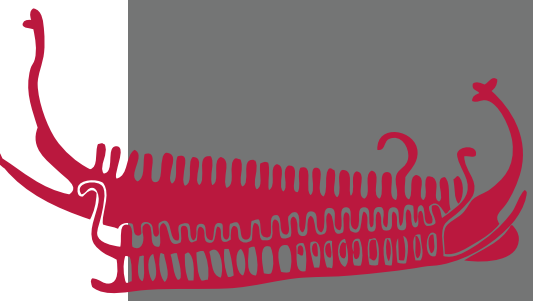
CURRENT SWEDISH ARCHAEOLOGY



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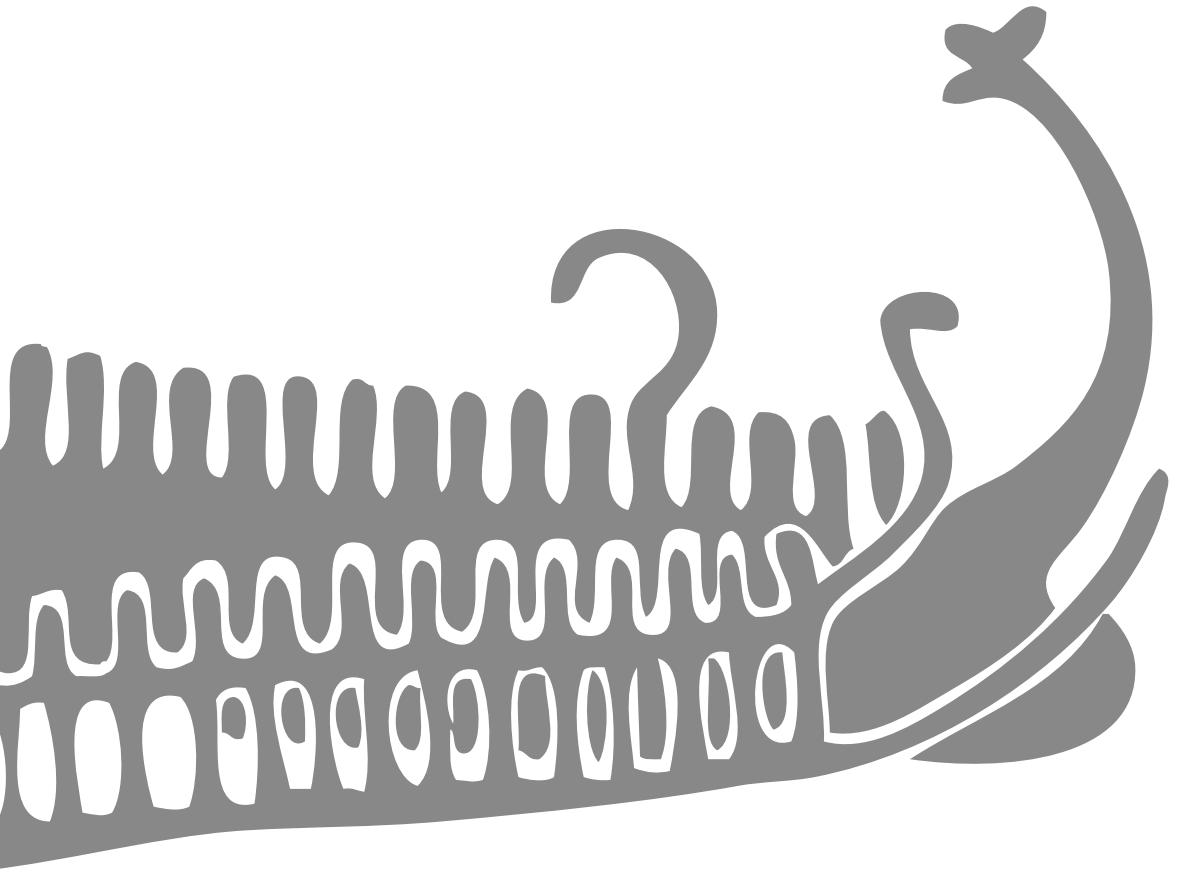

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Anna Sörman

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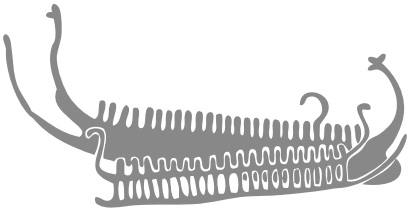

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The Swedish Archaeological Society

Vol. 31 2023

Editors:
Ing-Marie Back Danielsson
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The Swedish Archaeological Society

In 1947 the first meeting to establish the Swedish Archaeological Society was held at the Museum of National Antiquities in Stockholm. The Society is the common body for professional archaeologists in Sweden, regardless of specialism. According to the statutes the purpose of the Society is to further Swedish archaeological research and to support this research by granting scholarships. The Society is especially tasked with attending to the vocational interests of archaeologists. This task is to be carried out by taking part in public debate, by influencing public opinion, and by being a body to which proposed measures are submitted for consideration. The Society also arranges discussions and seminars on archaeological topics. The Society's board currently has sixteen members from universities, museums and archaeological institutions in various parts of Sweden. Mikael Eboskog from Bohusläns Museum is the present chair.

In 1993 the Society began issuing its annual journal *Current Swedish Archaeology*. Since then the journal has presented articles mirroring current archaeological research and theoretical trends.

Contents

ARTICLES

REVIEWS & NOTICES

Editorial

We are happy to invite you to read and engage with the 31st issue of *Current Swedish Archaeology*. The journal, which started its journey in 1993, celebrates 30 years of existence this year. Now, as then, it publishes current, high-quality archaeological research to both a national and international audience. It also promotes contact and debate around issues that Swedish archaeology shares with the larger international field. To continue this work and ensure the journal's future publications requires a dedicated readership as well as financial support. We are therefore pleased to announce that we have been awarded a grant from the Swedish Research Council (*Vetenskapsrådet*). The grant sends a clear message that journals within the Humanities are qualified to produce research of the highest quality. Such messages enable creativity and knowledge growth, and recognises the Humanities contribution to contemporary society. This has not always been the case.

One important issue where the humanities at large, and archaeology in particular, has a lot to contribute, is that of digital infrastructures. What does the future hold in regard to the increasing development, use of and dependence on infrastructures that support, and importantly also co-produce, archaeological knowledge? Although such infrastructures have been in the making for a number of years, actually decades, we thought it timely to discuss this topic in connection to the development of SweDigArch, a new national infrastructure for digital archaeology in Sweden. The project has been awarded 65,900 KSEK from the Swedish Research Council for a period of 6 years (2022–2027). The resulting digital infrastructure is built to '… ensure that Swedish archaeology is part of the data science revolution' (SweDigArch 2023). The lure of these infrastructures, the revolutionary potential, lies in the manifold ways data may be combined and then re-combined with other data, in order to reach new understandings

and possibilities for interpretation. However, when the infrastructure is built on data that by necessity is aggregated and harmonised, it needs to be acknowledged and investigated how these procedures affect the resulting archaeological knowledge. Ultimately, digital infrastructures concerns the way we make the world, and the effect this making has on the world, including the variety of stakeholders that may be both human and non-human (see also Barad 2007:381). To better understand what they are and what they do is a matter of urgency, especially at a time when archaeology is trying to challenge boundaries in thinking by engaging with Anthropocene and posthuman realities.

Jeremy Huggett delves deeper into these ethico-onto-epistemological issues in a keynote entitled 'Deconstructing the Digital Infrastructures Supporting Archaeological Knowledge'. Elegantly and thoroughly, he uncovers and accounts for what infrastructures are, how they act as emergent phenomena and how they during their unfolding may encounter unexpected changes, created by limitations that could not be foreseen or by unanticipated demands, for instance. He stresses that there is a general lack of discussions about the social and cultural aspects of infrastructures, although they have been recognised as much more than things, in fact as bundles of relationships that have lived implications. He rightly calls for critical and extensive overviews of infrastructures' infiltration, influence, empowerment and constraints on archaeological practice and thought. His call is eloquently answered, challenged, debated and elaborated upon by Nicolò Dell'Unto, Agiatis Bernadou, James Taylor, Bodil Petersson, Monika Stobiecka and Isto Huvila. In a final reply to these responses, Huggett sends off the discussion of the timely and critical evaluation of how infrastructures work, with the demanding and appropriate question: - 'If not now, when?'

In this issue you also find three research articles that provide new and deepened insights on different aspects of Scandinavian prehistory as well as the Swedish apparatus on contract archaeology. Firstly, Matthias Toplak and Lukas Kerk present us with an interesting analysis of bodily modifications of skulls and teeth in Viking Age Gotland. They demonstrate how these embodiments relate to, communicate and negotiate varieties of social identities. Jan-Henrik Fallgren, in his paper, delivers an alternative view of the establishing of the estate system in Scandinavia during the early medieval period (*c.*400–1000 CE). It is contended that incentives to create estates in Scandinavia were not at hand before the Christianisation process. Lastly, Matthew Nelson analyses contract archaeology in light of recent changes and tensions. He contends that it in order to create positive outcomes and values in society from contract archaeology, communication efforts need to be more dialogical and inclusive, taking into consideration the conditions of local contexts and interests, as well as the needs of communities. After the

articles follows a section with important news from research projects and events, as well as reviews of books and theses. Fredrik Svanberg explores Vivian Smits' PhD dissertation *Kulturarvsparadoxen* (2022), which examines how Swedish contract archaeology creates knowledge and how this can be made relevant in the broader public space, including government agencies and the general public. Magdalena Naum, in turn, takes a closer look at Martina Hjertman's PhD dissertation, *Afloat and Aflame* (2022), which investigates the discourses of marginalization in Gothenburg in the late eighteenth-early twentieth century.

It is our sincere hope that you find this year's issue to be both interesting and stimulating. News for next year, from 1st Jan 2024, is that research articles will be published online as soon as they are approved in the peer-review process. We thus welcome you to send in your research article as soon as possible and at any time of the year. The full issue is always published as usual in December.

Ing-Marie Back Danielsson & Elisabeth Niklasson
editors of *Current Swedish Archaeology*

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KEYNOTE

Deconstructing the Digital Infrastructures Supporting Archaeological Knowledge

Jeremy Huggett

Abstract

The last 30 years have seen significant investments in the development of digital infrastructures to support archaeological practice. From field recording systems to national data archives, these have come to play an increasingly dominant role in the collection, management and access to data used in the creation of new archaeological knowledge. While archaeologists have paid a lot of attention to the technical creation of these infrastructures, much less is said about their wider political, cultural and social aspects. Despite this, more and more countries are building digital infrastructures to support cultural heritage management, the curation of archaeological data and to provide access for data reuse. A lack of critical reflection surrounding these infrastructures opens archaeologists, heritage organisations and their wider user communities to unforeseen outcomes, hidden socio-political and technical biases, and the promotion of conventions and processes which ultimately carry consequences for knowledge practice. The way that infrastructures become embedded in practice means that a critical understanding of their implementation and application – the opportunities they offer, the constraints they impose, and the perspectives they adopt – needs to become part of a wider debate surrounding their informed use.

Keywords: infrastructure, data, knowledge, interoperability, sustainability, standards, metadata, interface, failure

Archaeology, School of Humanities, University of Glasgow
jeremy.huggett@glasgow.ac.uk

Introduction

In recent years, archaeology has seen a rapid growth in the collection and use of born digital data alongside a growing dependence on digital cultural heritage data infrastructures. During this time, debate surrounding these infrastructures has been limited and narrowly focused, and many of the issues remain largely unchanged. In 1981, for example, Gaines (1981b:vii) wrote of a new focus on databank management in archaeology arising from the growth in interest in complex questions that required large and diverse bodies of data. At the same time, she noted problems associated with access, control, the variability of archaeological data, and issues associated with the selection and use of thesauri (Gaines 1981a:224). The intervening period has seen the development of a range of project- and organisation-based (for example Intrasis, ARK, FAIMS), national (for example ADS, tDAR, DANS, SweDigArch) and international data infrastructures (for example ARIADNEplus), using dramatically faster hardware, cheaper and more extensive storage, more complex software and more elaborate data structures. Nevertheless, archaeologists continue to wrestle with many of the same kinds of challenges.

There is an extensive body of work accompanying such developments, ranging from discussions of technical standards, requirements and tools through to perspectives on the creation and management of digital networked archives. Inevitably, this work is presented primarily by those involved in developing or implementing the systems, in part reflecting the relative novelty of the tools, but this raises the prospect of what can be characterised as an 'advocacy perspective' (Meyer & Schroeder 2015:183), an 'institutionalized discourse' (Mongili & Pellegrino 2014:xxiii) or a 'master narrative … [a] voice which speaks unconsciously from the presumed center of things' (Star 1999:384). As a result, it risks a tendency to technosolutionism (for example Paris et al. 2023:18), reinforcing a political status quo, prioritising particular values (for example Slota & Bowker, 2015:2; Gupta et al. 2023:78), and presenting a narrative bias (for example Pollock & Williams 2010:529). Certain infrastructures can also dominate the attention space by virtue of being early, and thereby inadvertently encourage certain approaches which are deemed useful while closing down others. For example, the Archaeology Data Service (ADS) is frequently used as an exemplar because of its early lead as the oldest archaeological digital repository in the world (Richards 2021), and so has exerted considerable influence on developments elsewhere.

