then the system is already well-established, is known as 'watch and ward', and is maintained throughout the year at ports around the coast and in the two castles (ie, Peel and Castle Rushen). Punishment for not turning out when one's turn was due is severe, "upon paine of life and lyme". 'Ward' (ON, *varða*) has a range of connotations and is a difficult word to define in a specifically Manx context, with a variety of meanings, including 'beacon', and the act of keeping watch.

Greater detail is provided in A.D. 1577: those undertaking watch duties are to be conscientious and of sound judgement, and subject to strict time-keeping. Once the alarm is raised, 'everyone' is required to muster, "upon pain of forfeiting life, body, and goodes".

11 Cubbon, *Island Heritage*, pp. 124–30 and Fig. 35.
12 John Clague, *Cooinaghtyn Manninagh: Manx Reminiscences* (Castletown: Backwell, 1911), pp. 237–39.
13 Cubbon, *Island Heritage,* pp. 126–27.
14 See Paton (no date) for further details.
15 Also known as the Manx Statutes – the usual printed edition is Mark A. Mills, ed. *The Ancient Ordinances and Statute Laws of the Isle of Man* (Douglas: Phoenix Press, 1821). The edition is arranged in date order – see entries for the years noted.

In the 1590s, the laws are reiterated and the fines increased, due to the "great repugnancie" felt towards the obligation. The statutes are largely silent thereafter—there is a detailed description of how the watch is maintained in the castles in A.D. 1610—but its persistence is confirmed in A.D. 1711 when certain officials are exempt from duty.

The earliest statutes from the early 15th century detail the arms and equipment of the castles' professional officers and soldiers: "that every officer and soldier have bowe and arrows, sufficient dublett or habergion, a sword and a buckler, spurrs and saddle".[16] Duty watchmen are rudimentarily armed, if at all: once the alarm is raised, however, the able-bodied turn out in force with whatever weapons they possess, and already by this time statutory provision is made for eldest sons to inherit their father's weapons.

Officers are more heavily armed, and are expected to possess horse and harness. By the 17th century, their duties extend to inspecting the watch, calling the parish to arms, carrying messages, providing a ceremonial escort to their captain, and attending the Lord of Man or his deputy on occasions such as the annual parliamentary assembly, Tynwald.[17]

The practical aspects of their roles in raising the militia in A.D. 1651 are detailed in the depositions from William Christian's trial eleven years later, and partially corroborated by a contemporary pro-Parliamentarian narrative, the *Mercurius Politicus*.[18] The arrival of the invasion fleet had been anticipated, and the Manx conspirators had already secretly made ready to seize military assets, so when the fleet—a substantial squadron of 44 vessels—first appeared off the south coast, a muster of reportedly 800 men from six of the nearby parishes had been gathered in readiness just a day before in preparation to take Castle Rushen.[19] This was only possible due to the rapid movement of the officers—mostly the lieutenants on horseback—not only communicating with their parish captains but seeing to it that the mustering crosses were sent out.[20]

With the arrival of the fleet, a substantial part of the southern muster tracked the ships as they made their way along the east coast until eventually finding anchorage and shelter off the northern town of Ramsey.[21] Here one of the parish lieutenants had been nominated to negotiate, assuring the

16 A 'dublett' (doublet) was a short padded or quilted jacket; 'habergion', a long chain-mail shirt or hauberk; 'buckler', a small round shield.

17 David Craine, "The Horsemen and their Successors, 1793–1825," *JMM* 3 (1937), p. 167.

18 Harrison, *Illiam Dhone*, pp. 4–27, 63–76.

19 Harrison, *Illiam Dhone*, pp. 5, 65.

20 Harrison, *Illiam Dhone*, pp. 6–7, 10, 12, 14 and 20.

21 Harrison, *Illiam Dhone*, pp. 6, 10 and 65.

Parliamentary leaders that only Castle Rushen remained to be taken, as parish musters from the north and west of the island had successfully secured all other fortifications.[22] A few days later the invasion fleet returned to the south where, after disembarking their siege equipment in a show of force, the castle was surrendered.

A survey of sources would be incomplete without William Blundell's observations contained within his *History*,[23] written following his sojourn on the island from A.D. 1648 to A.D. 1656, and thus broadly contemporary with the period described in the depositions of the Manx Rebellion conspirators.

Blundell describes a watch kept day and night from the island's highest mountain, from hills in the west of the island (these must be Cronk ny Arrey Laa and South Barrule, Figure 15.1), and from the four main towns and their associated fortifications; the likely landfall of any approaching ship is observed and any landing is met by a force of armed men, whether it be at one of the ports or at a rivermouth or other low-lying beach.[24] He confuses the island's highest peak with the day-watch hill for Lezayre, and omits the coastal hills and ports. Unlike other accounts, however, Blundell also relates how vessels are routinely met by officials and their business investigated and cargo valued.[25]

3 The Archaeology of the Watch Sites

Archaeological excavation of possible watch-sites has been very limited, but has shown that several Iron Age promontory forts were re-used during the medieval period;[26] a small number of other sites display similar evidence, some without signs of previous use.[27] The first of Peter Gelling's excavations

22 Harrison, *Illiam Dhone*, pp. 10, 66–7.

23 William Harrison, ed. *A History of the Isle of Man written by William Blundell Esq 1648–1656* (Edinburgh: Manx Society, 1876).

24 Harrison, *A History of the Isle of Man*, pp. 50, 80, 89–92 and 95–97.

25 Harrison, *A History of the Isle of Man*, pp. 70–72.

26 Peter S. Gelling, "Excavation of a promontory fort at Port Grenaugh," *PIOMNHAS* 5 (1952), pp. 307–15; Peter S. Gelling, "Excavation of a promontory fort at Scarlett," *PIOMNHAS* 5 (1957), pp. 571–75; Peter S. Gelling, "Excavation of a promontory fort at Cass ny Hawin," *PIOMNHAS* 6 (1959), pp. 28–38.

27 Gerhard Bersu, "A promontory fort on the shore of Ramsey Bay, Isle of Man," *Antiquaries Journal* XXIX (1949), pp. 62–79; Roger C.P. Doonan, Paul Cheetham, Blaze O'Connor, Thomas Eley, and Kate Welham, "Investigations at Langness: the 2000 field-season," in *Billown Neolithic Landscape Project, Isle of Man: Sixth Report, 2000*, ed. Timothy Darvill (Bournemouth: Bournemouth University School of Conservation Sciences, 2001), pp. 40–47.

was published in the same year as William Cubbon's second account of watch and ward. Given Gelling's initial interpretation of the medieval phase as a small domestic house of the Viking Age there is no reason for either author to have considered the other's work; Cubbon, on the other hand, might more reasonably be expected to have taken note of Gerhard Bersu's interpretation of Vowlan as a coastal promontory from which beached ships might be protected,[28] but omitted to do so.

The evidence for medieval use of these sites cannot easily be classed as domestic and, in contradiction of both Gelling and Bersu, this author has therefore previously reassessed these and other coastal promontories as watch-sites.[29] At the same time it was noted that, should the need for watch-keeping have extended back to pre-parochial times before the 12th century, it would necessarily have been organised on a different basis.[30] This reinterpretation has since been acknowledged by Wilson and broadened to include oversight of beach markets;[31] in this context, an ever-increasing body of metal-detected finds of hoarded coin, hack-silver and bullion not only indicates that the island was part of a thriving trade network, but also felt insecure.[32]

4 Landscape Survey

While the author's earlier reinterpretation was mostly focussed on a sample of potential places from which watch might be kept, more can now also be said about the sites from a landscape perspective, based on study of both topography and historic landscape use.

4.1 *The Hills of the Day-Watch*

The Isle of Man (Figure 15.1) is nowhere more than about 17 km wide, but is divided visually by an upland ridge snaking 32 km along its SW–NE axis, and

28 Bersu, "A promontory fort," pp. 75–76.
29 Johnson, "Watch and Ward," pp. 73–79.
30 Johnson, "Watch and Ward," p. 78.
31 David M. Wilson, *The Vikings in the Isle of Man* (Aarhus: Aarhus University Press, 2008), pp. 92–5, 116–18, and pers. comm.
32 Kristin A. Bornholdt Collins, *Viking Age Coin Finds from the Isle of Man: A Study of Coin Circulation, Production and Concepts of Wealth* (University of Cambridge, Unpublished PhD thesis, 2003), pp. 330–41; Kristin A. Bornholdt Collins, Allison Fox and James Graham-Campbell, "The Glenfaba Hoard (c. 1030), Isle of Man," in *Early Medieval Monetary History*, eds. Rory Naismith, Martin Allen and Elina Screen (Farnham: Ashgate, 2013), pp. 481–4 and 508.

rising to a maximum altitude of 621 m. Two of its highest summits bear the name Barrule, which derives from Wardfell, (ON, 'watch-hill'). The earliest written form, *Worzefel*, occurs in a late 13th century Latin chronicle entry, and the same source also contains an early 14th century entry, *Warthfel*; they are known today as North Barrule (564 m) and South Barrule (482 m), and are located at or near the extremities of the ridge.[33] Close to the latter summit an additional hilltop—Cronk ny Arrey Laa (Mx, 'hill of the day-watch')—rises 442 m straight out of the sea, and the name also occurs at three further coastal locations around the island, though none of the others achieves more than a fraction of the altitude of the first.

The day-watch sites listed in A.D. 1627 typically combine prominence with coastal proximity. Most have been identified through documentary sources, place-names and field survey, except on the north-west coast where coastal erosion in the parishes of Michael and Ballaugh has prevented certain recognition, and in the southern parish of Arbory, where the significance of an obscure place-name has hitherto resisted definitive interpretation.

It is notable that, in contrast to the high summits on the main ridge, none of the sites are of such extreme height—the highest, Bradda (Rushen), attaining just 233 m, and Slieau Lewaigue (Maughold), 226 m. In the remaining eleven coastal parishes, most day-watch hills are of the order of 100–150 m high, except for the low-lying northern plain, where the sites are just 32 m (Jurby), 52 m (Andreas) and 89 m (Bride), and in the south-east, where the coastal hilltop in Malew is just 48 m high.

4.2 *The Ports of the Night-Watch*

The ports of the night-watch in A.D. 1627 are similarly identifiable. Once again, those for the north-west parishes of Michael and Ballaugh cannot be located with certainty; the same is true of Patrick a little further south, though the places that were vulnerable are obvious. In the north of the island the hills for the day-watch also serve as gathering places for the night-watch in Jurby and Andreas; the parish of Bride has both a port which can be readily identified today, and a hilltop—crossed out—which cannot. The east coast night-watches for Maughold, Lonan and Onchan all gathered at two points so as to protect the mouths of rivers and streams that are not intervisible.

33 George Broderick, ed. *Chronicles of the Kings of Man and the Isles* (Douglas, Manx National Heritage, 2004), pp. IX–X.

5 Discussion

5.1 *A Broader View*

Previous studies—including the author's own—have perhaps focussed on specific aspects of the watch system without teasing out some of the nuances of the documentary evidence, or investigating the landscape as covered in the preceding section. The consequences of doing both, and with reference to each other, are explored below.

An important point to note is that the list of A.D. 1627 is more than a simple 'snapshot':

- Two night-watch sites and one day-watch site have been crossed out, recording continued revision of the system after the document was first written.
- Two neighbouring parishes are lumped together, though their respective watch-sites are all included.
- Every parish has a single day-watch site, with the exception of one, which has two, but five parishes have two, or even three, night-watch sites: it can be observed that one parish has an angular coastline which cannot be adequately overseen from a single hilltop, and that several of the others have more than one landing place which is potentially vulnerable.
- The general position of almost every watch-site is known, after observations by Cubbon,[34] of the more substantial landholding families—from which officers were likely to be drawn—permitted the allocation of even the less identifiable sites to an historical landholding.

The scope for change through time is clear, as the following re-evaluation seeks to demonstrate (see Figure 15.1).

Beginning in the west (as does the A.D. 1627 list), the day-watch for both Patrick and German was located at Knockaloe in Patrick, the highest point of which is now called Corrin's Hill. A lesser summit on the same ridge lies less than 1 km to the NNE within German, and it seems likely that both peaks, which have very different views, could have been used, depending on the location of a perceived threat or weather conditions. During the lifetime of the A.D. 1627 document, the night-watch site for German at Try Bane (now White Strand) was abandoned for another beachside mustering point adjacent to the main settlement at Peeletowne (now Peel). While the latter was more convenient, Try Bane was a fine and secluded landing site, so it must be inferred that Peel was considered capable of providing an adequate observation point for both beaches.

34 Cubbon, "Watch and Ward," pp. 258–63.

For reasons already described, Michael and Ballaugh are problematic, and are therefore excluded from consideration. Further north, in the parish of Jurby, both watches gathered at Knockmore (now Cronk Mooar, Mx, 'big hillock'), a Viking Age burial mound adjacent to a chapel which served as the parish church from the 12th century until it became the parochial school at the end of the 17th century: the easy accessibility of this complex of sites from the rest of the parish is noteworthy. Just 1.15 km to the NNE, however, on a low-lying coastline of which the principal landmarks are a series of Viking burial monuments, stands another burial mound which bears the name Cronk ny Arrey Lhaa, whose meaning has already been discussed.

The day- and night-watches for Andreas were kept from Knock y Dooney (Mx, 'hill of the church'), another Viking Age burial mound with a vast viewshed; Bride (see above) cannot be clearly identified, whilst Lezayre is described below.

In the north-east parish of Maughold, there were two day-watch sites, at Slewlage (now Slieau Lewaigue) and St Machald's head (now Maughold Head). The former has an outlook predominantly to the north, and the latter, being on the outermost point of the parish, a 280° view from WNW to SSW, albeit from a lower altitude.

High above both is the summit of North Barrule, named for its watch-keeping function, and the island's second-highest peak. It stands at the end of a sharply-defined 3.7 km ridge and its daily ascent would be a significant and unnecessarily burdensome commitment for the watch-keepers with every risk that increased altitude might also bring poor visibility. There is a fore-peak, however, of 441 m, on the flat summit of which field-survey has now identified a low artificial platform suitable for a beacon, surrounded by seventeen potential rudimentary shelters grouped into several clusters amongst the exposed bedrock (see Figure 15.2). The true summit of North Barrule is shared with the neighbouring parish of Lezayre, and whilst by A.D. 1627 the Lezayre day-watch was nearby on Scayhold (now Skyhill)—conveniently adjacent to the property of the parish captain and his lieutenant—it is perfectly possible for the hill to have served as the watch site for the whole of the locality in pre-parochial times, much as Patrick and German may have shared the ridge of Corrin's Hill.

To the south of Maughold, the day-watch for Lonan in A.D. 1627 gathered at 'Sr Wms hill': Sir William Norris was the vicar of the parish until his death that same year, and it is notable that the highest point on the nearby coastline lies just 500 m east of his church, on Ballakilley (Mx, 'the farm of the church'). As with Jurby, the conjunction of the watch-site with monuments associated with the parish church, and the ease of access from all points of the parish, are striking.

In A.D. 1627 the neighbouring parishes of Onchan and Braddan were bracketed together and, whilst each had its own warden, the night-watch for

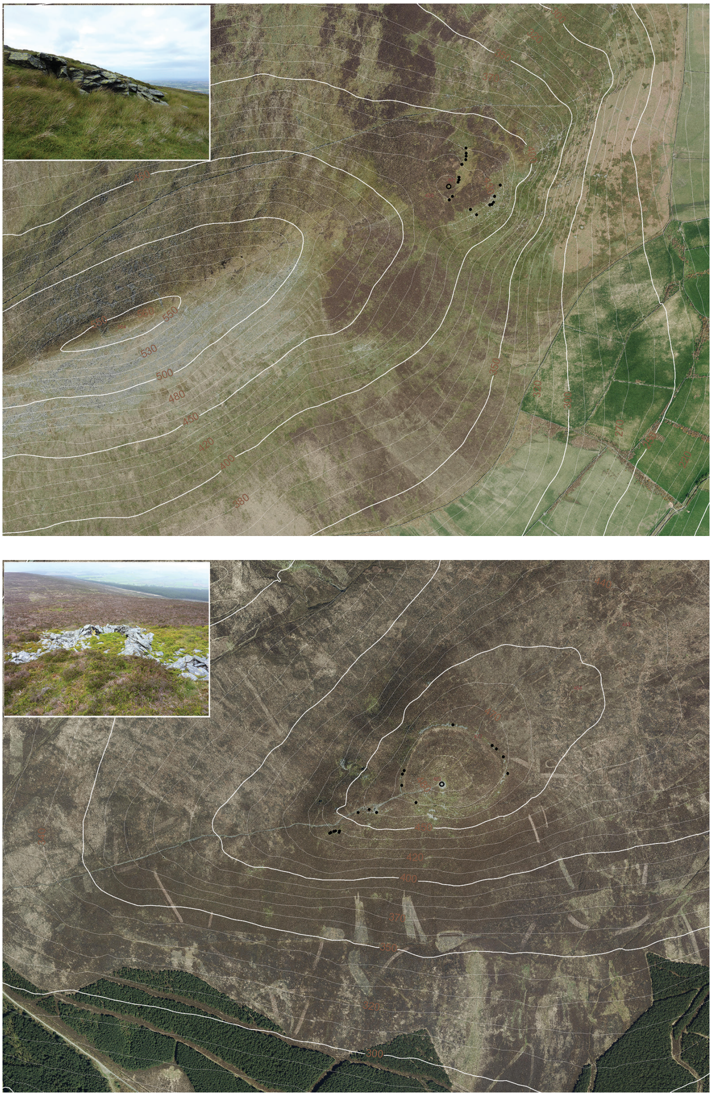

FIGURE 15.2 Top, North Barrule: the true summit (564 m) lies towards the left, whilst the fore-peak is towards top right. Black dots mark shelters amongst the exposed bedrock (see inset); the open circle marks the platform on which the beacon was presumably set. Bottom, South Barrule: the summit (483 m) lies just right of centre. Black dots mark shelters built using stones from the collapsed rampart (see inset), whilst further shelters are located amongst crags on the approach from the west; a summit cairn now marks the presumed site of the beacon. Contours in white (bold contours at 50m intervals).

BASE MAPPING COURTESY ISLE OF MAN SURVEY, FIELD SURVEY BY AUTHOR

Braddan mustered within Onchan. This probably reflects both the vulnerability of the wide bay at Duglas towne (now Douglas) and its convenience adjacent to one of the island's largest settlements. Nevertheless, this arrangement would have left the other landing place in the parish—the isolated bay at Port Soderick—unguarded, and not easily protected by the watch in the adjoining parish of Santon, which mustered at Gren Vicke (from ON, 'green inlet', now Port Grenaugh). The sheltered beach here lies less than a kilometre from the parish church, which, like Jurby and Lonan, is significant for its accessibility and the group of medieval funerary landmarks associated with it. Coastal hilltops to east and west of Port Grenaugh make suitable alternatives to the 'official' 1627 day-watch site, and the former has the added advantage of an overview of Port Soderick.

Malew, alone of the sixteen coastal parishes, had no day-watch warden in A.D. 1627, and it is therefore not clear whether the watch was even currently maintained from the small hilltop of Barrow (now the Broogh): the otherwise low-lying coastal landscape would suggest that an adequate watch could be achieved from the high wall-walks of Castle Rushen nearby—which had its own captain and command structure. In contrast, careful provision was made for the night-time security of the parish with two well-chosen muster-points at Reynoldsway (ON, 'Rognvald's ford', now Ronaldsway) and Scarlett.

The highest point in Malew is South Barrule, but the summit, crowned by a prehistoric hillfort, lies almost 8 km from the parish coastline, and would have been impractical. As already described, its name clearly indicates that the hill served a watch-keeping purpose at a time within memory when Old Norse was prevalent, however, and following the survey of its northern namesake, a similar investigation and reassessment of known features around the summit plateau has been undertaken (see Figure 15.2).

This identified at least nine simple, small, stone shelters built into the collapsed rubble of the outer rampart of the hillfort, the purpose of which has hitherto been unexplained. Although not definitively dated by excavation, these shelters are clearly much more recent than the structure into which they have been built; they are also in the wrong location—significantly higher in altitude and far from a reliable water supply—to have featured in seasonal medieval transhumance as once practised on the island and which might otherwise have explained their presence.

In addition, another ten examples have been identified of simple shelters making use of rock outcrops, crevices and overhangs, similar to those already observed on North Barrule. These are grouped into three clusters at varying altitudes on the most obvious ascent route from the west. Like its northern namesake, this again suggests a provision for using alternative sites on the same hill, depending on cloud-cover or other climatic issues.