Coupled with this advocacy perspective is the way in which debates focus on the components of these large-scale archaeological systems, rather than on the systems themselves. For example, there are (rightly) extensive

debates over terminologies, structures, organisation, policies, ethics and so on, but beyond the desirability of their creation, issues surrounding the nature of the infrastructures that these aspects contribute to are less commonly debated. As Wright and Richards (2018:S60) observe,

> … there is continued emphasis on technological and methodological innovations themselves rather than on the complex social factors that contribute to their success or failure and the connections they facilitate, but this has begun to change.

Discussions which extend beyond this technical/methodological focus include Wright and Richards (2018) on broader questions of stewardship and equity, Kansa (2022) on dependencies and sustainability, Optiz et al. (2021) on the support of transdisciplinarity, and the wider information studies perspective of Börjesson and Huvila (for example Börjesson & Huvila 2018; Huvila 2019a; Börjesson 2021). However, even in cases such as these, the tendency is to focus on specific areas or aspects, rather than examine the development and influence of the infrastructure as a whole. Consequently, there is a sense in which the study of these large-scale systems is approached in a bottom-up manner, looking in detail at their components and debating their utility, examining the parts rather than the whole (cf. Gupta & Devillers 2017:872). As a result, there is a gap in our approach to digital infrastructures: the focus on components and individual aspects means that an oversight of the nature of the whole infrastructure is lost within the detail. What are we building these infrastructures for? How do these infrastructures influence our practice? Are there alternative conceptions of archaeological digital infrastructures to those currently in use? And, how do the technical, political and ontological decisions made during the construction of these infrastructures influence the creation of archaeological knowledge? To begin to address questions such as these requires raising the gaze from specific tools, terminologies, structural models and so on, in order to take a broader perspective on the development of digital archaeological infrastructures.

What are infrastructures?

The term infrastructure itself is described as a '"plastic word" often used to signify any vital and widely shared human-constructed resource' (Thylstrup 2018:26). Larkin (2013:329) writes of the 'peculiar ontology' of infrastructures, in that they are both things and the relations between things, and this duality makes them 'conceptually unruly'. The most widely cited definition of infrastructure is that of Star and Ruhleder (1996:113;

see also Bowker & Star 1999:35) who characterise infrastructure as being embedded in other structures, transparent (in the sense of invisible through habituation, for example, becoming visible through breakdown), extending beyond a single event or place, learned as part of membership of a particular community of practice, incorporating standards and conventions, built on and constrained by an existing base (requiring backwards compatibility with prior works, for instance) and incrementally modified through negotiation and adjustment to other systems. From this, infrastructures emerge as:

> … complex, adaptive sociotechnical systems, made up of many interacting agents and components. Some of these are technological: buildings, devices, software and other artifacts. Others are social: organizations, standards, laws, budgets and political arrangements. Finally, some are human individuals who contribute to the infrastructure's development and maintenance or simply make use of it in their daily lives (Edwards 2019:356).

Such explicit attempts to define infrastructure are rare in the digital archaeology literature, although Huvila (2018:128) echoes Star and Ruhleder's characterisation, emphasising the interrelationships between people, technologies and archaeological practices. Otherwise, a variety of usages can be gleaned from the context in which the term is used. For example, Huvila (2019b:149) distinguishes between knowledge management systems which are primarily project- or organisation-based, infrastructures such as the ADS or the Digital Archaeology Record (tDAR), meta-infrastructures such as ARIADNEplus which integrates multiple infrastructures under one interface, and virtual research environments managing the research data lifecycle. Alternatively, infrastructure may be used in the sense of the software system itself or the technical requirements to operate it. For example, the Field Acquired Information Management Systems (FAIMS) developed for structured archaeological data collection is described as infrastructure (for example Sobotkova et al. 2016:338), whereas discussion of the Archaeological Recording Kit (ARK) refers to infrastructure as the network access required for the software to operate online (Dufton 2016:382). Likewise, the infrastructure of the Silchester virtual research environment (VERA) focuses on the broadband and WiFi network together with the hardware used to run the software (Dunn 2011:100–101). Beyond software systems or technical underpinnings, Niccolucci and Richards (2013:82) emphasise the human component of a research infrastructure, and Benardou et al. (2017:3) underline the importance of the research community in their description of infrastructure as 'scholarly ecosystem'. Closest perhaps to Huvila's (2018:128) use of the term, Kansa (2022:1412–1416) takes a broad view of infrastructure as systems necessary to support archaeologi-

cal information management and communication ranging across curation and communication infrastructures, software and data infrastructures, security infrastructures, social infrastructures and the dependencies associated with them.

This inconsistent reference to infrastructure is not unique to archaeology; more generally the term is frequently used in overlapping ways and in combination with others. Unpacking these reveals changing attitudes to infrastructures and the repositioning of infrastructural studies over a relatively short period of time. For example, *information infrastructures* became seen as key to research via the provision of a wide range of resources including centres, repositories, standards, visualisation tools and high performance computing (Bowker et al. 2010:98). Recognition of the problematic separation of data from information and knowledge led to information infrastructures becoming seen as *knowledge infrastructures*, consisting of:

> … the network of institutions, people, buildings, and information resources which enable us to turn observation and contemplation of the world into a standardized set of knowledge objects (Bowker 2017:391).

At the same time, information infrastructures became more narrowly defined, focusing on technical communication architectures, or to national or international policy frameworks rather than the systems themselves (Borgman 2015:33). More recently still, the rise of big data approaches and development of deep learning and neural networks has led to the notion of *thinking infrastructures*. These are distinguished from knowledge infrastructures by their more collaborative, distributed and decentralised nature, and their elimination of intermediaries. While knowledge infrastructures generally distinguish between knowledge producers and consumers, thinking infrastructures remove this clear separation (Bowker et al. 2019:9), and by extension, knowledge producers may become the systems themselves, as large language models applied in natural language processing increasingly risk being perceived (for example Bender et al. 2021).

Where archaeological enterprises sit in this infrastructural spectrum is open to debate, although most could be seen as information infrastructures focusing on the creation and management of resources, with more developed examples perceived as knowledge infrastructures supporting the construction of archaeological knowledge through access to large bodies of data. More realistically, however, the changing conception of infrastructures and the inconsistent application of the different interrelated terms means that infrastructures in archaeology contain a mixture of elements drawn from across these approaches without necessarily falling explicitly in one category or another.

Why focus on infrastructures?

The variability in definition and usage highlights the range of concepts that are embedded in the notion of infrastructure. Its imprecise use within digital archaeology tends to disguise this, despite the way that 'Infrastructure both enables and constrains what we can and cannot accomplish and how we go about our own work' (Kansa 2022:147; see also Huvila 2018:138). Few archaeological digital infrastructures are more than 20 years old. Most are considerably more recent, and many are in the early stages of development (for example SweDigArch, and see contributions to Jakobsson et al. 2021). None can be thought of as complete. Even older-established infrastructures remain works in progress: for example, the ADS may be recognised as an exemplar of best practice but after more than 25 years of effort it is possible to claim only that 'it is still far from standard, but the situation is improving' (Richards 2021). Similarly, tDAR has had mixed success in attracting depositors despite legal requirements for the long-term preservation of data (Witze 2019:42–43; see also Nicholson et al. 2023:64). Infrastructures are increasingly seen as essential – even transformative – for archaeological practice, required in order to undertake large-scale data analysis, integration and synthesis, and to enable archaeology to make a contribution to large transdisciplinary scientific research questions such as long-term social dynamics and climate change (for example Kintigh 2006:573; Buckland & Sjölander 2022:110). Viewed in this light, infrastructures do not simply curate and provide access to data but provide the means for developing the discipline in new directions (for example Kintigh et al. 2015:3; McManamon et al. 2017:240; Meghini et al. 2017:2), supporting novel analytical methods and knowledge creation and thereby increasing the reliance of practitioners upon their access and use (Börjesson 2021:1642). Investigation of the nature of these infrastructures before they are considered complete, wholly disappear into the background, and become taken for granted components of archaeological practice, is therefore crucial (for example Marttila & Botero 2017:103; Karasti & Blomberg 2018:237).

This is because infrastructures not only facilitate new methods and support new opportunities; they also limit practice and close down alternative approaches, as Kansa and Huvila have previously observed (above). For instance, most repository infrastructures organise data in particular ways to facilitate its discovery, requiring conformity with an institutionalised worldview. From the earliest studies of infrastructures (for example Star & Ruhleder 1996:113; Bowker & Star 1999:35) one of the characteristics identified with them is their transparent – as in invisible – nature: a 'good' infrastructure is one which disappears into its surroundings (Millerand & Baker 2020:10). Edwards (2019:358) identifies three forms of transpar-

ency: hiding or black-boxing the underlying technologies and techniques; habituation or invisibility through familiarity; and what he calls 'infrastructuration', whereby the infrastructure 'both shapes and relies upon the continual performances or rehearsals of agents'. Additionally, invisible work is involved in maintaining the systems that underpin the infrastructure which goes largely unrecognised (Borgman 2015:34). There are clearly ethical as well as practical reasons for addressing such invisibilities (for example Dennis 2020; Huggett 2021:424–429).

Infrastructures need therefore to become the centre of analysis (for example Heine & Meiske 2022:11), rather than simply treated as the means by which data are gathered and analysed. Examining infrastructures in this way encourages the study of the formation of knowledge and its contexts of creation, offsets the advocacy perspective, promotes the invisible labour entailed within infrastructures and incorporates a range of broader social and environmental issues (Heine & Meiske 2022:11–12). Ultimately it is important to recognise that infrastructures are situated culturally, socially, politically, technologically and spatially (for example Svensson 2015:338), which should make a critical appreciation of their design, purpose, development and implementation a necessary precursor to their use.

Building infrastructures

Infrastructures are best conceived as emergent phenomena rather than being carefully designed or directed from the outset:

> … its eventual ends and forms will not be fully contained in its beginnings, but rather subject to change through the intricacies of scaling, transfer, consolidation, etc. (Jackson et al. 2007).

Jackson et al. (2007) suggest that ecological metaphors (nurturing, growing and so forth) might be better associated with the development of infrastructures 'to capture the sense of an organic unfolding within an existing (and changing) environment' (Edwards et al. 2009:369). Such a representation fits with the image of the infrastructure as an 'ecology of people, practices, technologies, institutions, material objects, and relationships' (Borgman 2015:4), all of which are in flux with each other. Infrastructures are a process of enactment, always in-the-making (Parmiggiani 2017:208). It is an approach which encourages balance:

> … conceptualizing infrastructure as a process over time ensures that the technical and logistical sides of infrastructure are not privileged over, or seen as separate from, its social and political, or formal and aesthetic sides (Appel et al. 2018:17).

EMERGENCE

During its unfolding, an infrastructure frequently encounters unexpected changes imposed by unforeseen limitations and unanticipated demands placed upon it. For example, the Archaeology Data Service (ADS) was originally envisaged as a distributed system, recognising that archaeological information was held and maintained by a wide variety of institutions (for example Richards 1997:1058). Consequently, the ADS was conceived as a central brokering hub using metadata to link to the datasets held in museums and local archives and to the data in regional Historic Environment Records and the National Monuments Records held separately for England, Scotland, Wales and Northern Ireland. Only orphan datasets which had no alternative home would be held by the ADS itself. As part of this distributed focus the ADS supported organisations in acquiring online access: for example, a joint project between the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS, now Historic Environment Scotland) and the ADS saw the launch of CANMORE-Web for the National Monuments Record for Scotland in 1998 (ADS 1997:6, 1998:8; Richards 1997:1058). Relative to other disciplinary services at the time, it was always claimed that a unique aspect of the ADS was that its data was derived from the destruction of primary evidence, but it was this distributed emphasis that really set the ADS apart. However, in the early development years the stress on this distributed nature shifted for a variety of reasons, including the realities of the available technological infrastructure at the time, slow uptake of internet access by potential partners, and the need for demonstrable products to satisfy funders' requirements. With external links largely unfeasible or unreliable, the emphasis instead became the development of the central metadata index to resources and the licensing of copies of datasets to be held centrally by the ADS rather than accessed remotely (ADS 1998:8).

INTEROPERABILITY

Underlying this ambition for distributed access to data is the infrastructural concept of interoperability. Interoperability 'allows digitized cultural memory institutions to exchange and share documents, queries, and services' (Thylstrup 2018:67) and is seen as a key feature of data infrastructures. Interoperability enables the bringing together of multiple datasets while avoiding their treatment as a single body of evidence (for example Leonelli & Williamson 2023:7). This is distinct from the integration or aggregation of multiple datasets, which is a key feature of big data methodologies, for example, and which places considerable demands on the standardisation of data and is not feasible where the data are of radically different origins

(an excavation database versus a national monuments record, for instance) except at the most general level. Interoperability is a 'more responsible form of data linkage' (Leonelli & Williamson 2023:7), as it enables incompatible data to be connected without permanently changing their nature, although the level of standardisation necessary may still be of concern (Williamson & Leonelli 2023:105). Interoperability effectively creates networks of datasets and infrastructures which connect across a range of interfaces:

> … numerous systems, each with unique origins and goals … are made to interoperate by means of standards, socket layers, social practices, norms, and individual behaviors that smooth out the connections among them (Edwards et al. 2013:5).

Interoperability therefore does not solely operate at the data or the technical level – it also operates at the social level of infrastructures (cf. Thylstrup 2018:68).

For example, the distributed vision of the ADS did not disappear because of the early limitations encountered. The ADS launched HEIRPORT in 2002, a proof-of-concept portal for the Historic Environment using the Z39.50 communication protocol for the search and retrieval of data over TCP/IP networks to link the ADS with targets hosted by organisations across England, Scotland and Wales (Austin et al. 2002). Since the now-centralised ADS catalogue would always be out of sync with external data providers such as the regional and national monuments records, live searchable gateways to these resources would ensure that results returned remained current (Richards 2002:353). Similarly, the ADS ARENA (Archaeological Records of Europe Network Access) project used Z39.50 to simultaneously search data held by six partner organisations across Europe (Kenny & Richards 2005; Waller 2005). However, the Z39.50 protocol was not as reliable as it might be, and users were frequently faced with one or more unavailable targets, making cross-resource searching something of a lottery. This kind of direct cross-searching across different data targets has since been dropped, even though technological developments make it more feasible than before. Instead, ARENA's successors, ARIADNE and ARIADNEplus, employ a centralised metadata catalogue rather than using direct connections out to data providers, although the metadata does provide links to source data where available. Similarly, HEIRPORT was not further developed and the centralised ADS metadata catalogue only links to individual external records where accessible. In both cases, interoperability becomes the means by which the centralised metadata index is updated in the absence of direct cross-searching of local and regional resources. One advantage of this approach is that it only requires the high-level index terms to be translated and standardised across the various providers.

Such accommodations for interoperability illustrate the effects of unforeseen limitations and difficulties encountered at the interfaces between infrastructures. Less obviously, it also demonstrates the importance of social interoperability through personal networks – for instance, ARENA was a network of individuals brought together through personal contacts and common perspectives (Kenny & Richards 2005, sec. 3.1). Similarly, the original consortium members behind the creation of the ADS were a network of friends and colleagues spread across various universities. Such social aspects are rarely emphasised in accounts, and the significance of personal contacts and social engagement in infrastructural development is largely unrecorded. The ADS example also demonstrates that infrastructures do not develop in isolation but are more often grafted onto other existing infrastructures (for example Meyer & Schroeder 2015:183). For example, the ADS worked alongside a mixture of long-established digital and paper-based infrastructures including Historic Environment Records, National Monuments Records, with their own standards, recording systems, regulations, responsibilities, and funding lines, requiring complex and at times delicate manoeuvring amongst all parties to ensure social and political interoperability.

SUSTAINABILITY

Sustainability and resourcing over the long term is a key issue for infrastructures: indeed, from the outset at the ADS it was recognised that its short-term funding was in tension with its role as a data archive. This was one reason behind the proposed distributed model and the emphasis on only archiving orphan datasets: should funding cease, most data resources would remain unaffected by the closure of the ADS. Infrastructures are by nature fragile, and long-term preservation and maintenance of access entails cost and effort, with lack of investment leading to rapid degradation (for example Borgman et al. 2019:901; Millerand & Baker 2020:21). The invisibility of an infrastructure embedded into regular practice as a structuring force can give it an illusion of permanence, the risk only revealed when it breaks down and its functionality is, even temporarily, unavailable (for example Huggett 2022:271–272). Recognition of the indispensability of an embedded infrastructure is one way to establish a case for its continued sustainability.

The ADS has depended upon the successful negotiation of cycles of funding and defunding over more than 20 years. At any point, the sustainability of the ADS was under varying degrees of threat, and in recognition of this instability the ADS developed a legacy fund to support the winding down or transfer of the service should that prove to be necessary. The ADS was initially established in 1996 as part of a UK university-based e-infrastructure initiative, the Arts and Humanities Data Service (AHDS), funded by the

Joint Information Systems Committee (JISC) of the UK Higher Education Funding Councils (Richards 1997:1057) with additional funding subsequently provided by the Arts and Humanities Research Board (now Arts and Humanities Research Council, AHRC). However, the AHRC withdrew funding for the AHDS in 2008 following a review, making it unviable and forcing JISC to remove funding (see below). The ADS was unique amongst the AHDS service providers in being able to negotiate a period of transitional funding following the closure of the AHDS to allow it to evolve to a commercial funding model. Several factors were key to the negotiation of this transitional arrangement. The ADS had already developed a charging policy for depositors and so was able to demonstrate a potentially viable funding stream (Hardman & Richards 2013:76). The ADS was also unique amongst the AHDS services in having a close relationship with commercial and governmental organisations, core to its initial conception (see above). Furthermore, it was argued that archaeological data had a unique quality in that they were often the only surviving outcome of the destruction of primary evidence. In combination, a successful case was made to the AHRC for a period of transitional funding, the shortfall to be made up by growing commercial and research project income. This transition was not without its problems, but the fact that the ADS still exists is testament both to its ability to attract funding and to the level of community support, from the staff themselves through to data providers and project funders. Recent changes in policy mean that the ADS is again in receipt of core infrastructure funding from the AHRC (ADS 2021:3).

These ebbs and flows of funding and consequent concerns about sustainability had a range of infrastructural impacts, both on the technical and personal side of the ADS. For example, supporting the case for sustainability requires constant demonstration of value and in turn this demands not simply maintenance but also development, albeit in limited areas. Commercial imperatives can be seen in the prioritisation of tools such as ADS-easy to streamline the deposition of project archives, while the main ArchSearch interface to the collections remained largely unchanged during this period. Development work continued elsewhere, such as the implementation of the ARIADNE/ARIADNEplus portal, but only where project or commercial funding was specifically targeted. The arrival of significant new AHRC core funding in 2022 has enabled the public face of the ADS website to be redeveloped and a new version of ArchSearch will be launched shortly.

The experience of the ADS suggests that a national data infrastructure can be sustained using a blend of commercial and project funding, but it is far from ideal and takes a toll on the personnel and the profile of the organisation. The ADS is certainly not unique in this regard. In the USA, for instance, tDAR has similar funding challenges in juggling multiple grants

over time from the National Science Foundation (NSF) and the Andrew W. Mellon Foundation amongst others (Kintigh et al. 2018:32), including drawing upon public donation. As Wright and Richards (2018:S61) observe,

> Archaeologists are continually encouraged to find ways to make their work marketable within commercial frameworks and this is invariably part of any sustainability plan, but rarely produces significant revenue. Successful models for the long-term stewardship of archaeological data remain limited.

Buckland and Sjölander (2022:125) suggest that access to national funding is a necessity for these kinds of research infrastructure, particularly appropriate if those infrastructures are embedded within a national regulatory framework. However, while contributions to Jakobsson et al. (2021) show many of the countries represented have some kind of regulatory framework in place, infrastructural support for archiving, managing and making data available does not automatically follow. The requirements of funding bodies that data should be made open (for example Richards et al. 2021) might suggest that adequate secure infrastructural funding would follow, but again this is not necessarily the case, or not in large enough or regular enough quantities. It is therefore perhaps not surprising that in their discussion of the development of a national data integration infrastructure for the USA, Ortman and Altshul (2023:99) are uncertain about the most suitable organisational setting for such a service (private company, non-profit, university or other) given the uncertainties surrounding resourcing. The paradox common to all is how a long-term infrastructure can be securely established on the back of largely short-term, one- to five-year funding cycles, and the consequent challenges associated with the management of the inevitable periods of financial drought and uncertainties of insecure staffing.

FAILURE

Not all infrastructures are destined to succeed or to survive long-term in the face of resourcing challenges, technological change or competing infrastructures. Such issues are expected but unpredictable and associated with the unfolding nature of infrastructures which do not follow predictable, linear developmental paths (for instance, Karasti & Blomberg 2018:239). Indeed, to assume infrastructures are orderly, dependable and immune to social and technological change is to more or less guarantee failure (Edwards 2003:195).

As discussed above, the ADS faced potential closure in 2008 with the ending of core AHRC and JISC funding for the AHDS. The AHRC withdrew funding for three reasons (Collins 2012:166): it claimed that researchers had now gained the technical know-how to undertake their own data curation; it considered long-term storage and sustainability was best handled within universities rather than a centralised service; and, consequently, the AHDS

funding could be best used elsewhere. The AHRC also considered that relatively little use was made of the resources held by the AHDS, making the cost unjustified (Robey 2012:150). Despite vigorous objections that the AHRC had misread the situation and threatened fragile digital resources, the AHRC withdrawal paid little attention to suitable exit strategies, the ADS aside. One of the lessons drawn by Robey (2012:153) is the importance of visibility in relation to sustainability: digital resources need to be recognised and used as much as possible by their target communities in a form of network effect. This was clearly a strength of the ADS which supported its case to move to a transitional funding arrangement rather than have all core funding abruptly removed (see above).

While the ADS avoided failure amidst the collapse of the AHDS infrastructure, the Archaeology Data Archive Project (ADAP) was not so fortunate. The ADAP was established in 1994 within the Center for the Study of Architecture, a not-for-profit organisation in Bryn Mawr, USA (Eiteljorg II 1995:245). A key reason given for the discontinuation of the ADAP in 2002 was that it had been unsuccessful in attracting data. According to Eiteljorg (2011:262), it had failed to attract a single completed dataset other than one taken from an already-published CD-ROM: 'only a handful of scholars' had deposited files (Eiteljorg II 2002). With funding for a pilot project to support the archiving process not forthcoming, it was determined that the ADAP should cease operation and those files that were held were returned to their original depositors (Eiteljorg II 2002). Primarily the ADAP was unable to become self-sustaining as there was little evidence that data depositors were able or willing to pay for the service (Eiteljorg II 2001). Network effects apply again, since it seemed unlikely that a tipping point would be reached within a reasonable timespan whereby the resources became useful for analytical purposes and might therefore attract grant funding (Eiteljorg II 2002).

Arguably the ADAP never reached what might be called infrastructural status but there are lessons to be drawn from its experience. In comparison to the ADS, the ADAP clearly fell short in creating visibility, attracting resources and becoming embedded in its target community by clearly and unambiguously demonstrating its use-value. Although, in retrospect, Eiteljorg (2011:262) argued that it was 'unrealistic to expect that a more complex and costly approach offering no better rewards will succeed where a simpler and much less costly one failed', paradoxically a charge-free approach may have discouraged potential data providers unable to envision a long-term future for the archive. Likewise, the organisational setting (cf. Ortman & Altschul, 2023:99) may have been a factor: had the ADAP been hosted within a university or similar institution there might have been more confidence in its future outcome. Furthermore, by 2008 the ADS had already

become closely associated with larger pre-existing infrastructures across UK archaeology, including the national governmental organisations responsible for the management of cultural heritage. This provided the ADS with powerful and influential supporters whereas the ADAP had relatively few advocates to make the case on its behalf.

Infrastructures and social processes

Social and cultural aspects of infrastructure have not been a strong component of archaeological studies although these are frequently implicit in discussions of archaeological practices which make use of infrastructures (Huvila & Huggett 2018:93; see also Dallas 2015). More than technical constructs, infrastructures are not things but 'bundles of relationships' and,

> … whether in collaboration, deliberation, or conflict, individuals and communities come together around them and interact in ways that have lived implications (Carse 2016).

Ethnographic approaches lend themselves to a study of these relationships, but this has not been a significant feature of archaeological infrastructure studies to date (although see Huvila 2016; Börjesson & Huvila 2018; Börjesson 2021, for example). People contribute to the development and maintenance of the infrastructure while others will simply use it, and these relationships will change over time (Edwards 2019:356). Other groups of individuals may exert influence without closer engagement, their involvement limited to its approval and its funding, for instance. Still others may be part of a broader community who, while not users, nevertheless appreciate knowledge of (and perhaps critique) its existence. The social constellation associated with an infrastructure is therefore more extensive and membership more flexible than is commonly claimed.

VALUES

This broad collection of communities and individuals influence an infrastructure in crucial ways:

> All infrastructures embed social norms, relationships, and ways of thinking, acting, and working. As a corollary, when they change, authority, influence, and power are redistributed (Edwards et al. 2013:23).

Values embodied in the infrastructure may introduce certain biases or politics into the system (for example Slota & Bowker 2015:2), such as through the incorporation of a particular set of regulations or standards. Some values may also be in conflict with each other. For instance, Huvila (2016)

describes the standardisation approaches of early-established archaeological data archives as 'attempts to seize control and find footing' in other areas, which is problematic in terms of imposing restrictive requirements and yet a necessary component of a successful infrastructure which 'has to be established as a network of relationships between all parties' (Huvila, 2016). Similarly, Buckland and Sjölander (2022:115–116) point to the tension between researcher-friendly designs, which potentially allow more imaginative approaches to data analysis, and developer-friendly designs which are likely to entail efficient coding and documentation and hence are easier to maintain. There may also be ethical challenges: for instance, the low spatial resolution of the data used in the Digital Index of North American Archaeology (DINAA) places restrictions on reproducibility while being an important means to address colonial issues associated with disadvantaged descendant groups (Kansa 2022:143–144). Elsewhere, the Portable Antiquities Scheme (PAS) database for England and Wales restricts the availability of location data to bona fide researchers to avoid looting. This restriction is a condition of reporting but may also be a consequence of collectors seeking to withhold the knowledge in order to preserve exclusive access (for example Barford 2020:108; Brodie 2020:91). In both cases, influences external to the infrastructure impact on the way in which data are presented.