The parish of Arbory possesses an unusually short coastline suggesting that historical adjustments may have resulted in Malew to the east and Rushen to the west gaining land at its expense; certainly the parish as now defined is significantly smaller than both of its neighbours. The location of the day-watch site at Echewle has previously defied close identification, though Cubbon[35] proposed the locality of Ronague. Fieldwork suggests that a slight eminence of 144 m aOD to the west of a former road (now a private farm track) on the historical landholding of Ballakindry, towards which several other roads, tracks and public rights of way converge, could be a potential candidate. Broderick[36] offers a possible ON derivation for Echewle, 'cart-track mountain', which is attractive in the circumstances. The site is only a short distance from the findspot of an early 14th century coinhoard. The highest points in the parish lie another 2.5 km to the north on the flanks of Cronk ny Arrey Laa and suffer from practical shortcomings similar to South Barrule.

The Arbory night-watch assembled at Polbash (now Poyllvaaish), where a rock outcrop bears the name Cronk y Watch (Anglo-Mx, 'hillock of the watch'). Poyllvaaish has usually been translated as 'pool of death', but while Broderick[37] suggests alternatives, the outstanding quality of the bay as a calm, sheltered landing place, on an otherwise dangerously rocky coastline, has previously gone unacknowledged. Whilst not listed in A.D. 1627, the Iron Age promontory fort at Close ny Chollagh in Malew was re-used during the medieval period, and the author has previously shown that it is a likely watch-site.[38] Located just 200 m from Poyllvaaish and barely 500 m from Cronk y Watch, it is clear that all three sites are linked, and together with artefact evidence for nearby beach-market activity, suggests that Poyllvaaish was a significant coastal location requiring security and control before the creation of the present boundary between Arbory and Malew imposed a parochially organised framework on watch-keeping.

Lastly, Rushen, located like Maughold at one of the island's extremities, is similarly difficult to secure. In A.D. 1627 the day-watch was at Bradoe (now Bradda): the true summit (233 m aOD) provides a viewpoint northwards up the west coast and south towards the Calf of Man islet, as well as overland towards Bay ny Carrickey. Nevertheless, its effectiveness is compromised by the intervening mass of the Meayll peninsula at the southern end of the parish: the place name Cronk ny Arrey (Mx, 'hill of the watch'), attached to one of two summits on the peninsula that stand just over 160 m aOD, indicates that

35 Cubbon, "Watch and Ward," p. 263.

36 George Broderick, *Placenames of the Isle of Man 6* (Tubingen: Niemayer, 2002), p. 304.

37 Broderick, *Placenames*, p. 319.

38 Gelling, "Excavation of a promontory fort at Scarlett," pp. 571–75; Johnson, "Watch and Ward," p. 78.

a watch was once kept here, securing the south side of the peninsula, the Calf of Man, and the sound between the two. At night, the sole mustering place of the night-watch in A.D. 1627 was at Port Yrne (now Port Erin): this is the finest landing place within the parish, but it is far from the only port that would have been vulnerable at night: it must be assumed that its reasonably central location within the parish allowed for the despatch of watchkeepers to the various other locations that were at risk, or conversely that warning could be brought from them.

Whilst the foregoing largely considers the network as recorded in A.D. 1627, it would be remiss to conclude without also noting the potential interplay between the high summits of Cronk ny Arrey Laa, South Barrule and North Barrule. Field observations have confirmed that the summits are all intervisible, so despite an intervening summit partially obscuring the two extremes of the ridge from each other, it would have been possible to see a beacon lit on any of the peaks from the other end of the ridge, a maximum distance of 27 km. Additionally, South Barrule is visible from the coastal lookout hills of all but four of the parishes, whilst North Barrule can be seen from an equal number (see Figures 15.3 and 15.4).

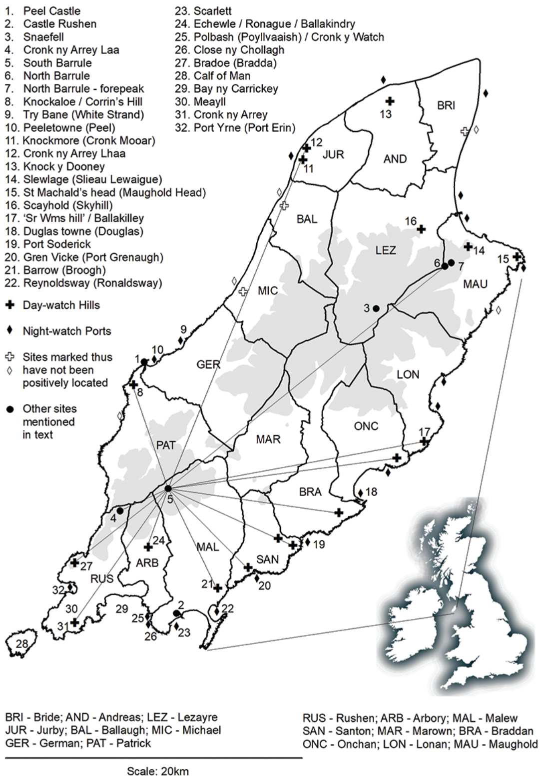

FIGURE 15.3
The Isle of Man: hills of the day watch visible from South Barrule. Other details as Figure 1
BASE MAPPING COURTESY ISLE OF MAN SURVEY, ANNOTATIONS BY AUTHOR

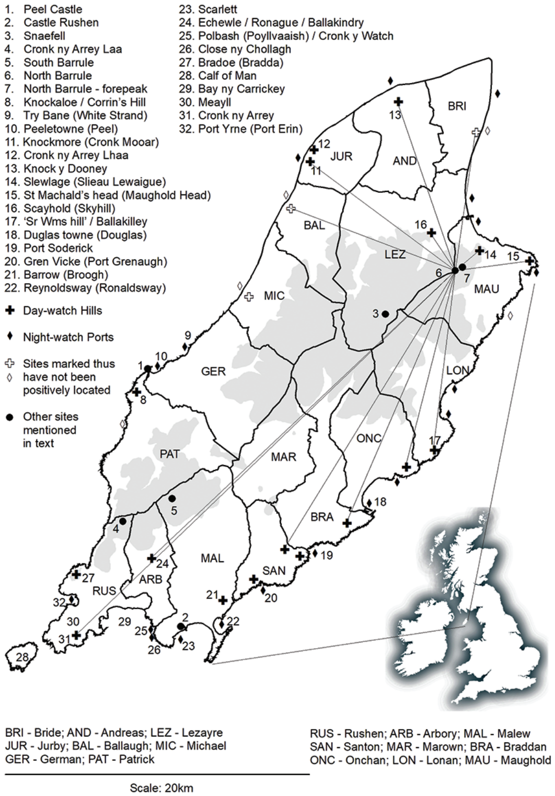

FIGURE 15.4
The Isle of Man: hills of the day watch visible from North Barrule. Other details as Figure 1
BASE MAPPING COURTESY ISLE OF MAN SURVEY, ANNOTATIONS BY AUTHOR

5.2 *Projecting Power*

If the foregoing is informative in terms of how landscape and topography affect the ability of the watch-stations around the island to fulfil their day- and night-time functions, what do the locations and altitude of the hilltop day-watch stations in particular tell us about the ability of the Manx to alert themselves to danger?

In perfect weather, the highest summits—North Barrule (564 m), South Barrule (483 m) and Cronk ny Arrey Laa (442 m)—theoretically provide views extending to distances between 75–85 km, stretching well beyond the coastlines of modern Northern Ireland, south-western Scotland, and north-west England. At such extreme distance, however, most threats would not even be visible to the naked eye, and day-to-day weather conditions would also limit the theoretical effectiveness of such viewpoints.

On the other hand, almost all parishes have coastal hilltops of between 100–200 m height from which a wide view of 35–50 km could be had, providing

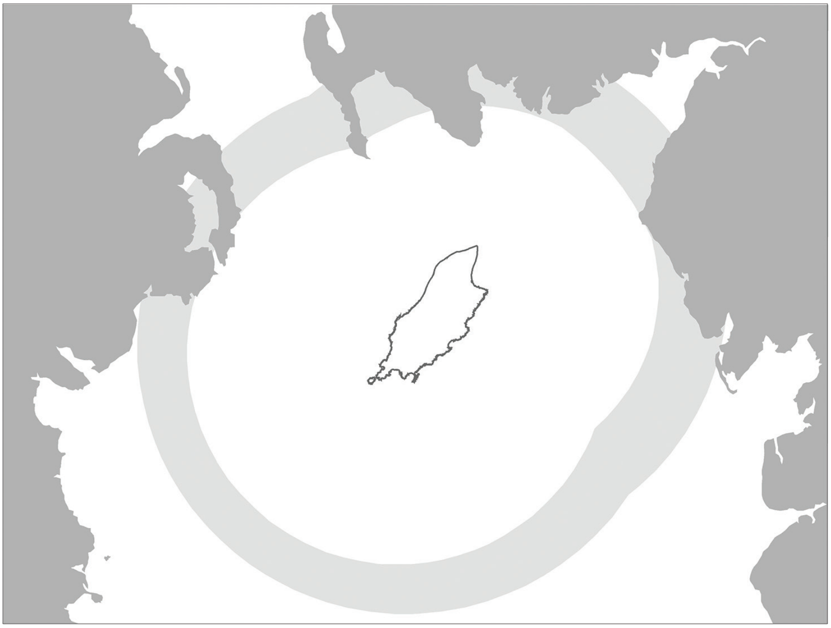

FIGURE 15.5 The Isle of Man: projecting power. The outer edge of the shaded area around the island is the theoretical limit of view (75–85 km) from the summits of the 'ward-fells', North Barrule and South Barrule, assuming perfect visibility (but not taking account of the mountainous topography of the English Lake District, the Scottish southern uplands, and the Mountains of Mourne in Ireland). The inner edge of the shaded area shows the combined limits of views from the lesser coastal hills (35–50km).
BASE MAPPING COURTESY ISLE OF MAN SURVEY, INTERPRETATION BY AUTHOR

several hours' warning. Even the most low-lying parts of the island in the north and south-east would have been able to rely on observation and warning from immediate neighbours, such is the degree to which views from the watch-sites interlock and overlap (Figure 15.5).

6 Conclusions

The re-analysis of a series of documentary snapshots and of previous commentaries, combined with historic landscape study and contemporary field observation, confirm the existence of a system of watch-keeping operating on a parochial basis. It is however clearer than ever before that this system was subject to changes which were iterative and pragmatic responses to the means of keeping watch, raising the alarm, and maintaining a functioning system that was unpopular and onerous.

Reassessment of place-name evidence is also strongly suggestive of changes to the system through time, and in combination with landscape survey has resulted in the location of at least one site that previously had entirely eluded identification.

Archaeological investigation has previously shown that coastal shelters for the night-watch can still be identified on several windswept headlands, but field survey has now also demonstrated the existence of shelters for the day-watch on the most exposed hilltops as additional evidence for this system of watch-keeping.

Quantifying how far out to sea a watch could be kept has not previously been attempted, but it is now clear that, in good weather, an early warning system of potentially great effectiveness would have been perfectly feasible, and would have granted enough time for the marshalling of resources, whether that were to meet a threat, or to police trade. It is also important to be mindful that most views are, of course, necessarily two-way, and in extreme circumstances the lighting of beacons might have deterred an aggressor who was relying on surprise.

If such scenarios seem unnecessarily bellicose, we should not lose sight of the fact that hoarding was a significant part of life on the Isle of Man between the 10th and 14th centuries, and also that such wealth was in part a result of trade, which itself was regulated and taxed. By the 17th century it is possible to see this translated into a level of watchfulness that ensured that every vessel was intercepted and its business inquired upon.

Lastly, whilst at present there can be no certainty as to the origins of the watch system, closer understanding of the composition of one of the island's few medieval documents confirms that elements of watch and ward were in existence by at least the 13th century.

Acknowledgements

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CHAPTER 16

Beacons from the Viking Age to the Early Modern Period in Western Norway

Frode Iversen†

1 Introduction

The use of warning beacons and fires on mountain tops in times of conflict has been known since ancient times.[1] Skaldic poems from A.D. 1000–50 are the oldest contemporary sources for the beacon tradition in Norway, although according to sources from the 1220s King Haakon the Good (Hákon *góði*) founded a far-reaching nationwide beacon system already around A.D. 950. The Norwegian coastal beacon system was replaced by an optical telegraph system in 1808, when Denmark-Norway entered the Napoleonic wars.[2] The new system was, however, not introduced in the interior, or in northern Norway, where the beacon system was once again activated. After the peace of 1814 the optical telegraph system was dismantled,[3] later to be replaced by the wired telegraph (from 1854–5) and telephones (1877) that also replaced the beacon system. In Sweden, the royal personal-union partner country of Norway between 1815 and 1905, the beacon system was activated, and the guard duties sharpened during the Crimean war in 1853.[4]

In 19th century Norway, beacons consisted of 100–200 logs raised into conical structures. Three to six metre long logs were stacked around a sunken middle log, and an opening was left at the bottom of the beacon to facilitate lighting.[5] The associated guardhouses were small, made of lain timbers with apertures providing lines of sight in all directions (Figure 16.1). Apart from their use for local mobilisation, the beacons were also part of larger regional and

1 Rolf Scheen, "Del 3 Norges viter," in *Den norske leidangen* (Oslo: Sjøfarosvarets overkommando, 1951), pp. 235–308; Bakke, this volume; White, this volume.

2 Fredrik Beutlich, *Norges sjøvæbning* 1810–14 (Oslo: H. Aschehoug & co, 1940), pp. 337–44; Scheen, "Del 3 Norges viter," pp. 260–61.

3 Roar Tollnes, "Veter og varder i Vestfold," Sandar historielag. *Kulturminner* 6.3 (1989).

4 Roar Tollnes, "Veter og varder i Vestfold," Sandar historielag. *Kulturminner* 6.3 (1984), p. 4.

5 Olaf Olafsen, "*Viter paa Sørlandet og Vestlandet i ældre tider*" (Kristiania: Norsk folkekultur, 1920).

DOI:10.1163/9789004749702_017

FIGURE 16.1 Vrågåveten in Numedal, *c.*1807. This beacon is a remnant from the Napoleonic wars. It has become an important symbol, and appears in the municipality's coat of arms. It is 6m high, and 6.5m wide.
PHOTO, BOTTOM LEFT: EXCURSION IN THE 1930S, UNKNOWN PHOTOGRAPHER, TOP: NILS HAUGANE, BOTTOM RIGHT: HÅKON KNAPPEN, REPRODUCED WITH KIND PERMISSION

national warning systems, which were manned and maintained under royal decrees during times of strife.[6] The beacons were visibly situated on hilltops

6 Olafsen, *Viter paa Sørlandet og Vestlandet*; Bernt Lorentzen, "Vardevakt og strandvern langs Norges sydvestkyst i det 17de århundre," *Historisk tidsskrift* 29 (1930), pp. 277–324; Arne E. Nytun, *Å sitte på Viten – Den som lar deg få vite!: Ei forskningshistorisk analyse av dei førreformatoriske varslingssystema med vetar i eitt nordisk perspektiv*. Masterthesis (NTNU, Trondheim, 2013).

and mountains and were lit according to established procedures after observations of enemy activity.

It has been discussed whether the use of beacons continued in Norway throughout the population crisis of the late medieval period (1350–1536/7).[7] I suggest that there was a significant degree of continuity, although parts of the coastal defences (Old Norse (ON): *leiðangr*, Norwegian: *leidang*) were abolished in the 15th century.[8] However, it was never formally discontinued and royal attempts were made to deploy the fleet during the war 1611–13.[9] Although the beacon system was central to the coastal defences described in the medieval laws, it was also used for mobilising interior defences, as described in Norwegian sources from the 16th century (see below).

This article focuses on the beacon system of Rogaland in southern Norway, available through an exceptional source from *c.*1643, which deals with the practicalities of the system (Figure 16.2). It is a military ordinance, more specific than contemporary and later laws (Christian IV's Norwegian law 1604,[10] and Christian V's Norwegian law 1687[11]). The ordinance contains information regarding what may be medieval traditions, providing details about practicalities, but also including chronological references that make it possible to separate older from more recent beacons sites. I will compare this information with other local sources, such as: (1) place-names; (2) antiquarian sources from the 18th century; and (3) oral traditions from the 19th and early 20th centuries. To highlight older and broader traditions I will also be using; (4) saga accounts from the reign of King Haakon the Good (d. A.D. 961), and from the Norwegian civil war period of the 12th century, as well as (5) laws from the 1160s to 1687.

7 Lorentzen, "Vardevakt og strandvern," pp. 277–324; Audun Dybdahl, "Vete," *KLNM* XIX (1975), p. 674; Geir Atle Ersland and Terje H. Holm, *Krigsmakt og Kongemakt 900–1814* (Norsk Forsvarshistorie) 1 (Bergen: Eide Forlag, 2000).

8 Ersland and Holm, *Krigsmakt og Kongemakt*; Beñat Elortza Larrea, "Archaic Martial Traditions in High Medieval Scandinavia: A Glimpse of Viking Age Warfare?," *Viking* 84 (2021), Special volume 1, pp. 105–26.

9 Halvard Dahl Bratrein, "Skjøttebåter og leidangsskip i Nord-Norge," *Acta Boralia* 1 (1984), pp. 27–37. Halvard Dahl Bratrein, "Vetten på Karlsøy: en middelaldersk vaktstasjon i den nordligste skipreida i Hålogaland," *Haaløygminne* 86 (2005), no. 4, pp. 76–77.

10 *Kong Christian den Fjerdes norske Lovbog af 1604* [Christian IV's Law of 1604], eds. Frederik Hallager and Frederik Brandt (Christiania: Carl Werner, 1855).

11 *Kong Christian den Femtes Norske Lov af 15de April 1687* [Christian Vs Norske lov 1687] [King Christian V's Norwegian Law of 1687 (Christiania: Chr. Tønsbergs forlag, 1852).

FIGURE 16.2 The research area, the county of Rogaland, Western Norway, and places mentioned in the text
MAP: FRODE IVERSEN

2 Background

Most countries in Northern Europe had similar warning systems. Danish *bavn* and Swedish *böte*, or *vårdkase*,[12] correspond to the English *beacon* and German *Leuchtfeuer*. The Norwegian timber beacons were different to the English and German iron-basket beacons, where wood was burnt in baskets at the end of high poles.

I base my research on the works of the priest and local historian Olaf Olafsen,[13] the historian Bernt Lorentzen,[14] and the navy captain Rolf Scheen,[15] who all discuss information found in laws and sagas, and list the beacon sites of Rogaland. My review reveals that there is great disparity between their respective lists, probably attributed to different uses of the sources.

The ON word *varða* has several meanings, including 'to guard'.[16] *Varder* are not beacon sites, but cairns whose primary function is to mark safe routes over sea and land.[17] The meaning of ON *viti* (and consequently *vete*), however, is 'sign, mark, or signal', and refers specifically to the fire warning itself.[18]

In Christian IV's Norwegian law of 1604 the word *viti* was confused with the Norwegian word *ved*, which means 'fire wood',[19] and the word *varde* was misinterpreted to mean 'beacon'. This is seen in chapter 4 of section 2, with the heading *Om vædvarder at holde* (about the upkeep of wood beacons), which is a misrepresentation of the 1274 The Laws of the Land:[20] *Um vita vørd/vørdu*, which means 'about guarding the beacon'.[21] This unfortunate confusion is the reason behind the use of *varde* for beacon in the 17th century sources, instead of the older *viti*. I use the original term *vete*, rather than the term *varde* used in the later sources.

The primary function of the beacons was to warn the population on land of danger. Medieval mobilisation meant that warnings and calls to arms were

12 Christer Westerdahl, "Ancient sea marks: a social history from the North European Perspective," in *Deutsches Schiffahrtsarchiv: Zeitschrift des Deutschen Schiffahrtsmuseums* 33 (Heubergredder: Ernst Kabel Verlag, 2011), pp. 74–75; see also Lemm this volume.

13 Olafsen, *Viter paa Sørlandet og Vestlandet.*

14 Lorentzen, "Vardevakt og strandvern".

15 Scheen, "Del 3 Norges viter".

16 Johan Fritzner, *Ordbog over det gamle norske sprog* 3 (Kristiania: Den norske forlagsforening, 1896), p. 867.

17 Westerdahl, "Ancient sea marks," pp. 131–32.

18 Fritzner, *Ordbog over det gamle norske*, p. 973; see also Ødegaard this volume.

19 Olafsen, *Viter paa Sørlandet og Vestlandet*, p. 6.

20 *Magnus Lagabøtes Landslov*, ed. Absalon Taranger (Oslo/Bergen: Universitetsforlaget, 1915), chap. III §4; *Magnus the Lawmender's Laws of the Land*, trans. Jóhanna Katrín Friðriksdóttir (London: Routledge, 2024).