COMMUNITIES

Identifying the range of social groups associated with an infrastructure and their interactions is an important part of understanding that infrastructure: for example, there may be communities of researchers, 'intentional' communities (special interest or support groups), and communities of practice (Bowker et al. 2010:105). These are frequently grouped under the heading of 'users' as distinct from 'developers', although users may be further categorised in a variety of ways. In a study of the ADS prepared for JISC (Beagrie & Houghton 2013) users are divided into two categories: 'depositors' and 'users', collectively referred to as 'stakeholders' (Beagrie & Houghton 2013:6), a narrow perspective which reflects the study's limited focus on the value of the collections. As Huvila (2016) argues, such studies are focused on:

> … estimating the (positive) societal significance of the repositories rather than critically explicating how the repositories are linked to the everyday practices of the different groups that influence or are affected by the repositories.

Millerand and Baker (2010:141) characterise three kinds of user: the 'hands-on user', who is engaged with the definition and development of the system; the 'social actor', who generates, exchanges, and consumes information

from the system; and the 'sociopolitical actor', whose role and position is affected and impacted by the system. In the ADS, for instance, the various management and advisory committees could be characterised as hands-on users given their role in defining and overseeing the development of the ADS; the social actors are represented by the data depositors and data users; while representatives of the various national archaeological bodies who interacted with the ADS might represent the sociopolitical actors. Of course, individuals may move between roles or hold several roles simultaneously: in the ADS, people may be both hands-on users and social actors, committee members and data depositors/users, for example.

This remains a partial picture with regard to social roles associated with infrastructures. For instance, from their case study Millerand and Baker (2010:143) identify three further groups: 'informatics specialists', essentially the developers who build the tools and work on the metadata specifications; 'scientists', researchers who are users of the system and its datasets; and 'information managers', responsible for curating the data and implementing standards. Again, there is a degree of overlap with 'scientists' broadly equivalent to 'social actors', for instance, but these further characterisations usefully broaden the range of social roles beyond the generic user. In the ADS, for example, applications developers, web developers and system managers can be seen to constitute the informatics specialists, while archives officers and collections managers may be identified as the information managers. Unsurprisingly, this broadly maps onto the staffing structure that exists within the ADS. A key advantage of this further categorisation is that it draws attention to the staff operating the infrastructure who may otherwise be largely invisible in accounts.

Relationships and interactions are not the same for everyone and depend on how they experience the infrastructure: some may find it supports their work, others encounter obstruction (for example Star & Ruhleder 1996:112–113; Star 1999:380; Edwards et al. 2013:13; Koch 2018:70–71). The negative aspects of infrastructure are frequently underestimated in general, and open to debate in archaeology, although the degradation of locational data referred to above might be one example. They may also be evidenced in the form of opposition, resistance, workarounds and the subversion of processes (for example Edwards et al. 2013:13–14; Huggett 2021:422–423), although this remains a poorly-explored area in archaeology. Elsewhere, differences in financial resources between communities, organisations and nations may negatively affect the ability to create and employ infrastructures, leading to a bias in objectives, structural characteristics and perspectives that favour the UK, Europe, and North America, for instance (Slota & Bowker 2015:5; cf. contributions to Jakobsson et al. 2021). It may also raise questions of sustainability in terms of differen-

tial availability and levels of funding for projects and programmes, and potentially the ability to support deposit fees and even access charges, for instance. Identifying the range of infrastructural communities therefore goes well beyond simply the recognition of audiences.

Infrastructures and knowledge creation

Data-based infrastructures are seen as a new form of cultural memory institution (Thylstrup 2018:22); indeed, infrastructures may be largely defined as being all about data (Edwards et al. 2007:31). However, what is lacking is a critical enquiry into the effects of infrastructural arrangements of data, and how these affect access and use of data in the construction of archaeological knowledge (although see Hacıgüzeller et al. 2021). As data is incorporated within infrastructures it becomes institutionalised, and the infrastructure determines what data and associated information will be available in the future (for example Borgman 2015:15). Such institutionalisation is seen as benign, even beneficial, if the alternative is data abandonment and loss, but infrastructural effects are critical to the use of data for knowledge creation as well as its long-term curation. Infrastructures reflect the priorities of the institutions behind them and the socio-political contexts in which they operate (Fullilove & Alimari 2023:66). Infrastructures are built on certain expectations or requirements, standards and protocols, which configure the data and its accessibility, making a critical perspective central to understanding their role in knowledge creation (Harvey et al. 2017:16). Both data and data infrastructures remain always in-the-making, and decisions taken concerning their treatment will affect the options and opportunities available to those who come after (Hacıgüzeller et al. 2021:1710). A potential paradox therefore exists: data are fundamental to knowledge creation and reliant on infrastructures to make them findable, accessible, interpretable and (re)usable (i.e. FAIR [for example see Nicholson et al. 2023]), but at the same time those infrastructures may limit certain actions, practices and relations (Van Rossem & Pelizza 2022:3). Discourse becomes centred on the data as represented within the infrastructure (cf. Lucas 2012:244), and consequently knowledge may become so deeply engrained that the infrastructure becomes difficult to challenge, or for new forms of expression or new ways of knowing to be considered (Bowker 2018:209).

STANDARDISATION

Standards are core to infrastructures: they enable them to behave in predictable ways to provide universal access, interoperability with other infrastructures, and assure technical sustainability into the future. The ADS

archive, for instance, is built on a range of standards at different levels, from the high-level Open Archival Information System (OAIS) model defining the basic components and functionality of an archive and its preservation issues, through a range of data content-related standards to low-level standards specified for preferred file formats. Standards therefore operate at every level of the archive, and some degree of standardisation is difficult to argue against given it is a prerequisite for sharing or linking data from different sources, even if the resulting complex and ill-defined web of standards is rarely discussed (Huggett 2012:542–543).

Bowker (2018:217) identifies what he calls a 'quintessential tension' with standards: an opposition between a desire for universality and the need for change. The risk of universality is that standardisation may encourage misinterpretation, disguise doubtful data sources, and facilitate 'data arbitrage' where the availability of data trumps its quality (Edwards et al. 2013:7). Rather than change, the costs associated with standardisation means there may be considerable inertia (Edwards et al. 2013:9). Once standards are set, they tend to stick, which is more often taken as a sign of success than as apathy. More significant than questions of effort or cost, however, is the way in which standardising data can change the nature of those data and promotes certain forms of knowing. It also makes some kinds of data undocumentable, and hence invisible (Van Rossem & Pelizza 2022:2). Strict schemas are problematic for messy archaeological data (for example Löwenborg 2018:51), and the study by Hacıgüzeller et al. (2021) shows how attempts to create structured data risk smoothing out variability or omit aspects which may not be represented within the data model. A category of data which frequently defies categorisation is the implicit or tacit knowledge behind the original data (for example Huggett 2020:9–11), and documenting it requires effort for which there is little resource, even if the desire is there (for example Opitz et al. 2021).

METADATA

Metadata are data about data but also a standard of standards. They are key to facilitating interoperability between datasets and infrastructures (for example Meghini et al. 2017:5). They also structure the data presented to the user: it is the metadata catalogues that are searched, and the results retrieved are based on those metadata. The metadata may be created automatically – for example, through a process of text mining to extract metadata (for example Richards et al. 2011) – or manually on accession. In either case, metadata is created as a high-level summary which allows data with similar characteristics to be identified.

However, metadata are frequently perceived as benign: they are not data themselves but a higher order of information (Boellstorff 2013, sec. 3),

underlined by the common view of metadata as providing administrative information about the data (who created it, who owns it). This attitude implies a lesser significance than data, yet metadata is more than simply a finding/linking aid and is capable of being treated as if it were primary data. Metadata increasingly shifts mode to be used as data in its own right: for instance, providing basic summary data including information about site/artefact types, time periods, and location, and used in everything from distribution analyses to 'big data'-style studies. Consequently, metadata becomes the data rather than simply how the data is located or linked, and is therefore another layer of abstraction at a remove from the original, primary record. Effectively, therefore, metadata may travel between being metadata and being data – what is metadata to one may be data to another (for example Huggett 2020:3; Buckland et al. 2022:19).

Of course, data are always collected and abstracted using criteria according to a specific frame of reference and this affects its capacity for knowledge creation. Metadata is no different, but its role in infrastructural data retrieval and interoperability places it in a different relationship with archaeological knowledge creation since the ideologies, politics, and perspectives that define the metadata influence the data located and the connections made in the first place. Metadata therefore increasingly govern what can be found and what can be known (Börjesson et al. 2020:207–208). The structuring imposed by metadata carries the biases and worldviews of the infrastructures that created them, and profoundly impact the meaning that can be derived from the data (Canning et al. 2022:12).

INTERFACE

If metadata reveals and limits the data that can be presented, the interface through which most users will experience the digital infrastructure is equally capable of inclusion and exclusion (Hookway 2014:4). Knowing how an interface structures our relation to data is essential since it is designed to function more or less invisibly, but successful invisibility also tends to hide its affordances. Like the infrastructure itself, it allows certain behaviours and actions to occur (Drucker 2013, para. 31). The interface acts as 'cognitive scaffolding' (Dieter 2015:170), empowering the user, but at the same time is a 'device of capture' (Dieter 2015:173), determining pathways and reducing autonomy. The interface, like the infrastructure, is not an object as much as a 'dynamic, systematized relation' (Dieter 2022:5). Like standards and metadata, interfaces are also abstractions, sitting atop a complex system and exposing some of that system's logic while hiding others. The effect of this abstraction is to distance the user from the underlying system: at the same time as the interface facilitates discovery and provides access to data, its underlying design and implementation shape what is revealed or hidden.

For example, the ADS search interface adopts a 'point and browse' strategy rather than a Google-like 'type and hope' approach, enabling the million plus metadata records to be swiftly reduced to a small, relevant subset (Richards et al. 2011:35). However, the underlying search methodology is hidden from the user despite what otherwise seems to be a transparent interface: it invisibly employs a fuzzy search despite the appearance of using a specific, constrained classification, which may give rise to initial doubts about the validity of the output (Huggett 2022:272). The search interface does not allow control of the Boolean search criteria used, and so the infrastructure constrains user action.

Burdick (2015:31) has described a series of attributes and qualities that seek to address such infrastructural restrictions. For example, she proposes the opening of the interface black box to make the underlying operations visible, and ideally alterable. She also argues for making multiple world views available, with the interface configurable using different ontologies rather than the default infrastructural perspective. Ambitiously, she also proposes that the interface should be capable of viewing and manipulating data in an infinite number of ways. For instance, current interfaces are predicated on text for data retrieval, which may not be the most appropriate method. As Bugaje and Chowdhury (2018:258; see also Bugaje & Chowdhury 2017) suggest, data is not read so much as visualised, combined or manipulated, and an interface which reflects this would be more natural and certainly more flexible. Addressing these and other design aspirations would help to support a more sophisticated engagement between infrastructures and knowledge creation.

Conclusion

According to Star and Bowker (2006:231),

> Something that was once an object of development and design becomes sunk into infrastructure over time. Therefore a historical, archaeological approach to the development of an infrastructure … needs complementary sociological, regulatory and technical studies.

This paper seeks both to start the debate and to set the stage for such extensive studies in relation to archaeological infrastructures. In doing so, it has largely focused on large-scale data archive infrastructures, but many of the issues discussed are equally relevant at other scales of infrastructure, from data management and publication systems (for example Open Context, ARCHES), to field recording systems (for example FAIMS, ARK, Intrasis), down to the level of the database (for example Burns & Wark

2020), and the different scales are interwoven in complex ways. In all cases, there have been discussions surrounding these infrastructures, but they have been rather piecemeal and consequently lack a clear overview of the range of questions and concerns encountered. Most contributions are by those who might be described as advocates for the infrastructure, reporting on technical details of implementation and application, but only lightly touching upon aspects such as the infrastructural influence on practice, its positive and negative effects, successes and failures. It is crucial, therefore, that such debates engage those external to the immediate context of infrastructure development and implementation, to offset the influence of advocacy perspectives and technical determinism. Furthermore, while even long-standing archaeological infrastructures are still in-the-making, others may never be started, or are delayed, or abandoned, and these are the norm rather than the exception (Carse & Kneas 2019:9). Archaeology has seen dozens of digital infrastructure-related developments over the years, few of which become established in practice, as evidenced in the Computer Applications in Archaeology (CAA) conference proceedings, for example. What happened to them and why have they disappeared? Which factors determined success or failure?

Part of the attraction of infrastructures lies in their combinatorial possibilities: the way in which each digital object made possible via the infrastructure may be combined and recombined with others, to create new objects and novel innovations (Baiyere et al. 2023:8–9). The expansion of these infrastructures into the corners of archaeological practice makes it important to understand their emergence, their development, their environment, their relationships, their social and cultural elements, their implications for practice and their unanticipated outcomes, as well as their benefits. Given the ways in which infrastructures infiltrate and influence, empower and constrain archaeological practice and thought, it is crucial to develop critical and extensive overviews rather than more of the fragmentary approaches adopted to date. A broader and deeper understanding of archaeological infrastructures today will also ensure that lessons from the past and present will carry forward into future developments.

Declaration of interest

The author was one of the original consortium members that saw the creation of the Archaeology Data Service in 1996, and subsequently served as chair of the management and advisory committees at various points in the intervening years. He is currently a vice-chair of the ADS management committee.