21 Olafsen, *Viter paa Sørlandet og Vestlandet*, p. 6.

sent from farm to farm with the aid of a message baton or *hærpil* (literally 'army arrow').[22] The law of the Gulathing from 1160 stipulates that everyone receiving the *hærpil* had to meet up by their *leidang* ship within five days, describing how the *leidang* was mobilised.[23] When the *leidang* was abolished in the 15th century, at least in some parts of the country, beacons replaced ships as mustering sites, depending on the terrain and/or which direction the attack came from. An example comes from Major General Georg Reichwein's collection of letters and protocols from 1646–57 regarding the south-eastern parts of Norway, which specifies mustering places along the Swedish border, and states that when the enemy approached through the so called 'Twelve mile forest'[24] (see Figure 16.1) alternative mustering sites were to be used.[25]

Rolf Scheen claimed to have identified 768 beacon sites in Norway (including 20 beacons in the current Swedish county of Bohuslän), although many of these are uncorroborated due to misinterpreted and modern place names, as seen above.[26] This is a result of an uncritical review of the onomastic material regarding chronology and tradition. I will study this in detail in the area of Rogaland and compare older sources with Scheen's list.[27]

3 Method and Use of Sources

Saga accounts from the 1220s bestow the honour of establishing the nationwide beacon system upon Haakon the Good (A.D. 930–61), between A.D. 953–4.[28] The law of the Gulathing[29] (representative for *c.*1160), the law of

22 See also Ødegaard this volume.

23 *Den eldre Gulatingslova* [The Gulathing law], eds. Bjørn Eithun, Magnus Rindal and Tor Ulset (Norrøne tekster) 6 (Oslo: Riksarkivet, 1994), § 312; *The Older Gulathing Law*, trans. Eric Simensen (Medieval Nordic laws) (London and New York: Routledge, 2021), § 312.

24 On the border between Värmland and Dalarna.

25 Olafsen, *Viter paa Sørlandet og Vestlandet*, p. 16.

26 Scheen, "Del 3 Norges viter".

27 The historians Ersland and Holm have identified some 800 possible beacons in Norwegian place names, but they have also included many uncorroborated *varde* names on their map. At best, Ersland's map and Scheen's list reflect the situation around 1800, when many new beacon chains were established.

28 *Håkon den godes saga* [Saga of Haakon the Good], Snorre Sturluson, *Norges kongesagaer* 1–2, trans. Anne Holtsmark and Didrik Arup Seip (Oslo: Gyldendal norsk forlag, 1979), ch. 20; *Fagrskinna, Noregs kononga tal*, ed. Finnur Jónsson (København: S. L. Møllers bogtrykkeri, 1902–3), ch. 32.

29 *Den eldre Gulatingslova; The Older Gulathing Law.*

the Frostating[30] (*c.*1260), the Magnus the Lawmender's Laws of the Land[31] (1274) and his town law[32] (1276), Christian IV's Norwegian law of 1604,[33] and Christian V's Norwegian law of 1687[34] all contain short provisions for beacon procedures. The information from normative sources has been thoroughly researched already, and I will refer to these sources in my discussion.

As previously mentioned, I base my arguments on a detailed military ordinance regarding beacon procedure in Rogaland, from *c.*1643. The original document can be found in *the Stavanger Amts Archiv* in The National Archives of Norway[35] and consist of twelve parts. This source has already been addressed by the historian Bernt Lorentzen in his article 'Vardevakt og strandvern',[36] which I am making extensive use of.

Lorentzen suggests three alternative datings for the Rogaland ordinance: (1) between 1611 and 1613, (2) the 1620s, or (3) the time of the Danish/Norwegian-Swedish wars, between 1643 and 1645. He argues that the latter is most likely, due to the beacon system being revitalised as a part of the military reorganisation that began in the 1620s.[37] I see no reason to doubt this chronology. In favour of his dating, I would add that the *Gjestal* ship district is mentioned in the ordinance under Hå main beacon (Table 16.1, no. 5). This unit was first established in 1635,[38] thus, Lorentzen's dating seems trustworthy.

Between 1537 and 1660 Denmark-Norway fought eight wars, of which five were against Sweden,[39] and the ordinance should be interpreted in this context. Later the ordinance was revised several times before 1710. It contains information about the guard duties of each beacon, how the guards were armed, and which farms were responsible for supplying horses and riders for wider alerts. Its information regarding which administrative unit each beacon belonged to is also of great value.

30 *Frostatingslova,* trans. Jan Ragnar Hagland and Jørn Sandnes (Oslo: Det Norske Samlaget, 1994).

31 *Magnus the Lawmender's Laws of the Land.*

32 *Den nyere By-lov el. Bjarkö-Ret* [Magnus Lagabøters bylov] [The Town Law of 1276], King Magnus Haakonsön, in *Norges gamle love indtil 1387*, II, trans. R. Kayser and P. A. Munch (Christiania: Chr. Gröndahl, 1848), pp. 179– 290.

33 *Kong Christian den Fjerdes norske Lovbog af 1604.*

34 *Kong Christian den Femtes Norske Lov.*

35 Designasjonen over Stavanger amtsarkiv 1786.

36 Lorentzen, "Vardevakt og strandvern".

37 Lorentzen, "Vardevakt og strandvern," p. 282.

38 Asgaut Steinnes, *Styrings – og rettsskipnad i Sørvest-Noreg i mellomalderen* (Oslo: Samlaget, 1974), p. 67.

39 Ersland and Holm, *Krigsmakt og Kongemakt*, pp. 157–215.

TABLE 16.1 The beacons of the 1643 ordinance

No		Areas responsible	Lighting instructions	Supplemental information
1	Sokndal varde (main beacon)	Lund ship district, Heskestad parish, and Sokndal ship district	Not lit after beacon lit in Lista fiefdom (len), mobilisation only once gathering baton is received. After confirmation captain allowed to light beacon.	Mentions a horse, and messages to areas where the beacon cannot be seen. 'Three quick men', either in Løgevik, or Århus (= Årstad) should warn Eigersund. Those men need not do guard duty. Mustering place by the beacon or by the farm of the captain. Rifles, gunpowder and bullets to be brought, as well as food and supplies for eight days.
2	Eigersund (main beacon)	Helleland parish, Birkrem parish, and Eigersund ship district	The gathering baton to be readied if the beacon at Sokndal is lit. Beacon to be lit after confirmation from Sokndal, or after own sighting of three to four, or more naval ships.	Rifles, gunpowder and bullets to be brought, as well as eight days worth of food and supplies. Årstad should always have three men (relieved of guard duty) ready to relay warning to the beacon at Ogna.
3	Ogna (main beacon)	Voll ship district, and Kvia ship district south of Sørevarhaug	Not to be lit unless message from Eigersund is received. Message to be relayed to captain of Hå beacon. To be lit after sighting of three to four naval ships. Message to Hå beacon and gathering baton relayed to those who cannot see the beacon.	Rifles, gunpowder and bullets to be brought. Beacon to be equipped with two horses tacked and ready day and night. Beacon to be guarded by the most judicious man living by the waterfront, able to distinguish between merchant and naval ships. Landed enemy should be stopped from crossing Ogna river by sinking barges, also to destroy bridges to Nordvarhaug.

TABLE 16.1 The beacons of the 1643 ordinance (*cont.*)

No		Areas responsible	Lighting instructions	Supplemental information
4	Hårr's beacon (auxiliary beacon)	Not to be manned	Auxiliary beacon to be lit after message from Ogna relayed by men from Hå. Population to mobilise.	
5	Hå (main beacon)	Kvia ship district north of Sørevarhaug, Gjestal, Haugland and Haug ship districts, and Klepp ship district south of Figgjoelven	Beacon not to be lit after sighting of ships heading south or north, but message should be sent. Beacon to be lit after landing at Håvåg, or Obrestadsviken. A fortlet to be built at Håvåg.	Guarded by six men, of which two are for relaying messages on horseback. The people living between Sørevåg and Figgjoelven to gather at the beacon of Obrestad, or Hå, with rifles, gunpowder, bullets and provisions. In case of enemy landing; destroy bridge at Nærheim, and ford sites to be guarded. Small fortlets to be built next to beacons. Enemy advancing further should be pursued on horseback by people with rifles, from Sirevåg. Two horses to be kept with the regional official at Reime ready to message Vigdel's beacon, and *lensmannen* at Gand ship district.
6	Vigdel's beacon (main beacon)	Klepp ship district north of Figgjoelven, Gand ship district outside Riskakverven and mainland part of Høle ship district, as well as Sola ship district.	To be lit if Hå beacon burns. If three or more naval ships are sighted inside Rott and Håstein, a boat shall be readied and equipped on Vigdel, or Ølbor. If the boat is attacked, or shot at, the beacon shall be lit.	Manned by four men with rifles, and two horses, as well as a captain and scribe. When message is received men shall ride with the gathering baton to inform of location of enemy threat, and there the people shall gather, either where enemy ship anchors or makes port. (See Figure 16.4)

7	Haga beacon (auxiliary beacon)	Not to be manned	To be lit if enemy lands in the south of Jæren, and if enemy ship is sighted between Rott and Håstein.	One of the messengers from Sola rides to warn Jåtten, the other rides to the beacon at Randaberg.
8	Jåtten's beacon (auxiliary beacon)	Not to be manned	To be lit if message comes from Gand about enemy landing in the south, or if any of the beacons at Haga, Randaberg, or Tastad are burning.	All the men living north of Figgjoelven shall gather at Stavanger with provisions and loaded rifles. The farmers at Jåtten to send the gathering baton to the different ship districts.
9	Tastad beacon (auxiliary beacon)	To be guarded by the town's people (Stavanger) and Jåtten's ship district.	Not to be lit if any of the beacons at Jåtten, Vigdel, or Haga are burning but message to be sent to town. The beacon at Tastad should follow the lead of the beacon at Randaberg regarding raising flag, or lighting.	Guardhouse is mentioned 1658
10	Randaberg's beacon (main beacon)	To be manned and maintained by the ship districts of Goa, Ask, Idse and Høle.	When the beacon is lit the men of the beacon sites at Hodnefjell, Vikedel, Tastad, and Jåtten should gather in town with rifles and provisions for eight days.	Comprehensive regulations regarding warning the town. In peacetime a carthorse to be kept at beacon. Town to receive daily reports of arriving ships. In times of war the beacon is to be manned from the town. Judge, mayor, and town council each to supply guards for three days. A seafarer to be appointed as scribe and responsible for keeping four inspectors at Sande and Bø to check ships.

TABLE 16.1 The beacons of the 1643 ordinance (*cont.*)

No		Areas responsible	Lighting instructions	Supplemental information
11	(Bjørgene) Most northerly beacon of the Karmsund (main beacon)	To be manned in times of war by Avaldsnes, Skåre, Vats and Vikedal ship districts and Skjold parish (1657)		Four men to row between the beacons to warn. Two men to row southwards and two northwards. Guardhouse mentioned in 1657
12	Bokn beacon (main beacon)	To be manned in times of war by Hetland ship district with help from Jelsa ship district, the parishes of, Sauda and Sand, and Suldal, Leiranger and Stangaland ship districts (info 1657)		As above, but two guardhouses in 1657
13	Hodnefjell (auxiliary beacon)			According to the ordinance it was built during 'the last war with Sweden'.

14	Bandåsen (auxiliary beacon)	As above.
15	Finneborg, outermost on Stjernarøy (auxiliary beacon)	As above.

Between 1628 and *c*.1640 the Norwegian military organisation underwent change, one result being the introduction of a permanent military force. Even though the ordinance corresponds to the regulations regarding the beacon procedure found in Christian the IV's Norwegian law of 1604, which was a translated and corrected edition of Magnus the Lawmender's rural law from 1274.[40] Lorentzen argues that the ordinance reflects a novel organisation of the beacon system.

Lorentzen found the ordinance incompatible with the beacon-procedure traditions and names that Olaf Olafsen (1843–1932) had collected and published ten years earlier.[41] Many of the beacons described by Olafsen were part of younger beacon chains established later than the ordinance. Olafsen's main source was the county governor Bendix Christian de Fine's *Stavanger Amptes udførlige Beskrivelse*, from 1743, which includes most of the beacons from the 1643 ordinance.[42] In addition, Olafsen used informants and memories of later beacon sites. Combined, these make it likely that Olafsen included a strata of beacons sites established after 1743. I will return to this later.

I propose that the 1643 ordinance should not be interpreted as a qualitative novelty and a break with older tradition, but rather that it reflects practices from the High and Late Middle Ages. Especially interesting is the fact that the ordinance distinguishes between permanent 'main beacons' (*hovedvarder*) and 'auxiliary beacons' (*løsensvarder*), which would normally have been unmanned and used for retransmitting alerts further afield. Another unique feature is that the ordinance establishes which administrative areas were responsible for the individual beacons. Below I will analyse eight main beacons and seven auxiliary ones described in the 1643 ordinance. These beacons will then be compared with the material based on traditions found in Olafsen's accounts,[43] as well as Scheen's lists,[44] which includes onomastic material from modern maps.

4 Results

The ordinance begins with three general aspects of the specified procedures of each of the beacons of Rogaland county, where the specific information regarding Jæren and Dalane (the southern part of the county) contains many details.

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40 *Kong Christian den Fjerdes norske Lovbog af 1604* (*Christian IV's Law of 1604*), eds. Frederik Hallager and Frederik Brandt (Christiania: Carl Werner, 1855), p. 1.

41 Olafsen, *Viter paa Sørlandet og Vestlandet*.

42 de Fine 1952, p. 55.

43 Olafsen, *Viter paa Sørlandet og Vestlandet*.

44 Scheen, "Del 3 Norges viter".

The instructions regarding Ryfylke len (the northern part of the county), are less detailed in the 1643 ordinance, although they state that details may be obtained through the regional government officials (*lensmennene*). However, the detailed information for the northern beacons is included in a revised version of the ordinance, from 1657.[45]

The general initial rules in the ordinance state that the beacon and guardhouse maintenance was the responsibility of the respective ship districts (*skipreidene*). Four guards were to be stationed at each beacon, of which at least two should be equipped with rifles, gunpowder and bullets. Each guard session lasted from noon until noon, and a guard scribe was responsible for the guard roster. A roster from the ship district of Goa in the southern part of Rogaland describes how the farmers of the ship districts in Goa, Ask, Idse and Høle, responsible for the beacon at Randaberg, were divided into 14 groups of four, which would translate into six or seven guard shifts per year for each farmer's household.[46]

Each beacon was assigned a captain (*hauptmann*, *hopmandt*), i.e. the most judicious man living close to the beacon. Captains were exempt from paying taxes, similar to the regional officials. The captains and the scribes shared the responsibilities of supervising the beacons.

In Table 16.2, I have specified and systematised the information regarding each beacon in Rogaland.

Olafsen identified 26 beacons in Rogaland but the 1643 ordinance only mentions 15, of which at least three were built during contemporary wars with the Swedes, probably in the 1620s.[47] Eight of the remaining twelve beacons were main beacons. Olafsen's sources were the regional official (*amtmann*) de Fine, and several contemporaneous informants. De Fine seems to have been aware of eleven of the 15 beacons that existed in 1643 making it unclear whether he had a complete grasp of the situation, although it is likely since he was a regional official.[48] The four that are missing are the auxiliary beacons at Haga, Jåtten, Tasta and the main beacon at Ogna.[49]

Of Olafsen's 26 beacons, it is likely that only eight were early medieval, i.e. the main beacons from the 1643 ordinance. In 1657 it was stated that the Sokndal beacon (Table 16.2, no. 1) was located at Tothammeren since 'old

45 Lorentzen, "Vardevakt og strandvern," p. 291.

46 Lorentzen, "Vardevakt og strandvern"; Scheen, "Del 3 Norges viter," p. 258.

47 Olafsen, *Viter paa Sørlandet og Vestlandet*.

48 Bendix Christian de Fine, *Stavanger Amptes udførlige beskrivelse: med eit tillegg*, trans. Per Thorson (Stavanger: Rogaland historie – og ættesogelag, 1952), p. 55.

49 An older place name, Vedafjellet (a beacon toponym containing the Old Norse element -veti), is located on Nordre Eigerøya, about 5 km west of the town. De Fine, and other early sources do not appear to mention this beacon. It may have been relocated to Egersund as the town increased in importance during the Middle Ages.

TABLE 16.2 Beacons in Rogaland according to Olaf Olafsen's (1920) review

Olafsen's numbers	**Name of beacon**	**Olafsen's source**	**1643 Ordinance**	**Suggested dating**
1	Sokndal	de Fine 1743	1 main beacon	Medieval? Before 1643
2	Eigersund	de Fine 1743	2 main beacon	Medieval? Before 1643
3	Hårr	de Fine 1743	4 auxiliary beacon	Before 1643
4	Hå/Obrestad	de Fine 1743	5 main beacon	Medieval? Before 1643
5	Moi	Informant Torkjell Mouland[a] (TM)		1743–1808
6	Ogna	TM	3 main beacon	Medieval? Before 1643
7	Kvalhei	TM		1743–1808
8	Vik, Orre	TM		1743–1808
9	Mossige, Time	TM		1743–1808
10	Tangerhaug, Klepp	TM		1743–1808
11	Tuvbakken, Klepp	TM		1743–1808
12	Kleppevarden, Klepp	Informant parish priest Ottesen		1743–1808
13	Vigddel	de Fine 1743	6 main beacon	Medieval? Before 1643
14	Vardeåsen by Hafrsfjord	Stedsnavn, Olafsen		Uncorroborated beacon
15	Myklebostad, Tananger	TM		1743–1808
16	Randaberg	de Fine 1743	10 main beacon	Medieval? Before 1643
17	Tasta	No reference	9 town beacon	*c.*1200–1643 (?) The name *Tastaveden* indicate dating before 1604.
18	Vålandspipen	TM		1743–1808
19	Ullandhaug	TM		1743–1808
20 (19, wrong numbering by OO)	Bokn	De Fine 1743	12 main beacon	Medieval? Before 1643

a Possibly the teacher Torkjell Mauland, 1848–1923.

TABLE 16.2 Beacons in Rogaland according to Olaf Olafsen's (1920) review (*cont.*)

Olafsen's numbers	Name of beacon	Olafsen's source	1643 Ordinance	Suggested dating
21 (20)	Mostravarden = Hodnefjell?	Informant: agricultural reformer, NN	Same as no. 26	Uncorroborated beacon
22 (21)	Vardeberget	TM		1743–1808
23 (22)	Finborg	de Fine 1743	15 auxiliary beacon	1620s
24 (23)	Bandåsen	de Fine 1743	14 auxiliary beacon	1620s
25 (24)	The most northerly beacon of the Karmsund (= Bjørgene, Karmøy)	de Fine 1743	11 main beacon	Medieval? Before 1643
26 (25)	Hodnefjell	de Fine 1743	13 auxiliary beacon	1620s

times' (*fra Arilds tid*).[50] This indicates the deep roots of the system. According to the ordinance, three of the auxiliary beacons were established in 1620s. The remaining four might be of high medieval origin. The name *Tastaveden* (veden = ON *viti*) (auxiliary beacon), indicates origin prior to 1604, when the law introduces the term *varde*. All but one of the seven auxiliary beacons were concentrated around the town of Stavanger. I interpret them as part of the town's warning system.