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On Infrastructural Speculation

Isto Huvila

Jeremy Huggett raises important concerns in his keynote about the implications of developing digital infrastructures to support archaeological knowledge and, in more practical terms, the everyday work of knowing in archaeology and about things archaeological. Much of the discussion concerning infrastructures so far has been premised by a tacit assumption that digital infrastructures are both necessary and helpful. What could and should perhaps be asked is – paraphrasing Christine Borgman's concern about data sharing (2015) – if digital infrastructure is an answer, what is the question? While the two most likely replies probably relate to why something is not available or why that something is 'poorly' organized, there are good reasons to argue that such questions are unsatisfactorily simple. Another crucial question, perhaps as a follow-up to the previous ones, asks what kinds of knowledge and knowledge-making a particular infrastructure affords and constrains. To ask the reverse might be equally important: what kind of digital infrastructure is needed to support particular types of archaeological knowledge and knowledge-making? As Huggett points out, citing the already vast body of literature on infrastructure, it would be a fallacy to believe that the infrastructures were neutral. In this sense I must wholeheartedly agree with Huggett's emphasis on the importance of more research into what infrastructures do, how they achieve it and how

Department of ALM, Uppsala University
isto.huvila@abm.uu.se

they influence archaeological knowledge and knowing through guiding and regulating how archaeologists and other stakeholders of archaeological knowledge do their work.

A necessary part of this exercise is to continue mapping the development (as Huggett does in his text), zooming in and out from both outside and within the infrastructures, and examining how they work in practice, for instance, by close reading and ethnographies of the abundance of existing digital and non-digital infrastructures. Another equally necessary exercise is to inquire into the broader epistemic assumptions underpinning the idea and ideology behind contemporary research infrastructures and the datafied research paradigm. While pursuing this understanding is in the interest of science and technology research, and infrastructure and information studies, there is also room for archaeological theory to scrutinize further what 'datafying' (Couldry 2020) archaeological data does to archaeology, similar to how earlier theoretical discourse debated the implications of antiquarian, processual and post-processual approaches to archaeological knowledge-making.

In addition to delving into the broader issues pertaining to infrastructures and their impact on archaeology and archaeological knowledge, Huggett raises important questions on how their influence is enacted through standardization, metadata and interface design. As he notes specifically of metadata, all three are often treated as benign. They are typically portrayed as a part of the solution rather than a potential source of complications or, alas, problems. Here the opening of the black box Huggett proposes for making interfaces less opaque could well be extended to expanding the ongoing work (e.g. Börjesson et al. 2022) of increasing the transparency of standards, standardization, metadata and metadata work to decrease their opacity and what they do to archaeological knowledge.

However, while I am inclined to agree that lifting the lid off the black box of infrastructures is important, I would argue that this is not enough. Possibly the greatest conundrum of data management and discovery relates to the difficulty underlined by Huggett, not only to understand, but to seriously challenge the infrastructure, and being able to consider how data could be structured, described and made otherwise available. An infrastructure does not function if it is not rooted in how its 'users' do their data work. It needs to follow the standards users are using. Similarly, the metadata created and interfaces developed need to facilitate the specific ways of searching, accessing and inputting information and be compatible with how the infrastructure has been envisioned by its users. At the same time, it is equally important for any future users of the information preserved through the infrastructure that the infrastructure constrains as little as possible how the information can be retrieved, restructured and

used to answer completely new, previously unforeseen questions. The current infrastructures, and how they include, exclude and structure information, will be challenged by the future as fiercely as present-day scholars challenge the practices of previous generations of archaeologists. Like the current paradoxical frustration surrounding the difficulty of using archaeological legacy data to address contemporary practical needs and research questions, and the simultaneous, spectacular success of many such endeavours, the data will hardly ever be directly retrievable for use beyond the very immediate, specific and consequently transient needs encoded in the infrastructure. At the same time, however, if infrastructures are (reasonably) inclusive (enough) of the variety, complexity and richness of data, it is not necessarily a problem, as beyond very elementary needs, every individual researcher and user needs to piece together their data from scratch anyway. Infrastructures work best if they are transparent and facilitate data discovery in the present but have elasticity so that the evident diversity of (re)use(s) is hindered as little as possible. An infrastructure needs to trust that future generations will succeed precisely *because it does not* try to solve all problems, and is transparent and aware of its affordances and constraints (Huvila 2018), possibilities and limitations.

A relevant follow-up question urging for the importance of the intelligibility behind infrastructures is how to increase their transparency and epistemic openness. Huggett calls for 'critical and extensive overviews rather than the more fragmentary approaches adopted to date' to interrogate infrastructures and their implications to archaeological knowledge and knowledge making. Agreeing with Huggett, I am inclined to believe that such critical and extensive overviews would perhaps benefit by being extended through scholarly speculation on future archaeological knowledge-making in the spirit of Isabelle Stengers (2009), who has advocated it as an alternative to critical thinking. Speculation 'always begins with the insistence of a possibility that makes us feel that things did not need to be conceived as they are, and it tries to nurture this feeling, to explore what it opens up to, what it demands' (Bergen 2018; Pignarre & Muecke 2023), and deals with the possibility of the 'leaps of imagination' when critical thinking aims at the best conceivable and most intelligent choice (Stengers 2002; Pignarre & Muecke 2023). In the best of worlds, a critical and extensive overview allows for consideration of both obvious paths and speculative courses which introduce new possibilities for developing and using existing and future infrastructures without degrading the critical rhetoric of what needs to be done, and of the perception that there is no choice in the matter (cf. Stengers 2009). Ideally, speculative research on digital infrastructures conducted together *with* the infrastructures *inside but from outside* would generate overviews as proposed by Huggett, and would serve as a

'speculative friend' for, rather than against, existing and future infrastructures, helping them to develop and thrive.

Another way of discussing the speculative take on comprehensive in-depth studies of both specific infrastructures, and the infrastructure of digital archaeological infrastructures as a whole, would perhaps be to describe it as a form of 'infrastructural imagination', something Geoffrey Bowker (2014) proposed would be needed to understand the role of infrastructures in our lives. To extend the attempt to understand infrastructures and the information, or data, they incorporate from our lives to the lives of future users of digital infrastructures would probably benefit from something beyond mere imagination, perhaps a dose of *infrastructural speculation*: courage to think and talk beyond what is possible and imaginable but perhaps still desirable, and conversely, strictly unwanted.

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Lost in Details

Digital Archaeology's Universalism

Monika Stobiecka

In 2019 I claimed that archaeology suffers from 'digital escapism', a term that can denote two different phenomena. The first is the dismissal of artefacts as subjects of scientific interest and a shift in focus to digital methods as subjects of studies. The second is the use of big data in archaeology and the attempt to make the discipline more scientific (Stobiecka 2019). While the first understanding of digital escapism refers mainly to the proliferation of method-oriented studies that praise technologies and unveil a particular technosolutionism described by Jeremy Huggett in his paper, the second way of embracing digital escapism falls into what Tim Flohr Sørensen has described under the banner of 'new empiricism' (Sørensen 2017).

Both tendencies have universalistic ambitions. A method-focused approach aims at developing means for pushing digital archaeology forward and making it more applicable – sometimes regardless of the costs, potential users, general availability and meaningfulness of purpose. The second dimension has far more serious consequences, suggesting that, as in 'new empiricism', all small details are lost in the quest for big data.

Similar concerns are presented in an interesting and thought-provoking paper by Jeremy Huggett. He views the last thirty years of digital archaeology in realistic terms and accurately diagnoses the main challenges for

Faculty of Liberal Arts, University of Warsaw
m.stobiecka@uw.edu.pl

the development of this research field. His paper is another attempt, after a brilliant study by Colleen Morgan (2022), to summarize the scientific achievements related to digital infrastructures in archaeology. I particularly appreciate his research questions, which provoke us to ponder upon the future of digital archaeology. The questions posed about the purpose, influence on archaeological practice, concepts behind certain tools and the infrastructures and technical, political and ontological dimensions of decisions related to digital archaeology are crucial to imagining a more technologically sustainable theory and practice. I would like to first comment on these questions and later address the issue of the universalism of digital archaeology, which I find particularly pertinent and not fully recognized in Huggett's otherwise exhaustive study.

My comment will be illustrated with a recent example of a bottom-up initiative by Quinn Dombrowski, Anna E. Kijas and Sebastian Majstorovic which resulted in the setting up of a database and virtual gallery of endangered and/or destroyed Ukrainian cultural heritage. SUCHO (Saving Ukrainian Cultural Heritage Online) was opened 26 February 2022, two days after the Russian invasion in Ukraine. Since then, more than 1,500 volunteers have archived thousands of websites and dozens of terabytes of data on Ukrainian cultural heritage. The records in the database are varied, including scanned documents, photographs or 3-D tours, and therefore it cannot be seen as a 'standardized' repository. SUCHO has come up in many discussions that I have had with colleagues involved in providing humanitarian assistance in Ukraine. Although it would be interesting to explore further the technical aspects of this database, they have never come up in these discussions. What was most important, of course, was its purpose. This interventional tool aimed at empowering a community that has suffered so much resonates well with what William Caraher called the 'archaeology of care', which 'recognizes the human consequences of our technology, our methods, and the pasts that they create' (Caraher 2019:381). The purpose and sociocultural meaning came first, unlike in many digital archaeology projects where the priority seems to be placed on methods. The SUCHO case shows that digital infrastructures can be sustainable if they engage communities that identify themselves with the cause.

I would like to emphasize that the SUCHO example is not meant to encourage ad hoc emergency solutions for digital archaeology, but rather to challenge thinking about the political status quo, recognized by Huggett as characteristic of many digital infrastructures. Although I see Jeremy Huggett's summary of the last thirty years of digital archaeology as a much needed one, it covers mainly Western scholarship (and related projects), and this brings me to my biggest reservation about the presented paper, one related to digital archaeology's universalism.

Technosolutionism, mentioned at the beginning of Huggett's discussion, is a universalistic approach that favours, first and foremost, the development and applicability of methods. Less space is given to theoretical frameworks and the sociocultural and political consequences of it. Moreover, technosolutionism is a tendency that develops under specific conditions: within a well-financed academic milieu and among trans/interdisciplinary groups of scholars with access to specialized know-how. In the case of archaeology, it is thus generally reserved for prosperous countries. The solutions they offer might be seen as applicable, functional and affordable (for some). What is lost, however, in this universalistic approach to developing methods are the details.

The details that are missed may be cultural, political or social and relate to further, pressing questions that were not asked by Huggett in his interesting contribution. They are as important as the ones posed, but in addition, sensitize us to the universalistic dimension of digital archaeology and its infrastructures. For instance, where are these technologies developed? Who is using them and where? Who can afford to develop these technologies and fully participate in digital archaeology? How then might these infrastructures be perceived as open and accessible? Who is really benefiting from them? These questions relate especially to the issue of interoperability discussed by Huggett. Which universities are able to take part in the networks and consortiums? Given the debate over the sustainability of digital infrastructures dependent on commercial imperatives, it would be interesting to see this matter discussed more broadly outside of the UK and US. The differences between private, national and university-based funding are another key matter mentioned in the discussion on sustainability. Here, a number of new questions arise: to what extent does funding shape digital infrastructures? Is there any secure funding in the age of fast academia, which prioritizes short-term grants and immediate results? Finally, in regard to all of these questions: what is the political meaning of digital archaeology and its emerging and/or collapsing infrastructures?

Jeremy Huggett covers some of the political questions raised here, but certainly a deeper engagement with digital archaeology's politics is much needed. Huggett maps out many important aspects entangled in digital infrastructures (for instance, invisible labour), but surely more papers like this should follow to address how digital ethics can meet the challenges posed by the realities of the Anthropocene, decolonization, late capitalism and the rise of nationalism around the world.

Huggett's paper should encourage us to examine more closely archaeological infrastructures from regional perspectives. These, in turn, provide the groundwork for discussing cultural differences related to functioning of digital repositories and databases in various contexts. Huggett describes the British and American examples, DINAA and PAS. Both are interesting

illustrations for the cultural background to user-depositor-platform relations; however, more contributions are vital for understanding the future of digital infrastructures.

Last, but not least, I find the mention of the messy archaeological data very thought-provoking. When so many archaeological finds are unruly (Olsen & Pétursdóttir 2016), it is difficult to think about standardized representations of objects that in digital infrastructures are reduced to 'unknown' or 'undefined'. Whereas the stubborn materiality of things encourages us to reflect and theorize about things and objects, their digital 'translation' (Stobiecka 2020) might sometimes only show their uselessness. It is a classic Latourian question to revisit in digital archaeology (in a future and more extensive study): how can we translate material objects into immaterial data (Latour 1999, see also Lucas 2012:245)?

Finally, I would like to offer my response to the last question posed by Jeremy Huggett in his inspiring study. Huggett asks about infrastructure-related developments and their fate after being presented in the CAA conference proceedings. This brings me to the memory of an excellent session titled 'digiTAG 2.0' organized during the TAG conference in Southampton in 2016. The session provided a great opportunity to discuss, first and foremost, the theory in and of digital archaeology. Today, encouraging a more theory-focused approach to digital archaeology and its infrastructures should remain a priority. I treat Huggett's paper (as well as the recent contribution by Morgan [2022]) as a call to end the 'regime of methods' in digital archaeology, especially those methods that are supposed to be 'universally applicable' no matter the cultural, social and political costs.

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Destroying the Tower of Babel?

On the Digital Infrastructuring of Archaeology

Bodil Petersson

After several years of working in digital aspects of archaeology, I am fascinated by the unwavering belief in, and efforts to construct an overarching national, European, even global system for the digital ordering of archaeological data. It is a fully understandable desire to build such a system, but there is also a sense in which it might be seen as striving to build the Tower of Babel. Therefore, it was a personal relief to read Jeremy Huggett's text, which deconstructs this belief by scrutinizing the fundaments of the idea of archaeological infrastructures.

Huggett's deconstruction was not undertaken from an extremely pessimistic perspective, but is instead a sober discussion on the present system and situation, and the related problems, from a position of experience; Huggett has been part of the development of one of the more long-lived archaeological infrastructures in our part of the world, the Archaeology Data Service based in the UK and established in 1996. On its website ADS is described as 'The digital repository for archaeology and heritage, supporting access, innovation, and research' (ADS website). Huggett has also been observing, deeply engaging in and debating archaeology and the digital for many years.

On several occasions I have experienced that digital infrastructures in general, and archaeological digital infrastructures in particular, have some

Department of Cultural Sciences, Linnaeus University
bodil.petersson@lnu.se

similarities with the ambition to create a common language for all archaeologists around the globe. For this purpose, a 'Tower of Babel', a common archaeological infrastructure (or several), is constructed for this specific group of users, and for other possible users as well.

Recently (in 2023), I took part in a PhD defense at Lund University in Sweden where archaeologist Paola Derudas defended her work *Documenting, Interpreting, Publishing, and Reusing – Linking archaeological reports and excavation archives in the virtual space* (2023). The work circles around the possibilities for describing and categorizing archaeological documentation. It moves ahead towards an extensive and ambitious digital 3D documentation and storage infrastructure, ultimately adapted for target users within archaeological documentation, research and communication. This digital 3D infrastructure is aimed at different groups in society who ultimately will be the possible users of the archaeological data. A related intention is also the deeper reflection, reuse and reinterpretation of the archaeological data.

What struck me most about the ambition in Derudas' impressive PhD work, and several other digital documentation projects, is a particular endeavour that many archaeologists embrace today: the wish to create the ultimate digital tool, often an infrastructure. The tool makes it possible to achieve an overview of large quantities of archaeological data, and to share it digitally, and thereby make it readily accessible to the rest of the world.

In general, the target groups that are supposed to use and reuse/reconsider the archaeological data entered into these infrastructures are not very well defined, and this seems also to be the case with the infrastructures that are discussed by Huggett. But the target users are still the argument for why these infrastructures are allowed to consume resources. And, in cases related to the technological systems that we believe in, we seem to accept astonishingly high costs over very long periods of time. There seems to be an endless and unbroken belief that new, constantly better technological solutions are always waiting for us around the next corner.

Huggett observes that there is a fascinatingly weak link between the belief in technical solutions such as systems for data documentation and storage, an infrastructure, and its ability to be the ultimate tool for ordering, structuring and eventually interpreting archaeological data (i.e. the remains of human activities in the past), and the distance that is created between the material and what humans were actually doing in the past. There seems to be a continuous gap between thinking like a machine and thinking like a human. It is difficult to move ahead from documentation and storage into the realm of interpretation, and with time, this becomes even harder, even with a storage place that is a digital infrastructure.

To adapt to the way machines learn, we try to find the smallest part in our documentation of archaeological sites, some kind of 'atoms' of human life in the past, and then we put these atoms into a huge storage system for structuring, restructuring, considering and reconsidering, interpreting and reinterpreting. This might be possible on a *big data* scale of things, as a way to come up with unexpected results that we have not seen before, because archaeologists have traditionally also been trained to take care of one place at a time and primarily interpret it as a singular phenomenon. Comparisons between similar places and phenomena have often occurred later, after the analysis of the single archaeological site that in some cases might have reached a position in peoples' minds as a fascinating archaeological site in itself, completely without comparison. Now, with these new archaeological infrastructures, comparisons on a larger scale might in principle be conducted at the same time that documentation data is registered and entered into the digital infrastructure.

But this is yet a dream.

Archaeological digital infrastructures appear as a serious and expensive investment in our ambition to achieve an overview of ourselves in the past, mostly from a bird's eye view perspective, but with the possibility of zooming into details if we wish to do so. We might envisage the archaeological digital infrastructure as some kind of drone or satellite with a mounted camera on it, providing an overview of the whole of humanity in the past and thereby giving back to us a more comprehensive picture of the past than previous attempts have ever managed, but we can also approach details within this system through the thorough groundwork performed by archaeologists.

What is the *philosophy* behind these infrastructures? Often the openness is referred to as a way to legitimize this kind of thorough and expensive documentation and storage. The FAIR principles are often put forward as an end in themselves.

The whole infrastructuring process of documentation and storage is about mainstreaming the handling of archaeological data, and as a consequence possibly also mainstreaming the future understanding and handling of archaeological remains. This leads to unforeseen consequences for interpretation and re-interpretation of the archaeological record once it has been processed to fit into these infrastructures. It is possible that some information will get lost on the way, while other information will definitely be FAIR. But the whole system will not actually per definition be 'fair' to the archaeological sites they structure in a specific way.

Several digital infrastructures are constructed, not necessarily from actual needs but because today's technology makes the effort possible. With this possibility, we archaeologists can see a possible future that might

lead to a change in perception of the archaeological material that has the potential to change the interpretations of the past. In the best of worlds, the digitized remains can also be reused in new interpretations, a wish that has followed archaeology throughout its documentation efforts, now intensified with the new possibilities that accompany the digital infrastructures. But it is also the case that later generations of archaeologists have often criticized previous generations of archaeologists for their poor documentation work. Documentation standards are shifting.

The universal claims of these infrastructures, to cover both large geographical areas as well as large areas of thought, are as impossible as the ambition to overcome other kinds of language differences in the world. Is it even something to wish for? Might this striving to construct the ultimate digital archaeological tower of data for everyone around the world only be a way to make the remains similar and remove local cultural frameworks? Will big data eventually destroy the regional cultural and historical understanding of sites? That is an aspect that comes to mind as I read Huggett's text.

In a sense, the striving towards a European or even global archaeological infrastructure may be likened to a single language for all the archaeology in the world: a way of putting the archaeological data into a uniform framework understandable to everyone. The data creates this digital infrastructure language that relies on a single cultural context and way of thinking around the data.

In addition, these infrastructures lean towards certain groups in society: the researcher, the archaeology/cultural heritage administrator, and in some cases the general public, but often without defining that general public. It has been shown to be complicated, but probably not impossible, to adapt the digital archaeological infrastructures to a format that works for those groups which are indicated as users, but it takes some effort to implement these adaptations. For example, archaeologist Fredrik Gunnarsson (2022) has researched the possibilities and obstacles through his thorough work on digital archaeology and the storage and use of contract archaeology data in a Swedish context.

The hopes and expectations connected with the idea of digital archaeological infrastructures are related to the hope for revelations of new patterns and insights about ourselves in the past that are as yet hidden from us. In addition, the investment of time and resources in building archaeological infrastructures is also an expression of the hope for archaeology and its remains to be eternally relevant.

When reading Huggett's text, I begin to think that the problem we have today with structuring archaeological data according to specific general rules that apply to Europe, or even the whole world, might now become

obsolete because of the rapid development of AI as a tool for retrieving and analysing different kinds of digital data across the world. If we in the future put the digitized results of all archaeological documentation and archiving from archaeological campaigns across the world in the hands (or whatever …) of AI, the output might be a much more complex interpretation than we would ever imagine possible. Is this something to hope for? Maybe the effort to build the digital archaeological Tower of Babel will become obsolete because of AI, which in the future will be fully able to collect, systematize and interpret different sets of data in ways yet unimaginable. The digital archaeological infrastructures need to be reconsidered from a less technical and more philosophical point of view in the coming years. Maybe it is the development of AI that will cause such a reconsideration?

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Digital Infrastructures and their Impact on Data Acquisition

James Taylor

In his paper Jeremey Huggett comprehensively explores the intricate relationship between infrastructures, digital data acquisition and knowledge creation in archaeology. As a practitioner deeply engaged in applied digital methods for primary archaeological recording, I am particularly interested in the implications of digital infrastructures for data acquisition and knowledge creation within our field. Rather than counter any of Huggett's points, for they are all important, I will use this space to further develop some of the themes raised and try to offer some practical recommendations for addressing some of the issues raised by this discourse.

The Societal Fabric of Infrastructures

Huggett highlights how archaeological infrastructures, often perceived as technical entities, are dynamic socio-cultural constructs that extend beyond functional utility. This perspective aligns with the understanding that infrastructures are not mere conduits of data; in fact, they possess the agency to shape the very processes of data acquisition. This agency is imbued through

Department of Archaeology, University of York
james.s.taylor@york.ac.uk

the standards, protocols and ideological underpinnings that these infrastructures embed. While the paper does shine a light on this crucial aspect, it is perhaps worth emphasizing again that our digital infrastructures are not only shaped by the data that they seek to host or agglomerate, but also the technological considerations which underpin that data and a series of related social, political and ethical dynamics.

There are many examples of this that one could draw upon at various levels, but consider for example LiDAR (Light Detection and Ranging) technology's introduction in archaeological prospection and landscape archaeology. While it emerged as a groundbreaking tool for archaeology, capturing data on large landscape areas quickly in high detail and unveiling previously unseen structures underneath forest canopies, the data gathered is heavily influenced by the choices made in scanning protocols, data processing methods and interpretation frameworks. As Štular and Lozić (2023) recently highlight, all too often these decisions and processes are 'Black Boxed'. Similar critiques can be offered in relation to the now very common use of 3D photogrammetry techniques in archaeology. Despite providing precise and detailed visual reconstructions of artefacts, sites and landscapes, the way this data is collected, processed and interpreted can heavily influence the stories told from these reconstructions. The 'black-box' issue is particularly relevant as emergent 'AI' technologies exhibit the potential to opaquely scrape and re-present the data from our digital infrastructures. As our data find their way into our disciplinary digital infrastructures, what are the implications of this lack of transparency in our contemporary data collection?

Agency, technological determinism, and the digital shift: Reshaping archaeological practice

Another facet of this is the link between agency and technological determinism within the realm of digital archaeology. *To what extent are our primary data collection workflows increasingly influenced by the affordances of digital technologies?*

In fact, digital approaches to archaeology harness the affordances of digital technologies in unique ways, for example: they capitalize on data storage for vast archaeological datasets, leverage multimedia integration for detailed site representations, employ data analysis for pattern recognition in artefact distributions, use virtual reality for reconstructing ancient environments and enhance collaboration across global archaeological teams. However, the full spectrum of these affordances and their implications for the field remain an evolving subject of exploration.

So then, to what extent are our digital infrastructures also influenced by the affordances of digital technologies?

The integration of digital infrastructures and tools into archaeological practice represents not just a supplementary addition, but a fundamental transformation in the very way archaeology is conducted (see for example the discussion presented in Taylor & Dell'Unto 2021). As we navigate through the realms of digital data acquisition and knowledge creation, it becomes evident that these tools and the infrastructures they support, or generate data for, are not mere passive entities. They are agents, actively influencing both the methodologies we employ and the interpretations we derive.

Whilst digital infrastructures empower researchers, they also exert a level of determinism by framing the possibilities and constraints of data acquisition processes and the way that data is curated, queried and ultimately (re-)used. They provide researchers with tools for more efficient data recording, visualization and interpretation. They offer new opportunities for the reuse, combination and analysis of datasets. Moreover, they offer advanced querying capabilities, enabling researchers to draw connections and make interpretations across datasets that would otherwise be isolated or difficult to compare.

At the topmost level, digital infrastructures that play an instrumental role in aggregating, managing and disseminating archaeological data (platforms like The Digital Archaeological Record [tDAR] or Archaeological Data Service [ADS] and above them, for example, ARIADNE Plus) have revolutionized the accessibility and interoperability of archaeological datasets. By amalgamating disparate datasets from various projects across regions, they facilitate studies that would not be feasible with isolated datasets and, by providing access to archaeological reports and publications spanning decades, they enable potential studies on long-term trends. These platforms allow researchers across the globe to engage with vast data repositories, promoting a more democratized and collaborative research environment and fostering a sense of global scholarly community. However, such platforms also necessitate stringent data standards and metadata practices, thereby implicitly influencing the way data is collected, curated and shared.

The standardized data entry fields and metadata criteria used at every level of the discipline, from intra-site, right through to the infrastructural level, being designed largely by practitioners and domain experts, also end up dictating the kind of information researchers prioritize during data entry, or even during primary acquisition of data in the field (*'we don't need to collect metrics and elevations anymore, because they are existentially embedded in our 3D and spatial data!'*; to paraphrase an increasingly common, and not untrue, refrain).

On a more granular scale then, the adoption of digital tools for the data acquisition which feeds into these infrastructures is also profoundly reshaping fieldwork methodologies. The use of drones for aerial surveying, for instance, has made it possible to rapidly document large archaeological sites, providing perspectives that were once limited to time-consuming satellite imaging or costly piloted flights. Similarly, (again!) 3D technologies have offered unprecedented precision in documenting fieldwork, structures and artefacts, allowing for detailed analysis and digital preservation.