Additionally, I have identified eight major administrative areas responsible for the maintenance of the main beacons along the coast (Figure 16.3). In the southern part of the county, these areas correspond to the medieval ship districts and quarters. In the vicinity of Stavanger, the high number of auxiliary beacons suggests that the system had been adjusted to the emergence of the town, and less like the traditional system. We lack information for some

50 Lorentzen, "Vardevakt og strandvern," p. 291.

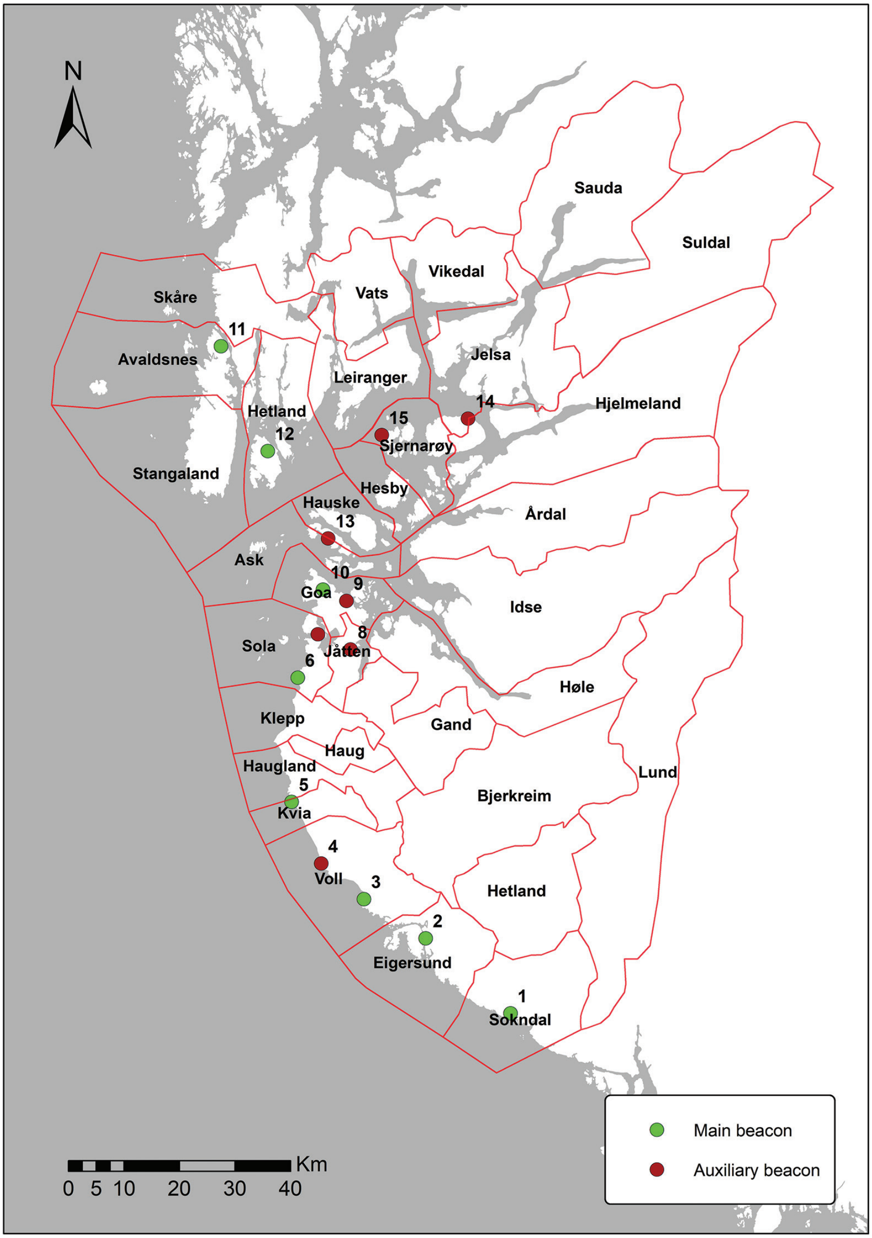

FIGURE 16.3A–B (a): Beacons in Rogaland and the medieval ship districts. (b): The associated administrative areas responsible for each beacon in 1643.
MAPS: FRODE IVERSEN

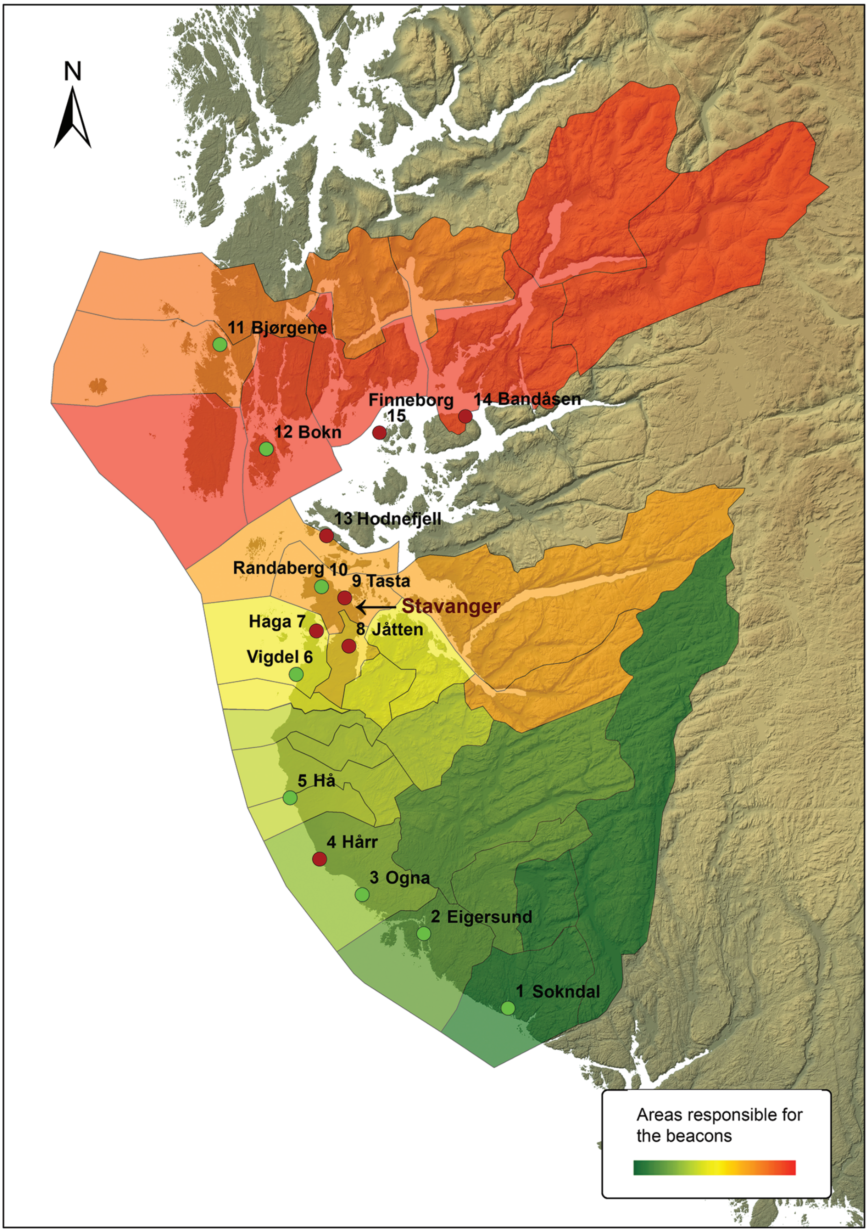

FIGURE 16.3A–B (*cont.*)

districts (Hauske, Hesby, Sjernarøy, Hjelmeland and Årdal). They were possibly responsible for the auxiliary beacons at Hodnefjell (13), Finneborg (15) and Bandåsen (14).

Scheen lists a total of 44 sites in Rogaland.[51] Scheen included at least 13 uncorroborated beacons, identified through place-names in nautical charts, and maps, but without documentary, or traditionary confirmation of beacon activity. Scheen had a special penchant for *varde* names and individual farm names as indicators for beacon sites. Hence the unproportional discrepancy compared to the number of sites in the methodical review in the 1643 ordinance. In Rogaland the confirmed documented sites from 1643 only constitute a third of the sites in Scheen's review. A simpler type of unmanned beacon – the auxiliary one, which supported the main beacon system – differs from the main beacon type through its lack of a guardhouse. The auxiliary beacon sites changed over time due to town growth, and evolving settlement patterns.

5 Discussion

It is time to readdress the main query: do the beacon practices of the mid-17th century reflect an older tradition?

Since the battle of Svolder in A.D. 1000 Norway has fought wars in every century – often three or four times and mostly against Sweden. Other adversaries were Denmark, the Hanseatic league, the Holy Roman Empire, Scotland, and mercenary fleets from the Netherlands not to mention naval raids from Novgorod on Northern Norway in e.g. the 15th century. According to the law of 1604 beacons and guardhouses should be readied when 'war is expected in the kingdom'.[52] The 1274 Laws of the Land has a corresponding rule, which states: 'Now, an army is expected in our country, then people are to appoint a beacon guard'.[53] The 1643 ordinance required a sighting of three naval ships for activating the beacon, which is the same as the number stated in 1274: three naval ships or more.[54]

There are many similarities between the regulations in the 1643 ordinance and the medieval laws. The 1274 Laws of the Land states that a responsible judicious person should be in charge of the daily guard duties, and chosen by one

51 These are numbered 309–53 in his list. Scheen, "Del 3 Norges viter".

52 *Kong Christian den Fjerdes norske Lovbog af 1604*, §§ 2, 4.

53 *Magnus the Lawmender's Laws of the Land,* Land defence section, 4*; Magnus Lagabøtes Landslov,* part III, chap. 4,1.

54 *Magnus Lagabøtes Landslov,* part III, chap. 4,3.

of the king's barons (*lendmenn*), or appointees (*ombudsmenn*).[55] In 1643, this *formann* (literally 'foreman') was called a captain (*hauptmann*) but the object was the same; he should be the most judicious man living in the vicinity of the beacon.

The 1274 Laws of the Land further states that during threat of war the baron (ON*, lendr maðr*) or the king's representative were responsible for the selection of messengers, and the farmers for lighting the beacons. The collaboration between royal representatives and farmers regarding the beacon practices existed throughout the Middle Ages, as well as in 1643. When guards were in doubt, they should send for reliable men to establish whether it really was naval ships they saw, both according to the law of the Gulathing and the Laws of the Land. The instructions of 1643 correspond to these rules, suggesting that there were still direct links to the medieval system.

It is extremely unlikely that a beacon lit by mistake could lead to the activation of an entire beacon chain, the way Icelandic saga writers imagined it in the 1220s. According to Fagrskinna,[56] King Haakon introduced death and maiming penalties for anyone triggering a mobilisation by mistake. As a consequence, no one dared to order a mobilisation, even when the enemy was actually approaching. Both Snorri Sturlusson and the anonymous author of Fagrskinna claim that the reason for the successful surprise attack, and lethal wounds inflicted on King Haakon by the sons of Eirik at Fitjar in 961, was the fear of punishment in case of a mistakenly lit beacon. This is, however, probably a literary construct. The 1643 ordinance actually states that *failing* to light a beacon during enemy landfall was punishable by death.[57] According to the medieval laws, general warnings and mobilisation were decided by the barons or the king's representatives after receiving *hærpil*, or batons, from messengers. The unchecked processes associated with mistakenly lit beacon chains – as described by Snorri Sturlusson, and in Fagrskinna – cannot be found in later laws and ordinances.

According to the law of the Gulathing (*c.*1160) the guards were selected through lotteries. They were supposed to light the beacons after sighting five ships or more, and had to pay fines if the beacons were lit by mistake.[58] The law had a specific rule for the easternmost beacon under its jurisdiction: if the guards there issued warnings by mistake they were fined 40 *marker*, which was 14 times more than after mistakes made at other beacons, where the fines

55 *Magnus Lagabøtes Landslov,* part III, chap. 4,4.

56 *Fagrskinna,* ch. 32.

57 Lorentzen, "Vardevakt og strandvern," p. 203.

58 *Den eldre Gulatingslova,* § 311.

amounted to three *marker*. This rule probably reflected the fact that the greatest threat of enemy incursion came from the east, and according to Geir Atle Ersland it was a result of the contemporary geopolitical situation.[59] The fact that beacon warnings originated from the east is also visible in the saga of Haakon the Good.[60] In the 1274 Laws of the Land the formula is different: there, the guard duties of the two easternmost and two northernmost beacons of the kingdom are the most important, along with anywhere else where enemy attacks could be expected. This reflects how the overall threat had changed after the Norwegian Late Viking Age and Early Middle Age (A.D. 1000–1130) expansion into Finnmark, and consequently the guards in these areas risked higher fines than the ones at other beacons.[61] There are, however, no sign of differentiated fines in Rogaland in the 1643 ordinance, which is to be expected since the area did not have any important national, or regional, borders. The most comprehensive instructions in this area were issued for the beacon at Hå, where the risk of enemy landings was the greatest because of the geography.

In the 17th century, good systems were in place to avoid mistakenly lit beacons. Warnings from beacons in area 1 led to general mobilisation in area 2 but before the beacons were lit there, confirmation – brought by messengers on horseback – had to be obtained from area 1.[62] Officially appointed men living close to the beacons were responsible for having horses at the ready. In 1643, there were examples of immediate lighting of a neighbouring beacon after an initial lighting, e.g. when the main beacon at Vigdel in Rogaland was lit after a beacon lighting at Hå, to gather the public, however, the gathering baton was not sent until confirmation had arrived from Hå (Figure 16.4).[63]

The historian Audun Dybdahl argues that the beacon system was abolished when the *leidang* was abolished in the Late Middle Ages.[64] The last known *leidang*, of some 100 ships (of which four were large) took place in 1429, and was followed by battles south of Bergen against a superior German fleet of cogs.[65] However, a 1492 diploma from Jämtland (Norwegian at the time) reveals that there was still an up-to-date beacon system there, 63 years later.[66]

59 Ersland and Holm, *Krigsmakt og Kongemakt*, p. 56.

60 *Håkon den godes saga*, ch. 22.

61 *Magnus Lagabøtes Landslov,* part III, chap. 4,4.

62 Lorentzen, "Vardevakt og strandvern," p. 284.

63 Lorentzen, "Vardevakt og strandvern," p. 287.

64 Dybdahl, "Vete," p. 674.

65 Ersland and Holm, *Krigsmakt og Kongemakt*, pp. 124–27.

66 *Diplomatarium Norvegicum*, eds. Chr. C. A. Lange, C. R. Unger *et al.* Vols I–XXIII. (Christiania/Oslo: P.T. Mallings Forlagshandel, 1847–1990), chap. XIV, no. 180.

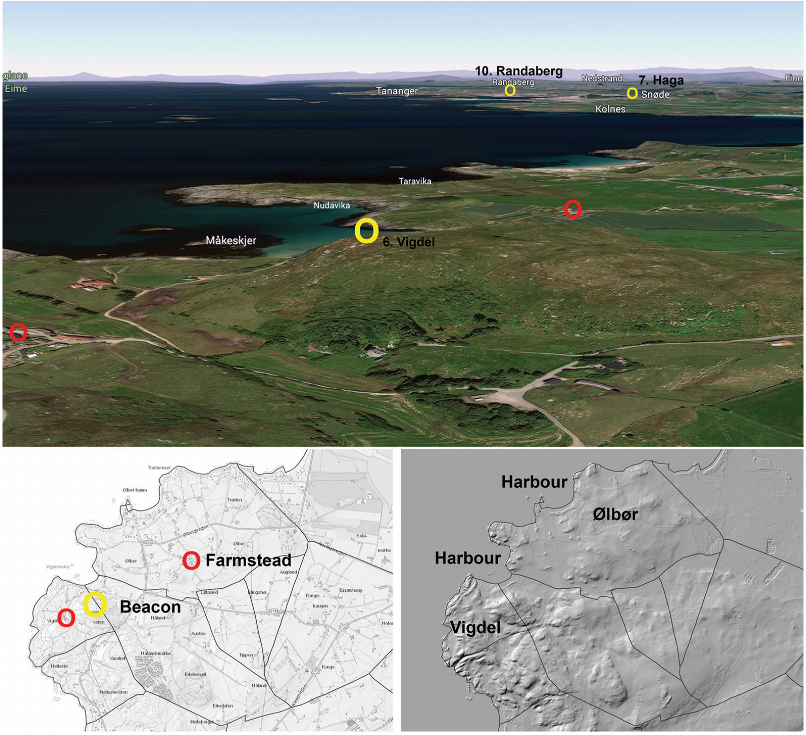

FIGURE 16.4 The Vigdel beacon site. Boats for inspection of potential enemy ships were kept at the farms Vigdel and Ølbør. Two guards should bring horses for further warning to the beacons at Randaberg (main beacon) and Jåtten (auxiliary beacon)
ILLUSTRATION BY FRODE IVERSEN

Norway took part in several wars during the 16th century, and in 1543 as well as on several occasions during the Nordic seven years' war (1563–70), so called 'beach duty' was ordered. It was not until 1628 that it was specified that beacons were to be included: as in *Strandvagt og Baale* (Beach guard and bonfire) (*baale* = Norwegian *bål* = beacon).[67] The Nordic seven years' war was the first conflict between Denmark-Norway and Sweden after Sweden had left the Kalmar union in 1523. In 1564, the counties of Jämtland, Härjedalen, and Trondheim were occupied by Swedish troops, and by 1567 the Swedes occupied large areas of eastern Norway. In the preserved guardhouse at Ulvedal in Stryn (which is situated by an important route into western Norway,) one of

67 Scheen, "Del 3 Norges viter," p. 256.

FIGURE 16.5 Medieval guardhouse at Ulvedal, Stryn. It is the only preserved guardhouse in Norway at its original location. It is dated to 1198, and has many inscriptions from later times, including the year 1564 when the Nordic seven years' war was in progress.
PHOTOS: KJELL ANDRESEN, RIKSANTIKVAREN, REPRODUCED WITH KIND PERMISSION

the logs has been dated to 1198, although this is uncorroborated (ID 214603-1[68]). The guardhouse also has a fourth log in its western wall, engraved with the year 1564 (Figure 16.5),[69] clearly suggesting that it was in use during the Nordic seven years' war. These two dates suggest that there was an unbroken beacon tradition with medieval roots in this area.

The armament of the guards was obviously different in 1643 compared to that of the Middle Ages as weapon technology had evolved. The guards and public contributed their own bullets, gunpowder, and rifles, but otherwise the rules were surprisingly similar. An event described in King Sverre's saga

68 ID = *Identification number* in the Norwegian Cultural Heritage Database, Askeladden.

69 Aaland, Jacob, *Nordfjord fraa gamle fager til no II, 3. Innvik-Stryn* (Søreide: Søreides prenteverk, 1932), p. 32; Scheen, "Del 3 Norges viter," p. 265.

between 1177 and 1202, during the Norwegian civil war period, describes the fighting around two beacons in Hordaland county, where initially Sverre's men attacked the beacon at Håøya.[70] The guards lit the beacon, but Sverre's men managed to put the fire out before it had alerted the guards at the Askøy beacon. Hence there was no warning transmitted to the town of Bergen, where King Magnus resided.[71] Such events demonstrate the importance of unbroken beacon chains for warning the towns, both in King Sverre's saga and in the 1643 ordinance, which dealt with the town of Stavanger in the Rogaland beacon chain.

On a general level it is obvious that the beacon system was adjusted to fit into changing settlement patterns, as in the case of an older beacon system from the 11th century that was adjusted to conform with Norwegian towns established during the 11th and 12th centuries. One example is Stavanger, which was elevated to episcopal see around 1110, and is mentioned as a town (*boen sialvan Stafang*) in 1233.[72] It is likely that the beacon chains leading to Stavanger were not established until after this happened. Most of the beacons close to Stavanger were auxiliary beacons.

A significant population decline in the Late Middle Ages probably influenced the system. Throughout the 17th century the number of towns and loading sites increased visibly, especially in eastern Norway, due to an increased timber export to England and the Netherlands. There was, however, no increase of towns in Rogaland at the time, perhaps with the exception of Kopervik, where the already existing beacon at Bokn would have been sufficient. A new chain of auxiliary beacons in the Stavanger area (Hodnefjell→Finneborg→Bandåsen) seems to have been established between islands, primarily to warn the innermost north-easterly parts of the northern region (*Ryfylke*). Between 1643 and 1800 new beacon chains were established in Rogaland and other parts of the realm as a result of renewed population growth and frequent wars.

In previous research it has been unusual to distinguish between early and late beacons. My study, however, shows that it is likely that several beacon sites in Rogaland were late additions, especially after 1743. It is also likely that the main beacons in the 1643 system were established in the Middle Ages,

70 *Sverres saga,* trans. *Dag Gundersen,* (Norges kongesagaer) 2 (Oslo: Gyldendal Norske Forlag, 1979), ch. 76.

71 See also Ersland and Holm, *Krigsmakt og Kongemakt*, p. 60.

72 *Regesta Norvegica. Kronologisk Fortegnelse over Dokumenter vedkommende Norge, Nordmand og den norske Kirkeprovins* (Christiania: Norsk historisk kjeldeskriftinstitutt/Riksarkivet, 1898–present), 1, no. 628; Knut Helle, *Stavanger fra våg til by* (Stavanger: Aktietrykkeriet i Stavanger, 1975), pp. 83–84; Frode Iversen and Jan Brendalsmo, "Den tidlige kirkeorganisasjonen i Stavanger stift," *Collegium Medievale*, (2021), pp. 115–66.

although such assumptions are less certain for auxiliary beacons. Olafsen[73] differentiated between three types of beacons: (1) main beacons in high positions, far apart; (2) regional beacons; and (3) town beacons (near towns and populated areas). In 1643 the main beacons of Rogaland were not situated particularly high, although they were visibly placed in elevated positions in the typical, gently undulating and flat landscape of the Rogaland coast. The 1643 system only distinguishes between main and auxiliary beacons, which seems to be a more relevant distinction. Archaeologically it would be relevant to separate between beacons with guardhouses (main beacons), and those without (auxiliary beacons).

On the whole it is obvious that this was a system that changed over time due to evolving settlement patterns, but also that the underlying principles and a group of the main beacons seem to have deep historical roots.