Yet, with these advancements come new challenges. While drones can capture vast areas, they might also inadvertently omit or allow us to misinterpret nuances that a traditional on-ground survey might capture; while 3D scanning offers precision, it can sometimes lack the tactile and experiential insights gained from hands-on examination. This is not a problem *per se*, but is certainly something to consider carefully as practitioners and perhaps mitigate against. Moreover, as these tools become mainstream, there is an emerging shift in the skills and competencies expected of an archaeologist. Knowledge of programming, database management, or 3D and GIS tools is rapidly becoming as desirable or indispensable as understanding stratigraphy or pottery typologies.

Amidst this digital evolution in practice, it is vital to strike a balance. While these tools offer incredible potential, it is essential to remain critically engaged, ensuring that technology complements rather than dictates archaeological inquiry. By being aware of both the affordances and limitations of digital infrastructures and tools, archaeologists can harness their full potential while ensuring that core principles of the discipline (such as the significance of context in our findings, the obligation towards documentation, data stewardship and dissemination, and the necessity of critical thinking and ethical engagement) remain intact.

Inclusive interdisciplinarity: Bridging gaps and exposing bias

Interdisciplinarity emerges as another central theme in this paper, which resonates with the 'grand challenges' of digital archaeology outlined by Huggett elsewhere (2015:83). Collaborative efforts that include archaeologists, computer scientists, data scientists, ethicists, and heritage experts are imperative. By creating avenues for dialogue, shared language and mutual understanding, we can bridge the gaps between these disciplines, ensuring that the development of infrastructures is both inclusive and accountable.

The socio-technical ecosystem surrounding infrastructures, highlighted by Huggett, ultimately necessitates this sort of interdisciplinary collabo-

ration, inviting experts from diverse fields to collectively address the multifaceted implications of data acquisition and knowledge creation. Such collaborations help ensure that technological applications in archaeology are anchored in robust theoretical and ethical frameworks. Engaging with interdisciplinary perspectives should also bring into focus the latent biases and assumptions that might be embedded within digital tools (see for example the discussion by Hacıgüzeller et al. 2021). However, it is crucial to understand that unveiling these biases and assumptions requires inclusivity in our multidisciplinary work. It is essential to include all stakeholders, such as local communities, indigenous groups, broader heritage professionals, policy makers and a representative cross-section of the wider public in the design of our archaeological digital infrastructures. Only by fostering this kind of broad, inclusive dialogue can we really ensure a more holistic and nuanced understanding of the archaeological narrative.

Towards holistic digital archaeology: Practical recommendations

It is, then, essential to acknowledge that the choices made in designing infrastructures, from metadata structures to user interfaces, carry ethical and sociopolitical ramifications. These choices may inadvertently favour certain perspectives and epistemologies while marginalizing others. To counter this, an approach grounded in ethical considerations and critical reflexivity becomes paramount.

Huggett's paper serves as a clarion call for researchers, practitioners and developers invested in archaeological infrastructures. As a response to these imperatives, practical recommendations emerge:

1. Ethical Frameworks: Developers must imbue infrastructures with ethical considerations, accounting for issues of equity, accessibility and representation. The ethical dimensions of data acquisition should be at the forefront of the design process. For instance, it is as imperative when designing infrastructures, as when collecting the archaeological data from the archaeological sites that will populate those infrastructures, to involve local communities and other stakeholders whom the infrastructure could/should serve, ensuring heritage is not appropriated without proper recognition or context.
2. Interdisciplinary Collaboration: We should continue to promote initiatives that gather experts from diverse fields and stakeholders to collaboratively shape and refine infrastructures. These will foster dialogue, cultivate shared vocabularies, and envision infrastructures that holis-

tically serve archaeological research and societal needs. For example, digital project design processes could be structured or workshopped to explicitly combine technology developers, archaeologists and again local stakeholders; these workshops would help develop user experiences that are technologically sound, archaeologically rigorous and locally meaningful.

3. Reflective Practice: Researchers and practitioners who populate our infrastructures should continue to regularly engage in reflective practice. This involves interrogating the biases and limitations imposed by our infrastructures, and critically assessing how data acquisition processes align with archaeological epistemologies. This might, for example, involve reconvening at the end of a digital field season or phase of development work to assess the data quality, potential blind spots or interpretative biases that emerged during the process, refining methodologies for the next season/phase and feeding these observations and awareness back into our infrastructural organizations.

In conclusion, 'Infrastructures in Archaeology' compels us to navigate the complex landscape of digital data acquisition and knowledge creation with a multidimensional perspective. As we forge ahead in the digital age, the transformation of archaeological knowledge hinges on our ability to recognize infrastructures not merely as tools, but as agents in their own right that shape the very essence of our discipline.

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Reframing Digital Archaeological Infrastructures

Agiatis Benardou

In his extremely thorough keynote, Jeremy Huggett discusses the development of digital infrastructures in archaeology over the past 30 years and highlights the need for a broader understanding of their impact. These infrastructures, ranging from data collection systems to national archives, have become central to archaeological practice, but their political, cultural and social dimensions are often overlooked. The keynote emphasizes the importance of critical reflection to avoid unforeseen consequences, biases, and the promotion of specific conventions. It calls for a more comprehensive debate on their implementation, opportunities, constraints and perspectives.

Central to the keynote is the exploration of the concept of 'infrastructures', which Huggett describes as complex sociotechnical systems. The definition and usage of infrastructures in archaeology vary, but they are seen as essential for the discipline's development, enabling new methods and knowledge creation while also limiting certain practices. Huggett argues for a shift in focus from specific tools and components to a more holistic analysis of digital archaeological infrastructures, treating them as emergent rather than static phenomena. He therefore underscores the requirement to consider infrastructures as ongoing processes, subject to change and adaptation over time, and highlights their situated nature within cultural,

DARIAH-ERIC / ATHENA RC / AUEB
agiatis.benardou@dariah.eu

social, political, technological and spatial contexts. The values embodied in infrastructures can introduce biases and conflicts, affecting how data is presented and used. Huggett explores the impact of standardization, metadata and user interfaces on knowledge creation within infrastructures, emphasizing the need for critical examination of these components. They are, after all, crucial strategic and political decisions in themselves.

Several interesting points of discussion emerge from Huggett's thought-provoking arguments. His attempt to unpack the notion of infrastructures and examine which categories archaeological infrastructures fall under raises several issues. Firstly, Huggett does not seem to be concerned with comparing and contrasting European archaeological research infrastructures such as ARIADNE and national archaeological infrastructures such as the ADS, ADAP, or tDAR. It seems important to address the differences between those initiatives, as they vary in scope, geographic coverage, governance and sustainability strategies. Secondly, Huggett's analysis does not fully consider the impact of the new 'thinking infrastructures'. He analyses the evolving and sometimes inconsistent use of the term 'infrastructure' in various academic and research contexts, including archaeology, and describes how the concept has developed over time, encompassing information infrastructures, knowledge infrastructures, and more recently, thinking infrastructures – each with its own characteristics and focus. Following this, archaeological infrastructures are categorized as information infrastructures (as they primarily aim to provide tools, repositories and standards for managing and accessing archaeological data and resources), and as knowledge infrastructures (as they involve a network of institutions, people and information resources that facilitate the transformation of observations and contemplation into standardized archaeological knowledge objects). Huggett stresses that thinking infrastructures are more collaborative, distributed and decentralized. He underlines how they blur the boundaries between knowledge producers and consumers and aim to eliminate intermediaries. However, while the keynote does not explicitly account for thinking infrastructures in archaeology, the development of new technologies and approaches like big data and deep learning could potentially impact the way research infrastructures operate in archaeology. For example, if archaeological infrastructures increasingly incorporate AI and machine-learning methods, they will align even more closely with the principles of thinking infrastructures in terms of decentralization and collaboration. This, again, is a point which would benefit from the distinction between national and European initiatives, and would allow for more fluidity in the categorization of archaeological infrastructures in this evolving landscape. This would, most likely, span across even more categories, not least because their positioning will surely change over time as their roles and functionali-

ties evolve to meet the changing needs of the archaeological research community and as new technologies and paradigms emerge.

In his keynote, Huggett also emphasizes that infrastructures are not guaranteed to succeed or endure long-term due to challenges related to resources, technological changes and competition from other infrastructures. He rightly argues that assuming infrastructures are stable and immune to change can lead to their failure. It is long-established that it is the dynamic, agile infrastructures that manage to sustain themselves. The example of the Archaeology Data Service (ADS) is cited, which faced potential closure due to funding issues but managed to adapt and survive by demonstrating its value and securing transitional funding. This is indeed the experience of APOLLONIS, the Greek Infrastructure for Digital Arts, Humanities and Language Research and Innovation, which managed to secure transitional funding from the Hellenic Foundation of Research and Innovation in order to maintain its ties (i.e. financial contribution) to DARIAH-EU and CLARIN-EU while supporting and expanding its user base. What is also key to the long-term endurance of infrastructures, and which Huggett addresses mostly in passing, is the users. While social and cultural aspects of infrastructures are noted, with emphasis on networks of relationships among individuals and communities, the role and categorization of the different social groups that play a part in the development and maintenance of infrastructures – including researchers, support groups, and communities of practice – deserves a closer analysis (or 'hands-on users', 'social actors' and 'sociopolitical actors' as Huggett distinguishes them, after Millerand and Baker 2010). Users are the cornerstone of infrastructure, and it is of course no easy task identifying and classifying them. However, deep understanding of a user base and identification of their needs and methods on a granular level may guarantee financial, technical and social sustainability.

Scholarly discourse in the field of digital infrastructures has unfolded across several decades, offering a panoramic view of the field. Among these references, Huggett's work stands out as a comprehensive repository of ideas, albeit with some caveats. While Huggett diligently gathers insights from an extensive array of sources, a few of these references appear dated and some have encountered skepticism from both scholars and infrastructure practitioners. For instance, the 2007 perspective presented by Edwards et al., suggesting that infrastructures are primarily defined by data, seems increasingly disconnected from the dynamic realities of infrastructural development on national and international scales over the past decade. Among the references in question are those from Gaines (1981a, 1981b), which delve into databank management in archaeology. These older texts are becoming antiquated in the swiftly advancing landscape of digi-

tal archaeology. The same goes for Star (1999), which explores the concept of a 'master narrative'. While potentially pertinent in certain contexts, it cannot bear the weight of over two decades of transformation in the field. This raises the need for a more critical examination of such ideas. Nonetheless, Huggett's reference list weaves a narrative of the changing tides in digital infrastructures supporting archaeological knowledge. It stretches from the early 1980s to the current year 2023, mapping the progression of ideas, methodologies and technologies. From Eiteljorg II's contributions in the 1990s and early 2000s, to the insights of Kenny and Richards (2005), Kintigh (2006) and the more recent works of Paris, Baiyere and others in the 2020s, the compilation signifies an evolving and dynamic discipline. Each reference encapsulates the spirit of its era and collectively underlines the ever-shifting nature of digital archaeology practices, emphasizing the necessity of reevaluating older concepts in the context of modern realities.

Overall, in his illuminating keynote address, Huggett has brought to the forefront a critical perspective on the development and impact of digital infrastructures in archaeology. By shedding light on the often-neglected political, cultural and social dimensions of these infrastructures, he underscores the need for thoughtful reflection to anticipate unintended consequences and biases. Huggett's call for a broader and more nuanced examination of infrastructures challenges the archaeological community to move beyond specific tools and components to comprehend these complex sociotechnical systems holistically. His insights provide a valuable framework for understanding their dynamic role in shaping archaeological knowledge. While his exploration of categories and their potential evolution raises intriguing questions, it also highlights the need for a more nuanced approach that accommodates the fluidity of this evolving landscape. In particular, the intricate network of relationships they entail warrant further exploration to ensure both technical and social sustainability. Ultimately, Huggett's keynote paves the way for informed and responsible future developments in the field.

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Shaping Education and Transforming Practices

Nicolò Dell'Unto

In recent years the investment in digital research infrastructures has been exponential, bringing various institutes and research centres to engage with massive digitization processes and quickly establishing digital archives and repositories for making these data available. This trend gained momentum after the pandemic, and the results of this accelerated pace are clearly visible in the significant amount of web infrastructures available worldwide. Jeremy Huggett's engaging keynote centres on the unique and delicate role of these infrastructures in present and future archaeological practice. It emphasizes the immediate and crucial need to initiate a critical discourse on the underlying factors that determine the success or failure of such technological frameworks. The discussion is timely and serves as a warning to researchers and institutions involved in building or using digital infrastructures. It encourages them to look beyond the technical aspects, and examines the political, cultural and social significance of these infrastructures within the wider society.

Importantly, the keynote paper stresses that digital infrastructures should be understood as complex socio-technical frameworks involving different interrelated actors. My impression is that, so far, the limited consideration of the social aspects guiding the development and diffusion of these digital infrastructures has contributed to hindering their diffusion

Department of Archaeology and Ancient History, Lund University
nicolo.dellunto@ark.lu.se

within a wider community of practitioners. Jeremy Huggett's contribution references a recent paper by Hacıgüzeller, Taylor and Perry (2021) and highlights how this opens up an important discussion about the constraints inherent in today's digital infrastructures and structured data when it comes to representing data.

In my view, an effective way to address the challenges of data representation requires a comprehensive approach that includes rethinking recording methods as well as the social dynamics that characterize any investigation. This process requires great focus and should be guided by experimentation that incorporates a wider range of heritage practitioners.