IDENTIFICATION OF BEACONS, 1643

1. Sokndal main beacon = Tothammeren (1657), a hilltop at the farm Tothammer by Rekefjord (Vedåsen?). Horses for further warnings were kept at the neighbouring farms Løgevik and Århus. The name Århus is confused with Årstad. Previous wrongly associated to Vardefjell near Eigeland.
2. Eigersund main beacon. Vardåsen on Husabø near Årstad where horses were kept for further warnings.
3. Ogna main beacon = *Veten* north of Sirevåg.
4. Hårr auxiliary beacon. Uncertain location. Sat by Hårr farmstead.
5. Hå main beacon. Probably by *Vetabukten*, furthest south on Hå farm on the border to Obrestad. de Fine (1743) calls it *Obrestad* beacon. The farm Reime, for horse keeping for further warning, is directly south of Obrestad.
6. Vigdel main beacon. Boats for inspection of potential enemy ships and most likely also horses for further warning were kept at the farms Vigdel and Ølbør (to the north).
7. Haga auxiliary beacon. Uncertain location here set at the highest point at the farm Haga by Tananger (Store Snøde, approx. 80 masl).
8. Jåtten auxiliary beacon. Either Jåttånuten or *Varaberget* close by.
9. Tasta auxiliary beacon = *Tastaveden*.
10. Randaberg main beacon = Bergsagelvarden by Randaberg.
11. Main beacon "North in Karmsundet". On the mountain «Bjerge» in 1658 = *Bjørgene*.

73 Olafsen, *Viter paa Sørlandet og Vestlandet*.

12. Bokn main beacon. Probably Boknafjellet.
13. Hodnefjell auxiliary beacon. Hodnefjell on Mosterøy. Måstravarden (?).
14. Bandåsen auxiliary beacon = Bandåsen at Ombo.
15. Finneborg auxiliary beacon. Finnborg, west of Kyrkjøy, Sjernarøy, "in the outskirts of Sjernarøy" (1657) (see Lorentzen, "Vardevakt og strandvern," p. 291).

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CHAPTER 17

Lookouts and Beacons in the Strait of Gibraltar Cultural Frontier Area, A.D. *c*.1350–*c*.1690

Martin Malcolm Elbl

1 Introduction

Mediterranean shores—North Africa included—were dotted with lookouts and beacons.[1] In European timeframes the relevant structures often date to the later Middle Ages or Early Modern periods, as well as before and after. That much is clear from many written and iconographic sources, largely European, from the A.D. 13th to the 16th centuries. Additional evidence, often unique, can be derived from cartographic or quasi-cartographic material such as early sea charts, textual coastal rutters, field sketches, urban plans and vistas, and maps dating from the A.D. 1600s onward. These often correlate with records of political, commercial, artistic, etc., content. A third type of source comprises local heritage listings, but these are not always complete and may uncritically echo older literature with little interest in beacons. Finally, remote spatial imagery

1 For a few examples, in diverse technical contexts – coastal as well as those of inland frontiers (e.g. Granada), see Francisco Javier Jover Maestre and José Luis Menéndez Fueyo, "Torres almenaras para la defensa de la costa (Elche y Santa Pola, Bajo Vinalopó)," in *Castillos y torres en el Vinalopó*, eds. Gabriel Segura Herrero and José Luis Simón García (Alicante: Centre d'Estudis Locals del Vinalopó, 2001), pp. 199–210; Alicia Cámara Muñoz, "Los guardianes del mar: fortificaciones, torres y atalayas en la costa Valenciana (s. XVI)," in *Jornadas del bicentenario – Torrevieja 1803–2003*, eds. José Fernando Vera Rebollo (Alicante: Universidad de Alicante, 2005), pp. 201–19; Carlos Gozalbes Cravioto, "El otro lado de la frontera: las fortificaciones costeras de la orilla africana del Estrecho de Gibraltar," in *IV Congreso Internacional: las fortificaciones y el mar* (*Alcalá de Guadaira 2008*), ed. Ayuntamiento de Alcalá de Guadaíra (Alcalá de Guadaira: Ayuntamiento, 2008), pp. 19–32; Rafael J. Pedregosa Megías and Juan Miguel Rivera Groennou, "Técnicas constructivas en las torres – atalayas de Montefrio (Granada): La Torre de Las Cabrerizas," *Arqueología y Territorio Medieval* 21 (2014), pp. 155–76; Anna Boato, Giampiero Lombardini and Rita Vecchiatini, "The Integrated Coastal Defence System in Eastern Liguria in the 15th and 16th Centuries. Verification of Historical Spatial Location Strategies through GIS," paper presented at 'RIPAM 2017: Conservation et valorisation du patrimoine architectural et paysager des sites côtiers méditerranéens, Genoa, 20–22 Sep. 2017'.

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usefully augments basic 'field walking'. Full and published archaeological data, in the Maghrib, are available only for rare locations.

The historical evidence is sparse, usually consisting of only snippets within other material. Thus, tentative attribution of signalling/surveillance roles typically requires multiple data strands. Neither time nor modernization have spared structures. Already denuded sites are also vanishing. More than three-quarters can no longer be usefully surveyed, or have already been erased without valid salvage archaeology. There are issues with dating and cultural attribution, for example by means of surface-collected diagnostic ceramics, in the Moroccan Rif, so assigning viable timeframes is difficult. Beacons also degrade, so their maintenance historically required both leadership *and* local commitment. They were rebuilt, multiple times, but only in response to apparent emergencies. Furthermore, folk traditions attached to certain sites, recorded in both written sources and oral traditions, keep sidetracking research. Finally, while recorded pre-1950s toponymy is useful for site spotting, place-name continuity has become broken thanks to multiple administrative changes, altered cartographic conventions, and changes in toponymic preferences between the colonial and post-Independence eras. It is not easier but more difficult to retrieve old place names from present-day commercial digital maps.

The project behind the present study tracks known coastal or near-hinterland towers/beacons, from Asilah on the Atlantic shore, through the Strait of Gibraltar, to the Rif (Mediterranean). The database includes over 30 sites—some attested quite lavishly—and *c.*20 potential sites. The research collates the data types outlined above, with inclusion of published and unpublished chronicles, chancery papers, official and private letters, diplomatic dispatches, tactical reports, travel memoirs, etc. Analysis of the archaeological literature continues, to weed out fragile hypotheses. Aerial imaging of proven or probable sites is also in progress, with *in situ* ground-truthing taking place wherever feasible (although this has been hampered by COVID-19). The goal of the project is to define a diachronic typology, utilising 'traditional' and 'new' (GIS–enabled) landscape archaeology approaches.[2] As part of this work, the

2 For technical context, e.g. Stephen J. Rippon, *Historic Landscape Analysis: Deciphering the Countryside* (York: Council for British Archaeology, 2004); James Conolly and Mark Lake, *Geographic Information Systems in Archaeology* (Cambridge: Cambridge University Press, 2006); Meghan C.L. Howey and Marieka Brouwer Burg, "Assessing the State of Archaeological GIS Research: Unbinding Analyses of Past Landscapes," *Journal of Archaeological Science* 84 (2017), pp. 1–9; Philip Verhagen, Laure Nuninger and Mark R. Groenhuijzen, "Modelling of Pathways and Movement Networks in Archaeology: An Overview of Current Approaches," in *Finding the Limits of the Limes: Modelling Demography, Economy and Transport on the Edge*

underlying DTMs (digital terrain models) are correspondingly being 'temporally regressed', through editing to suppress as much as possible all traces of modern engineering and urban growth.

2 Historical Baselines and Caveats

Inherent characteristics of beacon/lookout sites far outlasted historical shifts in governance. Even near the Moroccan ports that the Portuguese seized in the A.D. 1400s (starting with Ceuta, 1415), intermittently repurposed sites never really fell out of use. Neither did key features of earlier Islamic urban fortifications. Ceuta, Ksar es-Seghir, Tangier, and Asilah fell to the Portuguese mostly intact (1415–71), and while tactically awkward elements were abandoned, the rest was reused. Modernizing urban defences, at Ceuta or Tangier for instance, continued well past the A.D. mid-1500s.

Even more importantly, the Portuguese takeover did not really result in sudden alterations in surveillance patterns. Crude schemata—e.g. 'Islamic town/friendly Islamic hinterland' vs. 'Portuguese town/hostile Islamic hinterland'—are unrealistic. One cannot simply ignore pre-1471 power dynamics. Islamic ports—those with a history of separatism, like Ceuta—did not view their own hinterland or rulers in dynastic capitals like Fez or even more distant Marrakech with any naïve trust. Security concerns existed over inland approaches and rival Christian *and* Islamic sea traffic. The sea, in turn, was not *a priori* friendly to the Portuguese. Piracy—regardless of the religion of the crew—remained an issue, as did Maghribi boat raids to get news and hostages, and to test urban defences.

In this context, it is surely useful to have a baseline for the possible extent of any network of beacons in northern Morocco before 1415–71. For now, archaeology does not offer any such. A contour of one is nonetheless available thanks to Ibn Marzūq's *al-Musnad*, a celebratory profile of the Marīnid sultan Abū al-Ḥasan 'Alī, completed in A.D. 1371.[3] The information, albeit succinct, is of

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of the Roman Empire, eds. Philip Verhagen, Jamie Joyce and Mark R. Groenhuijzen (Cham: Springer, 2019), pp. 217–49.

3 Abū 'Abd Allāh Muḥammad Ibn Marzūq al-Tilimsānī, *al-Musnad al-ṣaḥīḥ al-ḥasan fī ma'āṯir mawlānā Abī Ḥasan*, trans. María Jesús Viguera Molins, *El Musnad: hechos memorables de Abū l–Ḥasan, sultán de los benimerines* (Madrid: Instituto Hispano-Árabe de Cultura, 1977), pp. 329–30 (Cap. 39) (for practical reasons all references here are to the Viguera version, which is commonly available to all interested non-Arabists); Martin Malcolm Elbl, "Keys to the Strait: Fortifications in the Strait of Gibraltar from Abū Ya'qūb Yūsuf to Abū al-Ḥasan 'Alī," in *Ports and Fortifications in the Muslim World: Coastal Military Architecture from the Arab*

interest, as beacons on a 'realm-wide' or 'empire-wide' scale feature very seldom in Maghribi sources.

Historian and poet, Ibn Marzūq was admittedly a court panegyrist. His report may involve hyperbole, yet the other concise data he offers regarding fortification upgrades at Ceuta and at Gibraltar are mostly verifiable, including descriptions of the building techniques. Ibn Marzūq was evidently well informed. The beacons he describes ran from Asfi (southern Morocco) to Algiers, with a possible extension into Ifrīqiya (Tunisia), probably as far as Béjaïa. Guards at each post watched the sea, the coastline, and the near hinterland. The lit beacons supposedly alerted the entire network in one night—or even part of a night—a distance caravans took two months to cover. Given a daily caravan stage of *c.*16–40 km, this implies some 960–2,400 km, depending on visibility. The distance along the coast from Asfi to Béjaïa is some 1,770 km, which would agree with Ibn Marzūq's account (Figure 17.1).

Examining the viability of this system, Elbl suggested a simple model, perhaps comprising about 100 to 120 stations at *c.*11 km to over 17 km intervals.[4] On this basis a signal could travel from end to end within 32 hours in clear weather: longer than Ibn Marzūq's 'single night,' but still a worthy achievement.

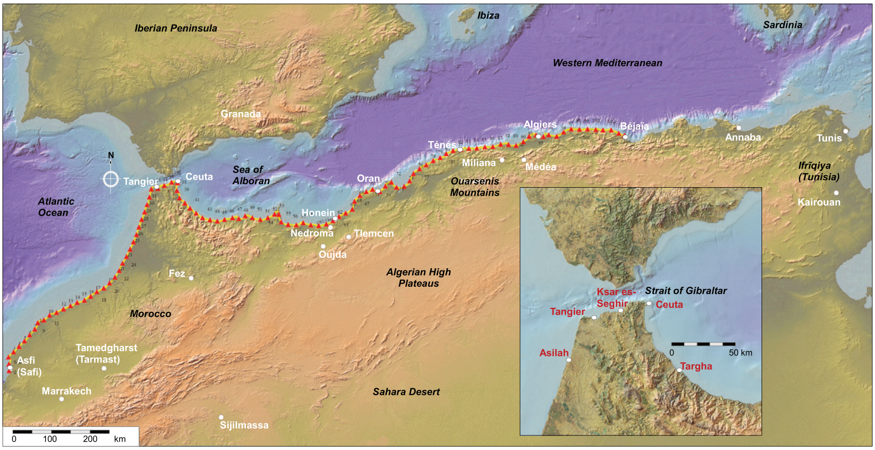

FIGURE 17.1 Overall model of the Marīnid signal beacon network as described in Ibn Marzūq's *al-Musnad*. The model assumes equidistant beacons, and includes 104 stations. The map inset shows certain key localities in the Strait of Gibraltar, for orientation purposes
ILLUSTRATION: M.M. ELBL

Conquest to the Ottoman Period, ed. Stéphane Pradines, (Fouilles de l'Ifao) 85 – 2020 (Cairo: IFAO, 2020), pp. 33–34.

4 Elbl, "Keys to the Strait," p. 34, with discussion of further sources.

It is unknown whether the beacons were built as described, or how long they remained in service. There was, though, political will to install them. Ibn Marzūq's claim that official pay was indeed disbursed to the guards and that coastal safety improved as a result[5] suggests the network was functioning in whole or in part. That said, contextual caution is warranted.

Abū al-Ḥasan cannot have envisaged a viable beacon infrastructure before A.D. 1332–4. Only then did he assert genuine power by eliminating his brother Abū ʿAlī, backed by the ʿAbd al-Wādid rulers of Tlemcen. A campaign against Tlemcen then began in February–March A.D. 1335 (A.H. mid-735). Only after Nedroma fell in July–August 1335 and Oujda in autumn 1335 to early spring 1336 (A.H. 736), was a compact sector of coastal and inland central Maghrib under Abū al-Ḥasan's control—including Oran, Honein, Miliana, Ténès, and approaches to Algiers. ʿAbd al-Wādid leaders at the borders of Ḥafṣid Ifrīqiya, who were blockading Béjaïa, defected to Abū al-Ḥasan. Areas south to Médéa, the Chelif Valley and into the Ouarsenis Mountains were then secured. Tlemcen, the ʿAbd al-Wādid capital, was isolated. The blockade was enforced from a camp-town at al-Manṣūra (The Victorious), and Tlemcen finally fell to an all-out assault on 7 May 1337 (27 Ramaḍān A.H. 737).[6]

Prior to April–May 1336 (late A.H. 736) at best, or even the spring of 1337 (late A.H. 737), beacons all the way from Asfi to Algiers—or even Béjaïa—would have made little sense, given need for maintenance and reliable garrisoning. Even patchy command-and-control depended not just on structures but, as Ibn Marzūq highlighted, on loyal guards. Note that, after the fall of Tlemcen, Abū Muḥammad ʿAbd Allāh Ibn Tāfrājīn, resident at the Marīnid court and in the siege camp as a Ḥafṣid official, accomplished the singular feat of reaching Tunis with news of the victory as early as 17–18 May 1337, entirely outpacing official couriers.[7] Beacons extending to Algiers, or further east, thus presumably were not in place yet.

Extending the network toward Ifrīqiya really mattered only for asserting control. The failure of crucial dynastic talks in A.D. 1337–8 (A.H. 738) created obstacles, as did the rise of pretenders in the Marīnid and Ḥafṣid domains.

5 Ibn Marzūq, *al-Musnad* (Viguera trans.), p. 330.

6 Walī al-Dīn ʿAbd al-Raḥmān Ibn Khaldūn, *Kitāb al-ʿibar wa-dīwān al-mubtada' wa-l-khabar fī ayyām al-ʿArab wa-l-ʿAjam wa-l-Barbar* (1375–1406), trans. Mac Guckin de Slane, *Histoire des Berbères et des dynasties musulmanes de l'Afrique septentrionale*, 4 vols (Algiers: Imprimerie du Gouvernement, 1852–6), vol. 3, p. 410; vol. 4, pp. 220–223. For practical reasons all references here are to the Slane version, which is universally available in digital versions to all interested non-Arabists. De Slane gives 1 May 1337 as date, but 27 Ramaḍān 737 A.D. in fact corresponded to 7 May AD 1337.

7 Ibn Khaldūn, *Kitāb al-ʿibar*, 4, pp. 223–25.

A stalemate ensued. By A.D. 1339–40 (A.H. 740) the politics of al-Andalus entangled Abū al-Ḥaṣan in staunch commitment to *jihād* war in the Iberian Peninsula, against Castile and Portugal. The subsequent death of his son Abū Malik in Iberia, and naval and amphibious operations preceding the sultan's landing near Tarifa (Spain) in June 1340 (A.H. 740) siphoned resources westward. The sultan was then defeated at the Battle of Rio Salado,[8] and hasty preparations began at Ceuta for a new expedition.[9] Naval setbacks and the fall of Marīnid-held Algeciras (in Spain) to Christians in late March 1344 (A.H. 744)[10]—as well as baffling Granadan politics—meant all eyes were on the Strait of Gibraltar.

Only with the death of the Ḥafṣid dynast Abū Yaḥyā Abū Bakr and the rise of his son ʻUmar in October–November A.D. 1346 (A.H. Rajab 747), followed by fratricidal rivalry, did Abū al-Ḥasan revive his plans for Ifrīqiya (Tunisia).[11] Operations began in late March A.D. 1347 (A.H. 747). Béjaïa surrendered without resistance. The repairs to its fortifications[12] provided a logical framework for extending a beacon system to the east of Algiers. Annaba then defected, the fugitive Ḥafṣid forces crumbled, and the Marīnids entered Tunis unopposed on 23 September 1347 (8 Jumādā II A.H. 748).[13] The triumph, however, was fleeting. Clashes with restless and powerful nomad tribal coalitions of southern Tunisia and nearby western Libya prompted a premature anti-nomad (anti-insurgency) campaign in mid-March A.D. 1348 (A.H. 748).[14] Abū al-Ḥasan suffered a defeat at Kairouan on 16 April 1348 (8 Muḥarram A.H. 749), thanks to unexpected defections. Fleeing to Tunis by sea, he refortified the town, but the enlarged Marīnid empire, which now stretched from the Atlantic Ocean to Tunisia, shattered amid unrest and the restoration of previous power-holders.[15] Some in Morocco deemed Abū al-Ḥasan dead, and his son Abū ʻInān was made sultan.

Allegiances became quite murky by June 1348 (Rabīʻ I A.H. 749). Abū al-Ḥasan lingered in Tunis, hoping for better luck. While Algiers temporarily remained

8 Ibn Khaldūn, *Kitāb al-ʻibar*, 4, pp. 223–24, plus a very rich secondary literature that far exceeds the purpose of this note.

9 Ibn Khaldūn, *Kitāb al-ʻibar*, 4, p. 234.

10 Ibn Khaldūn, *Kitāb al-ʻibar,* 4, pp. 235–37; Elbl, "Keys to the Strait," pp. 30–1 and archaeological works listed therein.

11 Ibn Khaldūn, *Kitāb al-ʻibar,* 4, pp. 246–47.

12 Ibn Khaldūn, *Kitāb al-ʻibar,* 4, p. 249.

13 Ibn Khaldūn, *Kitāb al-ʻibar,* 4, pp. 251–52. The Slane translation seems to involve a date conversion error, which has been corrected here.

14 Ibn Khaldūn, *Kitāb al-ʻibar,* 4, pp. 265–66.

15 Ibn Khaldūn, *Kitāb al-ʻibar,* 4, pp. 267–70.

loyal, Ceuta in the far west finally defected to Abū ʿInān, who quite logically and opportunistically opposed his father's return home (i.e. to Morocco).[16] Abū al-Hasan's dramatic escapes from shipwreck and bandits on the way back west, via Algiers, amid dire lack of news,[17] imply that signal networks were disrupted by June A.D. 1348 (A.H. 749). The sultan finally fled to the edge of the Sahara, to Sijilmassa, and then moved north to Marrakech. Defeated yet again at Tamedgharst (aka Tamedghast) in April–May A.D. 1350 (Ṣafar A.H. 751), he died in Hintāta lands on 27 June A.D. 1351 (23 Rabīʿ II A.H. 752) from an infected phlebotomy puncture.

In light of this detailed account there is a solid case for suggesting that Abū al-Ḥasan's beacons were installed in fair haste only after A.D. 1337 (737 A.D.). This may mean that all even marginally suitable coastal structures already in place were simply repurposed. What followed was a span of some eight years (A.D. 1339–40/A.H. *c.*740 to A.D. 1348/A.H. 749) when the beacons would have been geopolitically useful at a maximum network extent that was well worth maintaining. No hints have been found, thus far, that Abū al-Ḥasan's successor Abū ʿInān used the system effectively. The decline in coastal safety highlighted in *al-Musnad* makes it likely that the beacons no longer constituted a viable system by A.D. 1371.[18]

3 Watchtower/Beacon Sites in the Broader Strait of Gibraltar Zone

Unfortunately, it is near impossible to identify any of the sites listed here as beacons originally commissioned by Abū al-Ḥasan. This is also true in Granada, where *c.*70 beacons were apparently built or refurbished by *wazīr* Riḍwān during the 21-year rule of Abū al-Ḥajjāj Yūsuf I (A.D. 1318/A.H. 718 –A.D. 1354/A.H. 755, A.D. *r.* 1333/A.H. 733–A.D. 1354/A.H. 755).[19] Interestingly, Granada's programme mirrored that of Abū al Ḥasan. While coordination is likely, no proof for this has yet appeared, and Riḍwān's programme may partly have existed on paper only. Note the Granadan emphasis on 'refurbishing', thereby implicating *any* suitable existing sites—even hillside mausoleum shrines of local saintly persons (the on-site caretaker of each holy *qubba* [shrine] usefully doubling as

16 Ibn Khaldūn, *Kitāb al-ʿibar,* 4, pp. 276 and 280–81.

17 Ibn Khaldūn, *Kitāb al-ʿibar,* 4, pp. 284–85.

18 Ibn Marzūq, *al-Musnad* (Viguera trans.), p. 330. The text asserts that the coastlines remained safe only during the reign of Abū al-Ḥasan and not thereafter.

19 Rachel Arié, *L'Espagne musulmane au temps des Nasrides* (1232–1492) (Paris: De Boccard, 1973), pp. 274–75; Elbl, "Keys to the Strait," p. 33.

sentry). In this regard, it might be futile to search the records or the terrain for these ‘70 towers’.

4 Selected Sites

4.1 *Targha*

Targha,[20] in the Moroccan Rif east of Ceuta, is a surveillance micro-region of the kind that dot the coast at outlets of often steep seaward valleys—*c.*11 km apart, topography permitting. Most of these locations lack all-weather anchorage, and the inviting small beaches are very treacherous for naïve navigators. Local security ‘systems’ were often tripartite, consisting of a hilltop *qaṣaba* or refuge (inland), lone coastal tower (on a spit or promontory), and beachhead fort. The *qaṣaba*s usually include the oldest archaeological traces, going back to the A.D. 800s (A.H. 200s) through A.D. 1100s (A.H. 500s). The beachhead forts, by contrast, are typically of more recent date. At Targha, the fort on a rocky outcrop is mostly deemed to be Portuguese in origin. It is of rough-dressed local stone, European-fashion, probably preceded by earlier Islamic work. The *qaṣaba*s—typically built in *ṭābiya* style (rammed clay on dry-laid stone foundation)—were not primarily meant for signalling roles. Viewsheds at Targha confirm this (Figure 17.2). Lone watchtowers, though, offered broad seaward views, and lines of sight to nearby promontories.

4.2 *Torres Do Lião*

The closest match for Targha, 75 km north-west from the Rif, features in Portuguese and Spanish historical sources as *Torres do Lião* (Towers of ‘Lion’ – not the animal but the local *wadi* stream).[21] Like nearby sites, the *Torres* lacked

20 André Bazzana, Patrice Cressier and Abd el-Aziz Touri, “Archéologie et peuplement: les mutations médiévales, le cas de Targha,” in *Jbala. Histoire et société. Études sur le Maroc du Nord-Ouest*, eds. Ahmed Zouggari and Jawhar Vignet-Zunz (Paris and Casablanca: CNRS and Wallada, 1991), pp. 307–29; José Antonio Martínez López, Mansour Akrache and Larbi El-Mesbahi, *Fortificaciones en el norte de Marruecos: Tánger-Tetuán* (Murcia: Comunidad Autónoma de la Región de Murcia, 2005), pp. 135–56.

21 See e.g. Carlos Gozalbes Cravioto, “Arqueología de la frontera norteafricana del Estrecho de Gibraltar (siglos XIV–XVI),” *Almoraima* 42 (2011), p. 573. The stream is Oued Liane (aka Oued Alian aka Oued Ilyane). Further, Cláudia Barros, *O Olhar de Gomes Eanes de Zurara sobre o Norte de Marrocos: estudo da paisagem de Alcácer Ceguer* (*Ksar Sghir*), Master’s thesis (Universidade do Minho: Instituto de Ciências Sociais, 2021), pp. 81, 133, 141, 265 and 310–24. The fair number of listed sites in the area ranges all the way from Neolithic to Numidian, Roman, post-Roman, ‘Medieval’ (a problematic and avoidable concept in Islamic settings), and Early Modern or later.

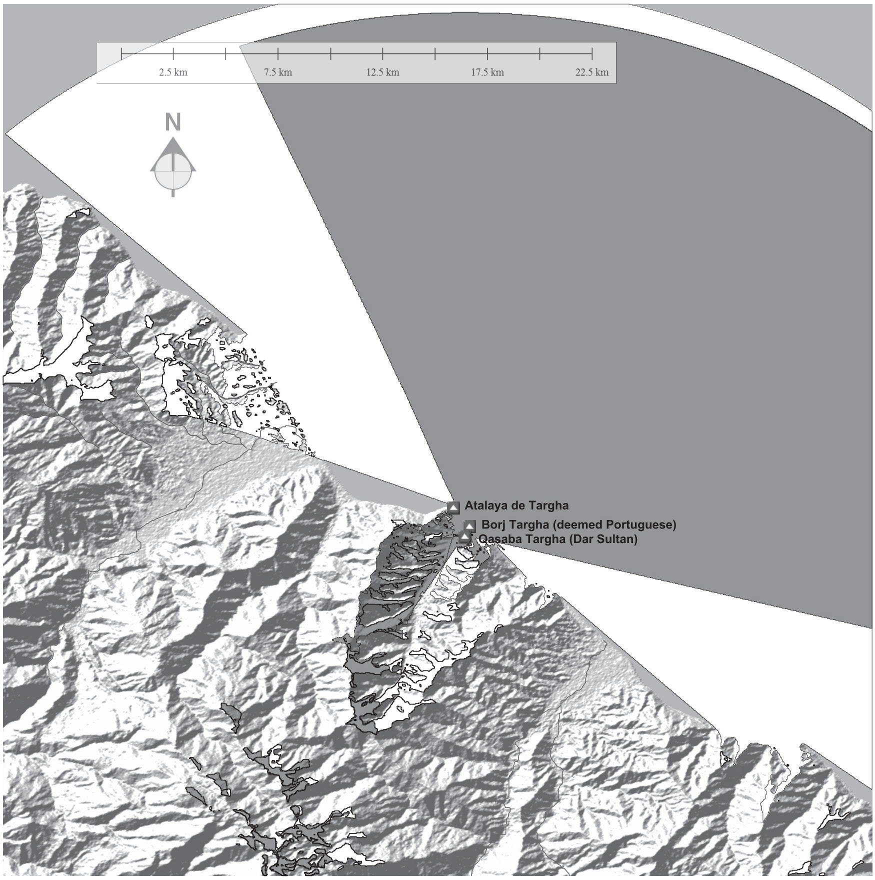

FIGURE 17.2 Overlapping comparative viewsheds calculated respectively from the 'Atalaya de Targha' promontory tower (white shading) and from the highest point of Targha's inland *qaṣaba* (aka Dar Sultan) (dark shading). A viewshed from Borj Targha is not included in this model
FIGURE BY MARTIN MALCOLM ELBL

a good anchorage—even as a foul weather refuge. One of the two locations was a tiny hilltop settlement, the other featured at least one, probably more, rudimentary towers. Surveillance capacity was limited and contact with other sites, on foot or on horseback, was awkward. Viewsheds attest to the problematic intervisibility (Figure 17.3). Northward viewsheds covered modest slices of the seascape. It was possible, however, to monitor extensively the nearby higher slopes and inland peaks. This was a rural 'backwater', and low but rugged terrain challenged any invader. The best use for the site was to watch for landings of smugglers or spies.

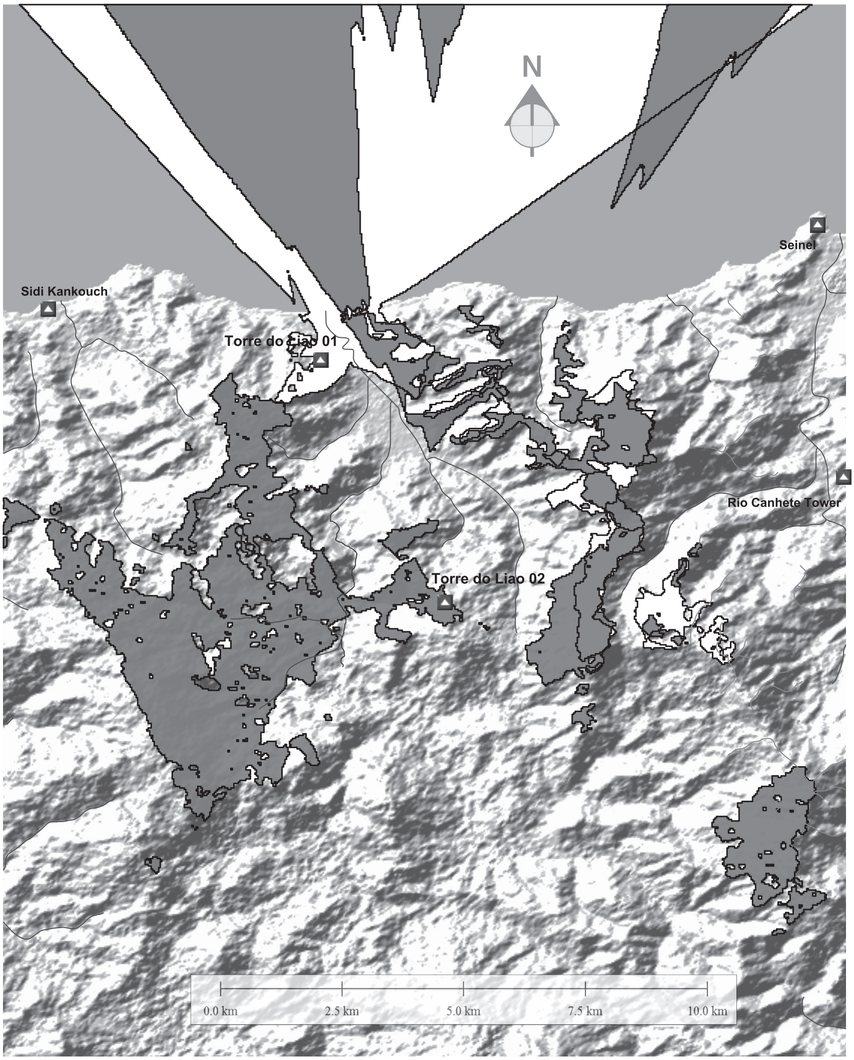

FIGURE 17.3 Overlapping comparative viewsheds calculated respectively from the Torres do Lião 01 site (coastal, white shading) and the Torres do Lião 02 site (inland, dark shading). To the west, the inland site viewshed very nearly met and intermeshed with viewsheds of the easternmost Tangier area sites
FIGURE BY MARTIN MALCOLM ELBL

4.3 *Ksar es-Seghir*

Ksar es-Seghir embodies a more complex scenario. Unfortunately, tangible data at various locations (such as Dar al-Borj) are vanishing. Modern port installations (e.g. the Moroccan navy station at Ksar es-Saghir and the container port at Tangier Mediterranean II) have accelerated this decay. The literature, both archaeological and historical, is broad and still growing.[22] Studying local tower or beacon sites must therefore increasingly resort to virtual landscape archaeology. The first formal urban fortifications at the estuary go back to A.D. 1287 (A.H. 685–6). Tactically, Ksar es-Seghir was always a glorified beachhead fort, upgraded *c.*50 years after the Portuguese occupation of A.D. 1458 (A.H. 862). A dynamic spit-bar partly blocked the estuary. The anchorage was useful yet poor, with capacity probably augmented only by a small intertidal lagoon further upstream.[23] The site served as a valued *jihad* port in the A.D. 1100–1200s (A.H. 500–600s), logistically supporting troops bound to and from Iberia.

Valleys descending north to Ksar es-Seghir featured refuge sites, isolated towers, and signalling locations.[24] The north-facing ones—lying mostly near crest lines—surveyed the coast and the sea, but all were problematic. The so called M'nar (literally 'Beacon'), a key crest-line location, easily stands out on visual inspection of maps (Figure 17.4). It was useful for monitoring nearby slopes and peaks, plus bits of coastline almost west to Sidi Kankouch,[25] but it was blind to all but two other lookout sites. It also could not discern well (or at all, under fog) the Portuguese-held Seinel hill above Ksar es-Seghir. This was a boon for the Portuguese, but viewsheds demonstrate that the Seinel was poorly sited for coastal surveillance or for getting signals eastward to Portuguese Ceuta.

The main northbound valley sloping toward Ksar as Saghir was beyond the purview of the M'nar, for instance. Other locations were required to watch inland areas more favourable for troop movement. Site-to-site intervisibility was not good, but distances were clearly short enough for messengers on foot—even when steeper slopes are factored into the model. The Portuguese never held the hinterland, and this kept Ksar es-Seghir vulnerable—a factor underpinning its eventual evacuation.

22 Martin Malcolm Elbl, "The Master-builder, the Bureaucrat, and the Practical Soldier: Protecting Alcácer Seguer/Qaṣr al-Saghīr (Morocco) in the Early Sixteenth Century," *Portuguese Studies Review* 12, no. 1 (2004–5), pp. 33–73; João Sérgio Sequeira Rodrigues Braga da Cruz, *O castelo português de Alcácer Ceguer: transformações morfológicas nos sécs. XV e XVI,* 2 vols., Master's thesis (Universidade do Minho: Escola de Arquitectura, 2015); Elbl, "Keys to the Strait," pp. 13–16; Cláudia Barros, *O Olhar de Gomes Eanes de Zurara sobre o Norte de Marrocos*, with ample additional bibliography. The Barros thesis unfortunately does not offer viewshed analyses for any of the listed field-walked sites.

23 Elbl, "Keys to the Strait," p. 16.

24 Gozalbes Cravioto, "Arqueología de la frontera," pp. 574–78.

25 Gozalbes Cravioto, "Arqueología de la frontera," p. 572.

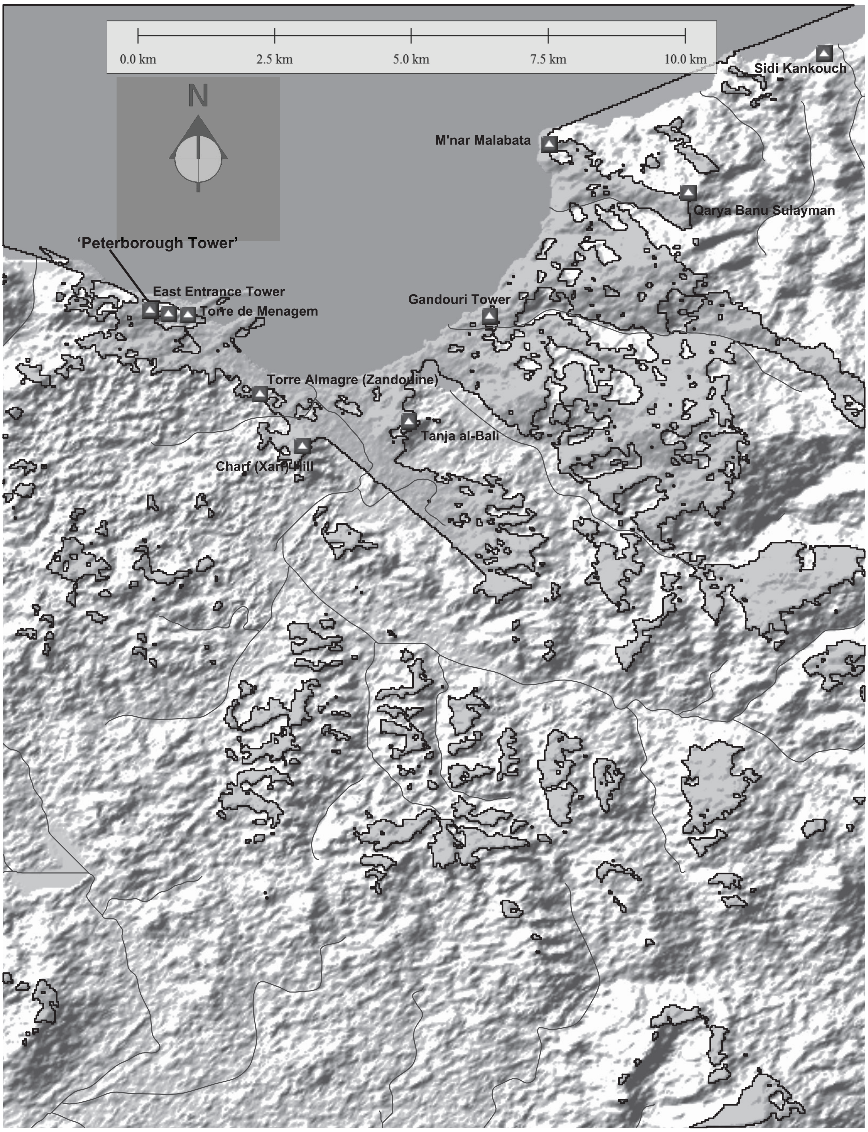

FIGURE 17.4 Single-point viewshed from a 3D-modelled top of an earlier Islamic tower (no longer extant) at or near the later Portuguese and subsequently English 'Peterborough Tower', top of Tangier's *qaṣaba*/later bastioned citadel. The western approaches are covered superbly, the southern ones less well
FIGURE BY MARTIN MALCOLM ELBL

4.4 *Marsa Musa, Balyūnash, Ceuta*

Marsa Musa was deemed in Arabic sources one of the premium tiny anchorages near Ceuta. It is surprising to find in the sources fewer mentions of watchtowers here than one would expect. The reason was partly the confined bay with rugged hinterland, which was daunting for heavy loads and troops. Balyunash, before A.D. 1415 a luxury satellite of Ceuta, featured private recreational suburban dwelling towers, which were handy as lookouts. Physical traces are nearly gone.[26] The towers, when modelled in 3D, easily communicated with each other as well as with Ceuta (namely the Almina peninsula). The same applied to Āfrāg (al-Manṣūra), a palatial fortified camp-suburb outside of Ceuta (early A.D. 1300s) that is finely documented, with partly extant walls and towers.[27] A surprising new observation is that Āfrāg (al-Manṣūra), deemed a key Marīnid tool to keep politically restless Ceuta subdued, had indifferent visual command of the port. Viewsheds (whatever the modelling approach) disclose only command of the sea and of near hinterland slopes. Psychological symbol vs. actual tactical reality?

Within Ceuta, remarkably enough, the visual prominence of fortifications or signal posts on top of dominant landscape features was misleading. The top of Jabal Almina (Almina peninsula), where a never completed Islamic citadel existed prior to 1415, should have been a valuable point for surveillance. This was not so. Almina was mainly useful for watching the Strait of Gibraltar in the north. In the opposite direction, it surveyed the more distant coastline to the south. On a fine day, Almina at best discerned only *approaches* to the south-trending shore. For the port of Ceuta, its immediate vicinity, and tactical stretches of the north and south shores, a tower *within* the low neck-of-land town was much more useful. The *Torre da Moura*—Tower of the Moorish Woman—which survived into the early 20th century. Part of the old Islamic *qaṣaba* and a tool of inner-town policing already in the A.D. 1200s, the *c.* 19-meter-high structure[28] outperformed observers at Jabal Almina.

26 Patrice Cressier, "Ville médiévale au Maghreb. Recherches archéologiques," in *Histoire et archéologie de l'occident musulman* (VIIe–XVe *siècle*)*: al-Andalus, Maghreb, Sicile,* ed. Philippe Sénac (Toulouse: Université Toulouse II – Le Mirail, 2012), p. 123; a decade of archaeological data remains largely unpublished.

27 See e.g. Fernando Villada Paredes and Pedro Gurriarán Daza, eds., *Al-Manṣūra. La ciudad olvidada* (Ceuta: Servicio de Museos, 2013).

28 Martin Malcolm Elbl, "Tangier's *Domus Praefecti* (Governor's House) and Ceuta's *Paços Reais*/*Paço Velho* (*Palacio Viejo*): 3D-Modelling Vanished Prestige Dwellings and Cross-cultural Symbols of Governance," in Martin Malcolm Elbl, ed., *Encounters in Borderlands: Portugal, Ceuta, and the 'Other Shore* (Portuguese Studies Review Edited Volumes Series) 2 (Peterborough/Toronto: Baywolf Press, 2019), pp. 221–29.

4.5 *Tangier*

The surveillance context in Tangier Bay was more complex still. The hydrography, now vastly altered by modern mega-urban sprawl, was very different.[29] More survives, however, of the medieval and early modern walls of Tangier than the 1683–4 demolition by the English might suggest. Security comprised various old stone towers[30] plus tiny hilltop posts without fixed installations that are mentioned in Portuguese sources. Relevant literature is large and still growing.[31] English rule saw the installation, in 1662 to 1684, of well-documented forward military posts. Virtual archaeology and digital modelling are essential here.[32] The main feature of the whole perimeter was its inherent coherency, even if after 1471 it was split into European and Moroccan zones. From the peak of the *qaṣaba*—Islamic, Portuguese, reused by the English—most of the other six or seven relevant towers and lookouts were clearly seen (Figure 17.5). The view out to sea, well across the Strait of Gibraltar, was all-encompassing. Former lookouts have now mostly disappeared, or linger only in topographic terms, or in the form of much later installations (e.g. the Cape Malabata lighthouse).[33] The old *qaṣaba* of Tangier (a bastioned fortress from the A.D. 1560s onward),[34] plus posts around the bay, visually commanded with a single exception practically all the approaches.

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29 For synopsis and analysis of sources see e.g. Martin Malcolm Elbl, *Portuguese Tangier (1471–1662): Colonial Urban Fabric as Cross-cultural Skeleton* (Peterborough/Toronto: Baywolf Press, 2013), *passim*; Elbl, "Keys to the Strait," pp. 17–21 (based on Arabic and European sources plus GIS plus secondary literature and field surveys). Extensive references are available therein, including e.g. the standard Dom Fernando de Menezes (2nd Count of Ericeira) [1614–99], *Historia de Tanger, que comprehende as noticias desde a sua primeira conquista até a sua ruina* (Lisbon: Officina Ferreiriana, 1732; Tangier: Tipografia Hispano-Arábica de la Misión Católica 1940).

30 E.g. the Gandouri tower; Gozalbes Cravioto, "Arqueología de la frontera," pp. 568–70.

31 For further references, see e.g. Elbl, *Portuguese Tangier;* Ana Carolina Rocha Mendes, *O Castelo Novo de Tânger: Resgate da arquitectura militar portuguesa entre os séculos XV e XVII*, Master's thesis (Escola de Arquitectura, Universidade do Minho, 2017); and the essential Cândida Sofia de Matos Carvalho, *O Castelo de Cima de Tânger entre Quatrocentos e Seiscentos: de Paço a Cidadela*, Master's thesis (Escola de Arquitectura, Universidade do Minho, 2018).

32 Elbl, *Portuguese Tangier*; for further examples and results of this approach see Matos Carvalho, *O Castelo de Cima de Tânger*; Elbl, "Tangier's *Domus Praefecti* (Governor's House)".

33 Gozalbes Cravioto, "Arqueología de la frontera," pp. 568–70. For further topographic and hydrographic context see Elbl, "Keys to the Strait," p. 17.

34 Elbl, *Portuguese Tangier*, pp. 637–760; Elbl, "Tangier's *Domus Praefecti* (Governor's House)"; Matos Carvalho, *O Castelo de Cima de Tânger*.

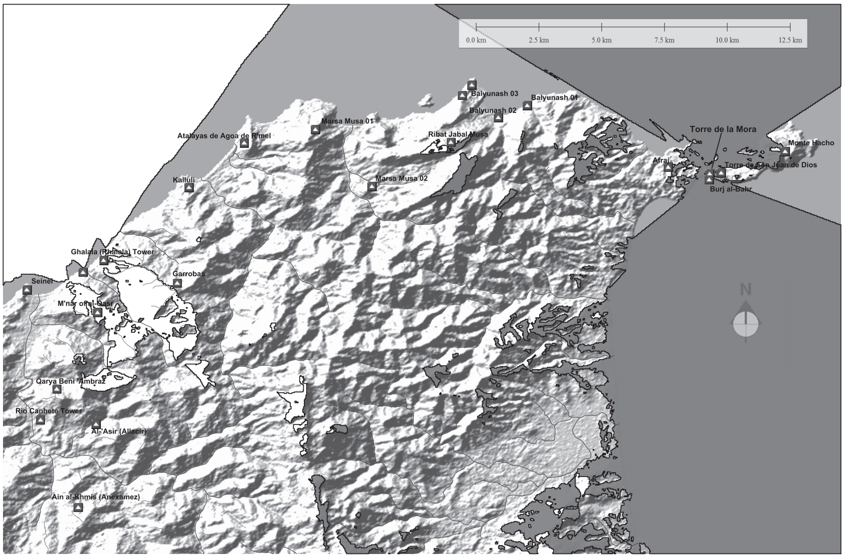

FIGURE 17.5 Comparative viewsheds calculated respectively from the Torre da Moura (no longer extant) in Ceuta (dark shading) and the M'nar site at Ksar es-Seghir (white shading)
FIGURE BY MARTIN MALCOLM ELBL

4.6 *Asilah*

For reasons of length, the present article omits a viewshed analysis of the *qaṣaba* of Tetouan and its sector. Returning to the Atlantic coast in the west, it is worth considering lookouts at Portuguese-controlled Asilah, after 1471. Locations can be reconstructed from chronicles, letters, and toponyms lingering in later colonial maps and field notes.[35] Even on this flat coast, the Facho—identified by the sources as a key lookout monitoring the approach of enemies—did in fact little or nothing for defence, at least as would appear from viewshed analysis (Figure 17.6). At best it covered, counter-intuitively, not the hinterland but the open sea. In the opposite direction, facing inland, a sentry posted at the Facho saw genuinely little, unless opponents were already near—only perhaps high columns of dust from advancing infantry and cavalry. This was so even if the sentry, on the Facho's *c.*9 m high platform, climbed further to the very top of the mast equipped with a basket—a *facho*—that could

35 For a very brief introduction see Martínez López *et al.*, eds., *Fortificaciones*, pp. 237–66; for further data, Indira Martins Peixoto, *As arquiteturas militares de Arzile ao tempo português: análise e interpretação evolutiva*, 2 vols., Master's thesis (Universidade do Minho: Escola de Arquitetura, 2017).

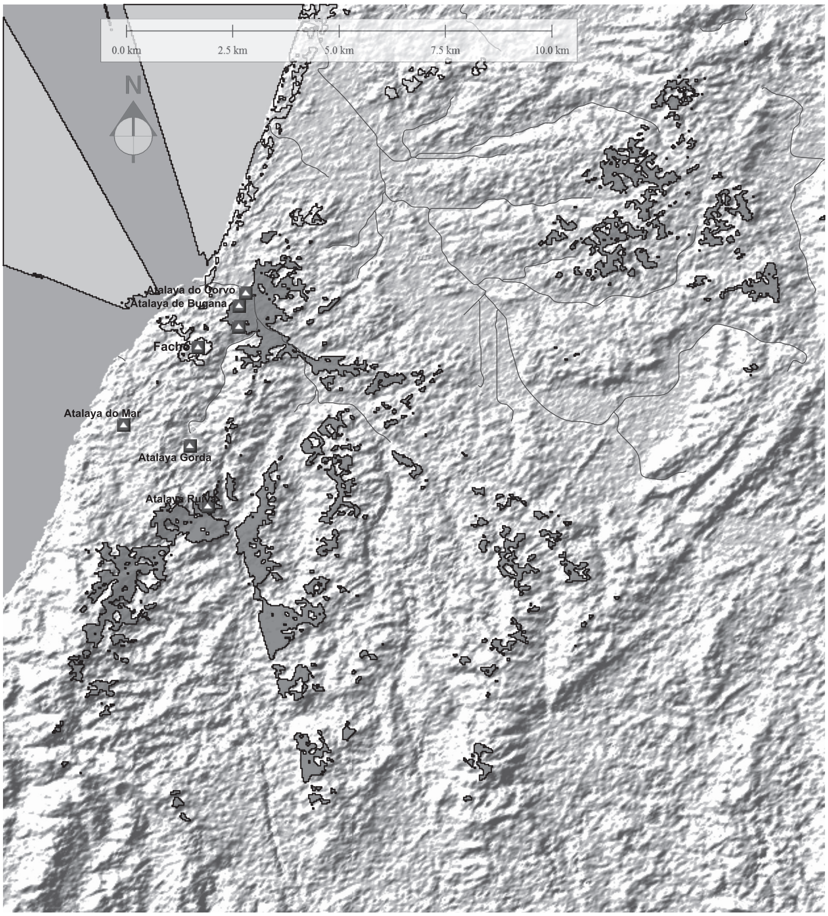

FIGURE 17.6 Comparative viewsheds calculated respectively from the Facho at Asilah (no longer extant, modelled as 9 m high) (light shading) and, cumulatively (dark shading), the Atalaya do Corvo lookout (north) and Atalaya Ruiva lookout (south)
FIGURE BY MARTIN MALCOLM ELBL

be raised or lowered as a warning signal ('enemy approaching'). Real information came from the other surrounding posts, by messenger—as historical records suggest.

Asilah's northern lookout posts—Bugana, Corvo, Outeiro (i.e. 'hillock') of Fernão da Silva, gave timely warning only with regard to the river bend immediately to the north-east of town. They could see some of the distant inland mountain peaks, but that information was nearly worthless. The lead time they offered for mustering defence within town was minimal. With an enemy moving at top speed, this bought at best only a dozen precious minutes or so.

The town's *Torre de Menagem* (The Keep), in a corner of the old Islamic *qaṣaba*, could perform better in this respect. It was the southern lookouts, in particular Ruiva, that in fact offered the best warning, both in northern and southern directions. At the very least, Ruiva for instance had a half decent chance of spotting overnight campfires of forces approaching either from Ksar el-Kebir or from Tetouan.

5 Conclusions

The documented existence of some 55 historic sites, plus those very obliquely mentioned in fragmentary Arabic sources, suggests a higher local density of tower/beacon installations (not all in use simultaneously) than strictly necessary for a beacon system such as that attested by Ibn Marzūq. This surely represents an intersection of different local and micro-regional warning systems that served variable and conflicting needs at different times. As records relating to Tangier Bay, Ceuta, and Asilah confirm, both on the European and—much less explicitly—the Islamic side, most lookouts were staffed only during crises. Portuguese and Spanish enclaves all scaled down their active lookouts in 'peacetime'. There is no reason to believe that Muslim counterparts did anything else. No formal lookout legislation or corresponding mustering requirements have been uncovered. A lookout mechanism was activated only once information obtained by other means—espionage, merchant gossip, or outright rumours—suggested that substantial forces were active in the field or at sea. By far not all parts of these lookout systems served adequately either the goals of dynasties with centralizing ambitions, or of regional commanders and adventurers, or of European enclave holders, even at the height of their respective power and territorial influence. The Ibn Marzūq coherent array of beacons that presumably functioned across North Africa for a limited time from A.D. 1337 (A.H. 737) to A.D. *c.*1348/A.H. 749) thus represented a peak of what was achievable at the time, as long as a single ambitious dynasty marshalled socio-economic resources and commanded the effective loyalty of local lookout squads.

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CHAPTER 18

Stamping on the Embers: Concluding Thoughts

Marie Ødegaard, Stuart Brookes and Thorsten Lemm

The different visual and acoustic beacon signalling systems presented in this volume—from broad-scale overviews to more detailed discussions of specific systems—demonstrate similarities but also differences across time and space. We find that through beacon systems we can study societies on different scales to gain insights into inter-regional systemic contexts, past socio-military strategies and landscape organisation, right down to specific defensive sites and local tactics. This conclusion will summarise key observations and discuss current understudied topics, with the aim of identifying future agendas and approaches.

As an alternative to the methods of non-verbal long-distance communication—especially signalling beacons—discussed in this book, other forms of messaging, such as courier systems on both foot and horse, bird carrier and homing pigeons, or attached to projectiles, have certain obvious advantages. Written correspondence can be more lengthy, complex and nuanced than the relatively simple messages sent by beacons. Provided they were not intercepted, such messages could convey private information, and for this reason alone they were used for a wider range of purposes, from personal correspondence to diplomacy and governance, or describing trade and commercial opportunities, as well as for military purposes. A case in point, the survival of hand-delivered letters, such as those of Cicero, Fronto, and Pliny the Younger, provide some of the most detailed insights into Roman society available to scholarship.[1] In this respect, the contrast to the visual and acoustic messages discussed by the contributors in this volume could not be starker. While the signified concept of beacon signalling could vary depending on the predetermined message, from identifying the location of people, warning of danger, or announcing simple news,[2] the information conveyed was far less sophisticated.

1 See e.g. Cristiana Sogno, Bradley K. Storin and Edward J. Watts, eds., *Late Antique Letter Collections. A Critical Introduction and Reference Guide* (Berkley: University of California Press, 2016).

2 E.g. Polybius, *The Histories*, IV, Books 9–15, trans. W.R. Paton, rev. F.W. Walbank and Christian Habicht (Loeb Classical Library) 159 (Cambridge, MA: Harvard University Press, 2011), X, 43. 1–10; Aeschylus, *Agamemnon*, trans. Herbert Weir Smyth (Cambridge, MA. Harvard University Press, 1926), lines 20–9; and discussions by Davis Woolliscroft, *Roman Military Signal-*

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This accepted, there is still great value in considering the systems of long-distance communication discussed in this book. Most obviously, and as many of the contributions in this volume attest, they can leave tell-tale traces in landscape that are recoverable by archaeological, historical, or toponymic means. Remains of beacon towers, charred deposits, historical records and place-names can provide detailed information on the physical infrastructure of communications systems, which, combined with GIS modelling and experimental archaeology can illuminate how these systems operated within localities. The evidence for beacons is more emphatic in some cases than others: relics of Roman and Greek stone towers, for example, allow authors such as Bakke, Williams, Thiel and White to consider very precisely the operational qualities of these structures. Analyses of beacons identified through place-names or textual sources, by contrast, are more circumspect. In these cases, our understanding of signalling systems can be improved by other means such as making use of GIS-based viewshed analyses to help reconstruct networks, as seen in contributions dealing with places as far apart as Byzantine Italy (McMahon) and Viking Age Denmark (Lemm).

Even when individual beacons are difficult to identify in the landscape, the concept of non-verbal long-distance communication offers many possibilities for fruitful study from an archaeological perspective. As the cumulative evidence presented in this book has shown, communications and signalling have many similarities in time and space, meaning that certain phenomena, such as the use of landscapes, the ways strategic decisions were made, how 'watching' and guarding was conducted, or how people prepared against conflict, have parallels across the millennia. Even though all the case-studies here presented are historically contingent, it has been one of the aims of this book to explore some of the wider possibilities offered by the study of beacons from an archaeological point of view.

1 The Systemic Context

In a very tangible sense beacons can be connected to wider systemic issues, such as territoriality and border formation, the operations of states and empires,

ling (Stroud and Charleston: Tempus, 2001), J.H. Donaldson, "Signalling Communications and the Roman Imperial Army," *Britannia 19* (1988); Vlad-Andrei Lăzărescu, Ștefan Bilașco and Iuliu Vescan, "Big Brother is watching you! Approaching Roman surveillance and signalling at Porolissum," in *Landscape archaeology on the northern frontier of the Roman Empire at Porolissum*, eds. Coriolan Horațiu Opreanu and Vlad-Andrei Lăzărescu (Cluj-Napoca: Mega Publishing House, 2016), pp. 292–301; see also discussion in Chapter 1.

international power relations, and warfare. In a geographical sense, since territories comprise areas over which sovereignty and supremacy are claimed,[3] beacons are often particularly intertwined with those borderlands that lie at the frontiers of rulers' dominion over subjects or people. This is exemplified by the detailed studies by Williams and Thiel on signalling and surveillance towers in Roman frontier contexts (e.g. the German-Rhaetian *Limes* or colonial Spain and Portugal). Beacons are often bound together in networks or chains, where long-distance signalling or territorial control are essential for the maintenance of power and the defence of territories.

Within these large political entities, beacons can also be connected to smaller, nested areas, defined by those groups co-operating for common defence, as is seen in examples described by Brookes (England), Lemm, and Iversen (both Scandinavia). In the earlier Norwegian system described by Ødegaard, people within these smaller administrative territories were responsible for manning warships, and providing men and equipment for the common defence. Similarly, Johnson's account of 17th century Isle of Man, showed how each parish came under the charge of a captain responsible for mustering and leading the militia in support of the watch.

In this way, several authors in this book have looked beyond signalling to consider the broader physical and human landscapes of civil defence, of which beacons were just one part. It is an obvious observation to make, but the success of beacon signalling to counter threats depended upon wider infrastructure, systems of mobilisation and communications. For example, Iversen shows how the system of late medieval Norway depended on riders on horseback and an infrastructure of farms with the responsibility for keeping horses, found at intervals in the landscape. It follows that control over beacon networks, infrastructure and military and civilian responses, was one dimension of wider controls over people, and therefore potentially a crucial element in power strategies and state formation processes. The inverse of top-down processes shows beacons also to be a way in which different civil societies responded to threats and developed resistance strategies from available resources and choices, and in this way are an expression of human preference and complex decision-making at a local scale.[4]

Various papers connect signalling to state control or the ability of leaders to wield more wide-ranging power, and this is often connected to processes of

3 John Baker and Stuart Brookes. *Beyond the Burghal Hidage. Anglo-Saxon Civil Defence in the Viking Age* (History of Warfare 84) (Leiden: Brill, 2013), p. 35.

4 Jianfeng Zhu, Yueping Nie, Huaguang Gao, Fang Liu and Lijun Yu, "GIS-Based Visibility Network and Defensibility Model to Reconstruct Defensive System of the Han Dynasty in Central Xinjiang, China," *ISPRS International Journal of Geo-Information* 6, no. 8 (2017), p. 247.

state formation and not least, territorial control. Earley-Spadoni argues that fortified regional networks (FRNs) facilitated the formation of early empires; and territorial control is also explicit in Pancorbo Picó and Galera Pedrosa's paper on 11th century Cardona in Spain. In the Western Norwegian examples, Ødegaard and Iversen both suggest that signalling evolved alongside political changes, reflecting power dynamics over the control of land and regions. Likewise, Brookes suggests something similar happening in Viking Age England, arguing that beacon systems reflect a sequence of military innovations taking place in tandem with new concepts of territorial power.

More nuanced, William argues that Roman signalling systems were less functional against invasions than they were for controlling illegal border crossings by smaller groups, whether raiding bands or merchants reluctant to pay a customs duty. At the same time, they functioned as a form of border control, where those living close by or traveling within the borderland felt the presence of a Roman military that could surveil and challenge whoever violated those borders. This aspect is also stressed by McMahons's interpretation of newly fortified sites in 11th century Byzantine northern Apulia, which functioned more to exert territorial control rather than long-distance communication. These studies give insights into the power of surveillance; how the knowledge of being watched can promote psychological fears and control the behaviour of those surveilled.[5] In this way, beacons and fortifications conceivably helped to shape societal responses to fear, both enhancing resilience and enabling political control.

In many of these examples, beacon sites were placed at the boundaries of territorial control, and as such their study can contribute new insights into the wider scholarship of boundaries.[6] Such studies have argued that boundaries retain a wealth of information that can be deciphered to throw light on how decisions were made, how groups defined themselves, and how supra-local power intersected with local agencies. They express on the one hand, how territorial power might be expressed and experienced in localities, while on the other, show the degrees to which people responded to and acted upon this power. Simply put, the manning and operation of a single beacon has only a limited capacity—what these systems demonstrate is a recognition of, and collective responsibility for, a supra-regional territory. In beacon systems we have evidence for the fact that powers could rely on local acquiescence and

5 See not least, Michel Foucault's *Discipline and Punish: The Birth of the Prison* (1977).

6 See, for example, a review of the literature in David Mullin, "Border Crossings. The Archaeology of Borders and Borderlands. An introduction" in *Places in Between*, ed. David Mullin (Oxford: Oxbow Books, 2011).

participation in supra-local issues, both political and defensive. The systems could change according to circumstances, and different leadership and alliances could certainly change the nature of co-operation. At the same time, the organisation of defence systems could be initiated from the bottom-up, or at least hold elements of local co-operation, and thus, through studies of beacon systems we can grasp notions of co-operation, decision-making processes, and power structures.

It is worth underlining the fact that there is no consensus on the limits of signalling communication and what ancient and medieval societies were capable of doing. Views on the speed and range of a beacon signal varies considerably in the literature, as the contributions in this volume also attest; and the extents of networks comprising systems are similarly much debated.[7] As a case-in-point: even when relying on the same sources, examples from this book present somewhat different opinions—ranging between more maximalist and more minimalist positions—on the capabilities of Roman signalling. Such debates about the proficiency of beacons systems underscore the need for more studies deploying new and other perspectives and methods. The same call extends to questions about the effects of signalling systems on local communities, those relating to manning and resources, as well as efficiencies of beacons for warning—all themes that so far are somewhat underdeveloped in scholarship. We would advocate to extend such research into studies on the societal responses to threat and warfare, especially local communities' contributions to these systems and what this meant for collective identity. As many papers in this book have shown, the resources used for organising, manning and operationalising these systems could be substantial, so their study holds great potential for understanding the military, economic and social capacity of past societies.

While most of this discussion has concerned itself with military signalling, beacons could of course, also be used for civilian communication. Examples from around the world attest to their use for a variety of functions: as summons to meetings and rituals; to schedule or notify of ceremonial activities; in trade and hunting activities; or even in farming (e.g. by preventing crop predation by animals, or signalling when it was time to plant crops).[8] Comparisons and

7 See also the discussion in chapter 1.

8 Steve Swanson, "Documenting Prehistoric Communication Networks: A Case Study in the Paquimé Polity," *American Antiquity* 68, no. 4 (2003), p. 755; Ward Beers, "Fire and Smoke: Ethnographic and Archaeological Evidence for Line-of-Sight Signaling in North America," in *Papers in Honor of Sheila K. Brewer, Papers of the Archaeological Society of New Mexico 40*, eds. Emily J. Brown, Carol J. Condie and Helen K. Crotty (Albuquerque: Archaeological Society of New Mexico, 2014), p. 24; Ward Beers, "No One Here Gets Out Alive: Line – of-Sight.

understanding of how such different signalling systems functioned alongside each other are so far little discussed. Nor do military functions necessarily exclude other uses. Pancorbo Picó and Galera Pedrosa suggest that the medieval system in Cardona, Barcelona, was about controlling salt resources. Similarly, Williams argues that the Roman towers were set to watch over valuable natural resources as well as routes of transport in the provinces of the Iberian Peninsula and North Africa. Bakke shows how the military guards responsible for observation and fire-signals had a team which often included specialists that supervised agricultural production and natural resources, like the Tegean marble quarries. Thus, beacons could in some instances be multi-functional.

Such observations reiterate the need to consider the signification of beacons, as well as the intended recipients of the messages sent. Did different beacons signal different messages, and what were the predetermined messages sent? What knowledge was required to decipher messages and who held that knowledge?[9] At some Chinese beacon sites, women and families are reported,[10] suggesting these sites might not have been directly on the front lines. In other instances, the presence of women might suggest they were indeed part of conflict situations.[11] In Viking Age Scandinavia, women's role in the equipping of warships has been a topic of important recent scholarship.[12] Conceivably, studies exploring the involvement of different groups of people in other aspects of civil defence—such as signalling—has similar potential.

2 Getting 'Inside' Events

For all their simplicity, these signalling systems give us much information on military decision making. They show where particular threats were anticipated

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Communication and Regional Defense in the Prehistoric Rio Abajo, New Mexico," in *Collected papers from the 18th Biennial Mogollon Archaeology Conference. october 9–11, 2014, New Mexico State University, Las Cruces, New Mexico,* ed, Lonnie C. Ludeman (Las Cruces, New Mexico: Friends of Mogollon Archaeology, 2015), pp. 205–16.

9 Swanson, "Documenting Prehistoric Communication Networks".

10 Christopher J. Foster, "The Spread of Scribal Literacy in Han China: All along the Watchtowers," in *Power from Below in Premodern Societies*, eds. T.L. Thurston and Manuel Fernandez-Gotz (Cambridge University press, Cambridge, 2021), p. 194.

11 Hassan S. Khalilieh, "The Ribat of Arsuf and the Coastal Defence System in Early Islamic Palestine," *Journal of Islamic Studies* 19, no. 2 (2008), pp. 169–70.

12 Anna Nørgård, Store og små sejl – tidsforbrug ved spinding og vævning, in *Vikingetidens sejl, festskrift tilegnet Erik Andersen*, eds. Morten Ravn, Lone Gebauer Thomsen, Eva Andersson Strand and Henriette Lyngstrøm (Arkæologiska skrifter) 14 (København: Saxo-instituttet, Københavns Universitet, 2016), pp. 77–96; Eva Andersson Strand, Weaving Textiles: Textile Consumption for Travel and Warfare, *Viking* 84, pp. 176–186.

to come from, how such threats might be challenged, and when such systems were in operation. They offer a rare and clear window into the strategic visions of the societies (and their leaders) that built them. Certainly, different regions adapted beacon systems to suit their geographical and military needs. For instance, Byzantine Apulia's beacon network was used to maintain control and display imperial presence, while Viking Age Scandinavia developed coastal beacon systems to defend against maritime threats. Similarly, the Romans employed watchtowers along their frontiers, and the beacon systems along the Strait of Gibraltar served variable needs at different times, from the goals of regional commanders, to European enclave holders and ambitious dynasties. But the contributions in this volume also show that there was a much more sophisticated reading of the terrain that underscored these systems.

All studies are grounded in landscape—looking at the positions and functions of these sites in relationship to surrounding features like rivers, mountains, embayments, inlets, and fjords, as well as political and economic structures like boundaries, settlements and military institutions. The local context of beacons is necessary for understanding, not only why these sites were located where they were, but also how they related to social and military situations in the past. High vantage points like mountain peaks and coastal cliffs could of course provide ideal locations for beacons, ensuring clear lines of sight, but in many of the analyses described here there is a more subtle and strategic placement of these structures, for example, affording views in particular directions, or spaced in such a way to facilitate efficient communication relays. As such, beacon studies can reveal the sophistication of past communications networks, as well as the operational skills of (pre)historic people in building alliances and co-operation between people, often across different landscapes and regions at significant scale.[13]

Examples highlight past strategic decision making, providing a rare insight into the minds of leaders and generals who are almost invisible through other sources. Importantly, in most of the communication strategies discussed here, these devices served to gain an *advantage* in warfare, and in this regard, they were part of strategic military thinking that weighed up time and threat, military capability and the very nature of combat. They show how signalling could be pivotal to mobilising and manoeuvring forces, and attest to

13 See also e.g. Lauren Kohut, "Warfare and Alliance: A Human-Scale GIS Analysis of Defensive Alliances in the Colca Valley, Peru," in *Global Perspectives on Landscape and Warfare*, eds. Hugo Ikehara-Tsukayama and Juan Carlos Vargas Ruiz (Louisville: University Press Colorado, 2022), pp. 247–72; Ray Kerkhove, "Smoke signalling resistance: Aboriginal use of long-distance communication during Australia's frontier wars," *Queensland Review* 28, no. 1 (2021), pp. 1–24; John Mock, "Raising the Alarm: Defensive Communication Networks and the Silk Roads through Wakhan and Chitral," *The Silk Road 15* (2017), pp. 1–12.

communications, and thereby strategic and tactical considerations, concerning regions of a medium-to-large geographical range. Fleshing out such systems, to include the routeways for moving troops and non-combatants, the relay stations used by couriers to supply horses and provisions, mustering sites, and the bases of operations, are logical areas for further studies that are—necessarily—only skimmed over in many of these contributions.

It is doubtful that any of the authors contributing to this volume would claim to be experts in military strategy, and in this respect more could be done to analyse these systems from the perspective of the armchair general. How might the tactical or operational efficiency of these systems be improved? Where, from a military perspective, are there weaknesses in these systems, and what were the challenges to implementing them efficiently? Are there situations where signalling could have been valuable but was not deployed? These are questions we often do not have the answers to but would welcome the insights from military planners for whom these are common considerations.

Nor can we readily address the degree to which such generals relied on other forms of intelligence to guide their actions. Our focus throughout this book has been on overt messaging, but in reality, success in warfare requires as much strategic information of intended operations as can be gathered.[14] No doubt diplomacy and espionage also played an important role in determining strategy, not least when these might lead to less-violent outcomes.

Of course, diplomatic messaging and spying represents quite different communication mechanisms to the simple uses of beacons, in that it was usually secret. Spies might gather information from within a rival's realm, or work in secret to follow enemies or watch specific people, groups, or sites. It is unsurprising in this regard that, when they are recorded, spies and diplomats are often found either at the borders, as described by Earley-Spadoni, or near the centres of rival power where they might best gather the necessary tactical information.[15] To be most effective such secret information needs to be sent home in a constant stream, either directly by agents themselves or via some

14 Even if the role of intelligence in war is debated: see e.g. John A. Gentry, "Intelligence in war: how important is it? How do we know?," *Intelligence and National Security* 34 (2019), no. 6, pp. 833–50.

15 E.g. Jean – Baptiste Santamaria, "Secrets, Diplomatics, and Spies in Late Medieval France and in the Burgundian State: Parallel Practices and Undercover Operations," in *Beyond Ambassadors, Consuls, Missionaries, and Spies in Premodern Diplomacy*, eds., Maurits A. Ebben and Louis Sicking, Rulers & Elites 19 (Leiden: Brill, 2021), p. 167; John Alban and Christopher Thomas Allmand, "Spies and spying in the fourteenth century," in *War, Literature, and Politics in the Late Middle Ages*, ed. C.T. Allmand (Liverpool: Liverpool University Press, 1976).

secret method of communication, using couriers or other means.[16] Ancient and medieval sources are replete with examples of such messaging.[17]

Even without knowing the degrees to which non-verbal messages were supplemented by other forms of communication, this book challenges the notion that we can't get into the minds of people in the past without textual sources. In their various studies all the contributors in this volume actively think about the strategic decision making of past actors to gain an understanding of how such people understood their specific historically contingent military-political circumstances. In so doing, unlike many other forms of archaeological interpretation, which concern themselves largely with general systemic themes—the rise and collapse of states, interregional connections, and so forth—these sites provide insights to specific historical intentionality. They provoke us, in other words, to actively consider what Collingwood describes, as the 'inside' of events: "that in it which can only be described in terms of thought".[18] Some of the contributions come closer to Collingwood's definition than others, particularly when considering sites in the context of specific events, for example the discussion by Ravn and Juel on Danish Erritsø's strategic importance, possibly responding to events like the Frankish invasion of 815, Lemm's discussion of a defensive system for the protection of the Viking Age trading town of Hedeby, Brookes study of events in 10th century England and Elbl's descriptions of systems in the Strait of Gibraltar area, linking them to chronicled events between *c.*1350 to *c.*1690. These are all fine-grained temporalities in which different types of warfare are conducted, such as battles, static defences, sea watch, and which include the uses of beacons in each system.

These same fine-grained temporalities also demonstrate how beacon systems might evolve over time. Elbl shows how the system emerged from overlapping local warning systems rather than originating as a cohesive network. Beacon systems could also adapt to changing threats, settlement patterns, and population shifts, as they do in Iversen's account of changing threats encountered during the Nordic Seven Years' War (1563–70). Beacon systems changed in England (Brookes) and the Isle of Man (Johnson) in response to viking raids and threats. Johnson also gives examples of how the beacon system changed

16 E.g. Vincent Lee, "Choquequirao to Machu Picchu at the speed of light: visual signaling among the Incas," *Ñawpa Pacha* 30, no. 1 (2010), pp. 1–23.

17 Amongst the earliest is the story told by Herodotus of how Harpagus sent a message to King Cyrus of Persia around 550 BC, outlining a plan for victory against the Medians, by concealing a letter in the belly of a hare served at Cyrus' table. Herodotus, *The History of Herodotus*, 1, trans. G. C. Macaulay (London and New York: MacMillan and Co, 1890), 123; see also Thiel this volume.

18 Robin G. Collingwood, *The Idea of History* (Oxford: Oxford University Press, 1994): p. 213.

again in the early modern period, nevertheless often reusing the same watch sites.

This latter observation stresses that topography, as well as weather, can limit how a system might change. Bakke describes how before the Romans demanded the Greek city-states demolish their fortifications in 136 B.C, despite shifting alliances and military regimes, many of the watchtowers continued to be in use for over three hundred years. The examples, and many others besides those presented in this book, emphasise how certain places in the landscape have an important strategic role that is unchanging throughout millennia.

3 Different Perspectives for Future Research

In this volume the investigation of beacons has mostly been carried out at regional or inter-regional scales, with studies of beacons as archaeological sites far less pronounced, and arguably difficult to grasp. As the contributions demonstrate, signalling networks can be reconstructed connecting places far apart, over large-scale geographical distances and across long time periods. Further analyses of these kinds promise more insights, and hold potential for understandings of communications within and between societies, military systems and landscape use, as well as socio-political responses to war and threats.

Because beacon sites are not necessarily physically connected and can only be understood relationally, this creates a challenge for archaeological research, which is commonly—literally—grounded in the 'archaeological site'. Many contributions in this volume have sought to address this problem in one or two ways: firstly, by considering what beacons were connected to within their locales; secondly, by considering how they might be connected to each other. Both approaches warrant further research.

To reconstruct how beacons operated requires an understanding of the organisational structures of the military landscape, including societal infrastructure and logistics. What were the other military elements of these landscapes, including auxiliary structures and routeways, garrisons and people; and how were these systems operationalised in terms of cost, manning, military supplies and other resources?[19] By understanding the structures of each small fraction of the communication network, beacon studies have the potential to shed light on the military capacities and decision making of (pre)historic societies at a very granular scale.

19 E.g. Mock, "Raising the Alarm".

In seeking to explore the ways in which beacons were connected to each other, many of these contributions have examined their intervisibility, often by turning to GIS-based viewshed and visibility analyses. However, the actual distances that beacons could signal over is still very much debated and, arguably, can only be solved through experimental means. An interesting example of this kind was carried out in Britain in 1977 as part of Queen Elizabeth II's Silver Jubilee celebrations, in which a signal was sent from Windsor Great Park to Unst in the Shetland Isles: a distance of over 1,300 km (Figure 18.1).[20] Other experiments of this type have been conducted, including that described by Runge and Stauersbøl Mogensen.[21] These show the potential of experimental archaeology to test the intervisibility of beacons in the physical landscape. Additionally, techniques mentioned by ancient writers, such as synchronised water clocks, torch combinations, semaphore, flare signalling, heliographs and use of pigeons, have been tested showing that they indeed can have functioned.[22] These types of messages were two-way communication systems, where it was possible to convey messages and get answers or current intelligence. To test

FIGURE 18.1 Spectators watch Queen Elizabeth II's Diamond Jubilee Beacon on 4 June 2012, on Coombe Hill overlooking Chequers near Wendover, Buckinghamshire, England. As in 1977, beacons were lit to mark the Queen's reign.
CLIFF HIDE NEWS/ALAMY STOCK PHOTO

20 Royal Institute of Chartered Surveyors, *Silver Jubilee Beacons 1952–1977: An Informal Record of the National Network of Beacons to Celebrate the Silver Jubilee of Her Majesty Queen Elizabeth* (London: RICS, 1977), p. 29.

21 E.g. J. Luoto and P. Huttunen, 1987. Tulitiedotus tutkimuksen kohteena. *Kotiseutu* 4, pp. 194–98; https://www.ucl.ac.uk/early-medieval-atlas/news/2016/aug/lighting-anglo-saxon-beacons [accessed June 2023]; Baker and Brookes, "Beyond the Burghal Hidage", p. 182.

22 Woolliscroft, "Roman Military Signalling"; see also Bakke this volume.

(the limits of) intervisibility over certain distances, and to learn more about the timing of responses and taking action, and hence the timing of the effectiveness of a system, future experiments of lighting fires at potential beacon sites would harbour great potential.

The same is true for acoustic communication between sites and their surroundings, and on the battlefield. Using instruments as the carnyx, as described by Bertaud, or horns and trumpets, mentioned by Pancorbo Picó and Galera Pedrosa, Thiel, and Bakke, it is possible to test the capability, effect and range of audible signalling. Signals of this sort could transmit more complex messages or even be used to communicate in ideal conditions. And as Bertaud's paper shows, analysis of the functional characteristics of instruments and their archaeological contexts can give information of the organisation of armies and military communications. Tests of instruments and acoustic communication, and studies of whether they could have functioned as two-way exchanges of more complex messages, and over which distances, hold so-far unrealised potential. The power of sound has only to a small degree been studied from a stationary defence perspective, and more could be done to simulate combat situations. Instruments, such as the *tuba* and the *cornu*, could be used for tactical signalling during battle and sometimes even for the organisation of camp life, as described by Thiel. Audible signalling was also, and perhaps especially, effective in scaring enemies entering a territory, as testified by historical sources. Indeed, the psychological impact of visual effects combined with roaring sounds on enemies should not be underestimated.[23] Lăzărescu, Bilașco and Vescan[24] use sound propagation modelling based on GIS spatial analysis to test visual and audible signalling, and more such analyses should prove useful for future studies of signalling in connection with beacons.

While many papers in this book provide examples of visual analyses to identify chains and networks of beacons, and/or consider signal fires as components of defence systems, they only to a small degree explore the notion of beacons as archaeological sites and structures from a micro perspective. Beacons are often ephemeral sites, and as beacons are made (partially) of wood or other easily flammable material, like the timber superstructure watchtowers described by White, they will not leave behind many traces. Sometimes even other types of structures could also be used for signalling, like rooftops and trees.[25] Thus, it can be challenging to get a grip on beacons archaeologically. However, beacons can consist of stone watchtowers, like the Greek watchtowers described by Bakke, while others note pyramidal, rectangular and oval/

23 Lăzărescu, Bilașco and Vescan, "Big Brother is watching you!," p. 280.
24 Lăzărescu, Bilașco and Vescan, "Big Brother is watching you!".
25 Beers, "Fire and Smoke"; Kerkhove, "Smoke signalling resistance."

circular beacons and watch towers, with diameters up to 15 m and up to 4–20 m high, or rock platforms with flat-topped piles of available cobbles.[26] This also indicates, as previously highlighted, that beacons were changed according to circumstances, topography and available resources to build and man them. In certain areas, it is thus only the place-name or historical sources that bears witness of them.

However challenging it might be, the next step in beacon research should, nevertheless, be to identify and investigate more sites physically in the landscape. This requires new approaches of archaeological and geophysical survey, and harnessing multi-proxy palaeoecology to map the wider landscape around the sites. Additionally, through excavations there is high potential for obtaining datable material that can be analysed by scientific means. Ideally for radiocarbon dating, the excavation of a site could identify multiple layers of charcoal, either from the spot of the actual signal fire, or from the fireplace inside the guard house, if one can be identified (Figure 18.2). Several layers of charcoal would in theory enable a dating sequence of incidents of

FIGURE 18.2 Remains of a guard house from Veten at Eldsfjellet in Holsnøy, Alver, Vestland county, Norway. Picture taken during an excavation by the "Viking Beacon-project", AM-UiS, in May 2025
PHOTO: THEO GIL. ©MARIE ØDEGAARD, AM-UIS

26 E.g. Rolf Scheen, "Del 3 Norges viter," in *Den norske leidangen* (Oslo: Sjøfarosvarets overkommando, 1951), pp. 235–308; Swanson, "Documenting Prehistoric Communication Networks"; T. W. Bell, A Roman Signal Station at Whitby, *Archaeological Journal* 155, no. 1 (1998), pp. 303–22; Khalilieh, "The Ribat of Arsuf"; Woolliscroft, "Roman Military Signalling".

threats and conflict. Starting from a similar idea, the "Viking Beacon-project" recently tried to date signal fires in Norway by taking samples from lake varves less than 200 m from beacon sites. This proved difficult, probably in part due to the need for wind directions to point directly towards the lake so to produce the appropriate laminated sediments.[27] Alternatively, excavated sites might contain datable objects or items related to activities at the site, like manuscript fragments used by messengers at watchtowers in Han China.[28]

As few actual beacon sites have been studied by archaeologists, many beacons existing in landscape have gone unnoticed. This has led to an underrepresentation of registered sites existing in cultural heritage lists, as well as the occurrence of incorrectly listed sites, for example registered as prehistoric grave mounds on high mountains, even when they have beacon place-names.[29] It follows that more archaeological investigations of beacons have a huge potential for dating sites, for defining site-classes, and extending those results to other so-far unidentified monuments. As the examples in this book show how most beacons were part of wider networks of supra-regional communication, dating of any individual site can provide important insights not only at the micro, but also at the meso and macro scale.

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27 Marie Ødegaard and Jostein Bakke, forthcoming.

28 Foster, "The Spread of Scribal Literacy," pp. 175–201.

29 Marie Ødegaard and Theo Gil, "Lost in the Records? Archaeology and Cataloguing of Beacons in Norwegian Heritage Database," *Primitive Tider*, in press.

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Subject Index

Ancient Source Index

HISTORY OF WARFARE

Beacons and Military Communication from Antiquity to the Early Modern Period

From fire-lit beacons to sweeping lines of sight, this book uncovers the hidden infrastructure of pre-modern warfare. It is the first archaeological study to trace how military signalling systems shaped landscapes and societies from antiquity to the early modern period. Spanning ancient Greece, Viking Age Scandinavia, and medieval North Africa, the book investigates how visual communication enabled mobilisation, defence, and control. Through case studies and new interpretations of archaeological and historical data, it reveals a world where ordinary people, not just armies, played a central role in responding to the threat of war. A major contribution to military and landscape archaeology.

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