Encouragingly, the very same authors of the article are among the promoters of a recently funded project, TETRARCHs (Telling Stories with Archaeological Data), supported by the European Union's Horizon 2020 research and innovation programme, which aims to explore different methods of collecting archaeological data to support different forms of storytelling. The project aims to reach out to different audiences and establish innovative workflows for the collection and management of archaeological and cultural heritage data (https://www.tetrarchs.org/index.php/about/).

Another interesting initiative that takes a broader view of digital infrastructure is the Potter's Wheel Tracing Project. This collaborative research effort focuses on bringing together specialised expertise to address the challenge of tracing the diffusion of technology across different communities in the Bronze Age Aegean. The data generated by the project are archived and distributed through a digital framework, the TPW Knowledge Hub (Hilditch et al. 2021). This framework includes not only the data itself but also videos demonstrating the data generation process. This set-up allows users to not only revisit or reuse the stored information but also to gain insight (directly from the creators of the records) into how the data was originally generated. This approach encourages reuse and data reproducibility involving the community of users at a deeper level.

Examples such as these illustrate an encouraging trend in which researchers are increasingly recognizing digital infrastructures as central components of future research frameworks and as focal points for their analysis, not just as providers of data. Such thinking and strategies have the potential to transform digital systems into something other than skeuomorphic representations of traditional archives.

While there is still much to be done, the emergence of these positive approaches represents a notable shift in perspective. Their trajectories, driven by a genuine engagement with existing digital systems, suggest that a transformative journey is underway.

Empowering archaeology education in the digital age

An essential (and rather underestimated) issue to consider in this ongoing debate is how we facilitate new practices and who should be responsible for doing so.

When I was a student at university, visits to archives were a fundamental part of my education. We were trained to retrieve and manage data and learned how to manage and check the information we found. Navigating an archive was a key experience in becoming an archaeologist. The archive was a place to learn best-practices in documentation, re-use and (most importantly) gain a clear and deep understanding of how to organize our records. Of course, these infrastructures were much less adaptable in terms of the variety of information they could provide, and during their establishment and development our society did not experience so many technological changes (at least not like today). And so, just thinking about this experience as an archaeology teacher, I am wondering if we are adequately equipping our students to effectively use the digital archives that are available today. Are we including specific training modules in our courses to develop critical skills in this area? Are we adequately preparing our students for the digital age? And, are we adapting our pedagogical approach to the evolving digital landscape?

This is certainly not an easy task, especially because most of us do not possess direct experience in digital resources. Understanding the process of engagement with digital infrastructure is crucial to understanding its true capabilities and to adopting a critical developmental approach. The construction of an infrastructure requires a thorough consideration of its practical use and its impact on scholarly exchange. Recognizing instances where researchers organically shift from ongoing tasks to using the infrastructure, and learning to recognize when they find their interactions satisfactory before moving on, holds significance. Unravelling these dynamics can provide a comprehensive view of the collective impact of these infrastructures and their role within the broader archaeological process. Tracing the design and testing of these new blended practices — combining digital and physical elements for specific tasks — can provide valuable insights into the real affordances of digital archives and, in particular, the ways in which they affect our practice and challenge relationships and hierarchies.

Together with my colleagues at Lund University and the National Research Council of Italy-CNR, I have been experiencing this process within the framework activities of the Dynamic Collections project, a (small) 3D web infrastructure designed to support higher education and research in archaeology (Ekengren et al. 2021). The ongoing development

of the platform is primarily driven by its use by both teachers and students; rather than focusing solely on the technological development of the platform, one of the main challenges so far has been to identify and establish routines that encourage the use of data in a way that supports critical engagement and active participation within the learning process.

On a larger scale, a similar phenomenon can be observed with Swedigarch, the Swedish National Infrastructure for Digital Archaeology (https://swedigarch.se/). This relatively new infrastructure is supported by the Swedish National Research Council (*Vetenskapsrådet*) and includes several Swedish universities and cultural heritage institutions working in the field of digital archaeology. Among its various objectives, Swedigarch has the task of formulating and implementing national strategies for the integration and dissemination of the wide range of digital data and information produced by and used in archaeology. Such implementation has a significant impact on the cultural and social aspects of how archaeology is (or will be) conducted in the future, and for this reason, the involvement of various stakeholders is an essential part of the process.

As an active member of Swedigarch I see the key challenge as creating a system in which databases tailored to different scholarly communities can work together effectively. The aim is to establish practices that help users to integrate different perspectives and methods into their work.

While this process may initially appear risky, as it may lead to the inadvertent exclusion of small but crucial elements of particular practices, it also provides scholars with the means to develop methodologies that can be applied to large datasets. In order to mitigate the potential loss of valuable information, a significant focus on the socio-technological aspects of this development process is imperative.

In general terms, this transition requires careful consideration, with a focus on developing critical skills and adapting pedagogical approaches. Understanding how researchers can and may engage with digital infrastructures is key to understanding how these will influence future practice.

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Unravelling Archaeological Digital Infrastructures

Reply to Comments

Jeremy Huggett

When I was invited to offer a keynote paper, the editors provided a generously broad brief in the context of the development of a new national infrastructure for digital archaeology in Sweden (SweDigArch). This new infrastructure is described as facilitating:

> … the production of aggregated and harmonised datasets, previously unmatched in scope, fulfilling the demands for cutting-edge integrative, interdisciplinary research on long-term socio-environmental dynamics. Swedigarch will enable new approaches for digital methods, reinvent archaeological research agendas, and ensure that Swedish archaeology is part of the data science revolution (SweDigArch 2023).

On the one hand, the expressed objectives are ambitious, highly commendable, and broadly aligned with national infrastructural developments elsewhere (see Jakobsson et al. 2021; 2023, for example). On the other hand, as those behind SweDigArch are undoubtedly aware (see Dell'Unto 2023), those same goals disguise a host of equally significant challenges.

Archaeology, School of Humanities, University of Glasgow
jeremy.huggett@glasgow.ac.uk

Infrastructures are embedded in a series of intertwined imaginaries concerning archaeological data, including research frameworks, big data and algorithmic analysis, and the nature of archaeological data itself (Huggett 2022a:270ff). Such imaginaries provide different ways of conceptualising the assumptions, expectations and practices embedded in the political, social, economic, technological, ideological and ontological conditions surrounding infrastructures and their development. There is a paradox at work here. As Huvila (2023) elegantly describes it, a successful infrastructure currently requires agreement on data practices, conformity with data standards and the creation of metadata, as well as interfaces to support specific ways of adding, finding and retrieving data. Yet, to support novel and unpredictable future research questions, that same infrastructure should create as few constraints as possible. In many ways, these two objectives conflict with each other. Infrastructures may be 'engines of ontological change' (Karasti, Pipek & Bowker 2018:270), shaping our 'conditions of possibilities' (Pickren 2018:230), but they risk becoming ontological fossils constrained to a specific world view. Such world views are constructed from customary practices and governed by what is considered to be (ir)relevant at a given time (for instance, a common archival question concerns what should be deposited following an archaeological intervention: the data themselves, or is a summary report sufficient?). When such infrastructures operate as technological gatekeepers, organising and promoting certain practices above others, a more extensive and detailed critique is necessary. A critique that, as Huvila (2023) suggests, zooms in and out (see also Huvila & Huggett 2018:92–94), between the realities projected by those who create and operate the infrastructures and those of the wider user communities beyond (after Carse 2017:36). Despite the significance of digital infrastructures for future archaeological research, a fundamental critique is still largely missing. To date, infrastructures have sparked limited discussion beyond impact or implementation studies (following Pollock & Williams, 2010:524–525) which typically follow a narrative of improvement and the validation of solutions adopted.

I therefore thank the six commentators for their constructive engagement with this important topic, and for their thoughtful contributions to the debate. It is always interesting to see what aspects people pick up on and what goes unremarked, including those areas not fully addressed or else omitted altogether. Rather than attempt a defence of any shortcomings identified in the original keynote, and since all contributors appear to broadly agree on the need to better understand archaeological digital infrastructures, this response will highlight points I found particularly interesting and draw out some common themes across the different commentaries.

Universalist approaches to technology are all-too common: the idea that technology is neutral and hence agnostic about politics, society and the general environment in which it is employed, and that it is therefore applicable in the same way everywhere and with equal benefit to all. Both Stobiecka (2023) and Petersson (2023) highlight aspects of universalism in relation to infrastructures. Stobiecka challenges the focus on Western scholarship and infrastructural projects (2023), while Petersson (2023) uses a Tower of Babel analogy to describe an apparent ambition to create a common global archaeological infrastructure: an 'ultimate digital tool'. Petersson is rightly sceptical as to whether this is possible or even desirable, warning of a threat to local cultural frameworks through the imposition of a uniform international structure. However, I would argue that the more common image is of multiple national and regional infrastructures which maintain their individual cultural identities whilst interoperating with each other at a metadata level (for example, see Geser et al. 2022). That said, the current dominance of Europe and the USA – where most exemplars of digital data infrastructures at different scales can be found – combined with the common metadata standards for interoperability, could still result in a near neocolonial universal infrastructure directed by Western approaches to data and systems. As Stobiecka argues, if we seek to create a better balance and incorporate broader experiences and more varied circumstances, efforts to address political, economic and social questions need to be grounded on a much wider body of work than is presently the case. The collections of papers edited by Jakobssen et al. (2021; 2023) which range beyond Europe to include experiences from Argentina, Israel, and Japan, for instance, is a valuable first step in this direction.

Just as infrastructures need to resist universalist approaches, so too does the data they operate upon. This is a particular theme of Taylor's contribution (2023). For example, he warns that '… infrastructures are not mere conduits of data; in fact, they possess the agency to shape the very processes of data acquisition. This agency is imbued through the standards, protocols, and ideological underpinnings that these infrastructures embed'. In doing so, he underlines the implications of infrastructuration: that data are constrained as well as enabled through the way that infrastructures influence the collection, curation and circulation of data, and consequently its subsequent reuse. An inherent tension therefore exists between the intrinsically messy and often unique character of data (also highlighted by Stobiecka 2023) and the infrastructural protocols required to mobilise it. This is true across all levels, from on-site recording systems through to national and international archives and metadata catalogues. As Petersson (2023) astutely observes, the selectivity required to mobilise the FAIR (Findable, Accessible, Interoperable and Reusable) principles to which data infrastruc-

tures subscribe may therefore not be entirely 'fair' to data. The heterogeneous and fragmentary nature of archaeological data are widely recognised but the requirements for their infrastructural incorporation and subsequent mobilisation rely on degrees of homogenisation – through selection and abstraction, along with the range of other digital affordances that Taylor (2023) describes.

One suggested means of addressing this heterogeneous character of data is through the application of artificial intelligence (AI) and machine learning (ML) techniques. For example, Petersson (2023) suggests that AI may make the structuring rules required for data interoperability obsolete; similarly, Benardou (2023) proposes that ML could be incorporated into archaeological research infrastructures. To date, the majority of applications of AI and ML in archaeology have been concerned with the identification and automated classification of artefacts (primarily pottery and lithics), or the automated recognition and classification of features from aerial or satellite imagery (Huggett 2021; 2022b). An example of ML in the context of a digital archaeological infrastructure is the recent collaboration between Graham (2023) and Kansa (2023) using an image dataset with linked descriptions of artefacts derived from Open Context to train a ML model. This is invaluable as a proof of concept, but the application of such tools remain problematic (beyond the ethical questions flagged by Kansa 2023). For example, training such systems requires tagged and structured data. This means that the resulting models and their subsequent uses would be invisibly influenced by the structure of the original training dataset. The most appropriate size of a training dataset is also unknown, although the presumption is that the larger the training data the more accurate the outcomes are likely to be. Further, we can expect that the difficulties these models exhibit in dealing with edge cases will be exacerbated in the case of archaeological data where the representativeness of known data is problematic, especially when considering yet-to-be discovered data. ML models have no understanding of their content and do not 'see' objects as humans do. They do not fail gracefully but tend to force objects into existing categories rather than recognising them as distinctively new, and the logic behind their decisions will likely be obscure despite work to develop explainable AI (for example, Huggett 2021:427–428; 2022b:284–286). This is why recent criticism of ML has highlighted their invention of 'facts', their propagation of misinformation, their difficulty in drawing inferences and hence establishing causation (as opposed to correlation), and their 'hallucination' of improbable or impossible outcomes (for example, Bender et al. 2021; Arkoudas 2023; Denning 2023; Levine 2023). This is not to suggest that the use of AI and ML should not be investigated, but that caution is needed given the heterogenous character of archaeological data and knowledge

creation, and the difficulty of unpicking the decisions and determinations of black-boxed systems. The transition from information or knowledge infrastructures to 'thinking infrastructures' presents significant challenges which should not be underestimated.

A common focus across the contributions is the need to understand the users of infrastructures. Benardou (2023) argues that the different social groups involved in infrastructures deserve closer analysis, while Dell'Unto (2023) emphasises the importance of understanding scholarly communities and their practices to support their use of built infrastructures. Equally, Taylor (2023) highlights the importance of a wide range of stakeholders in the development of infrastructures, including indigenous groups, heritage professionals, policy makers and the wider public. As Taylor argues, this will help reveal embedded biases and assumptions in the infrastructures, and facilitate the creation of more holistic and nuanced archaeological narratives that may result from infrastructural use. While clearly critical to the success of any infrastructure, such information is not captured by the kind of metrics commonly associated with user surveys. For instance, the user study of the Archaeology Data Service (ADS) (Beagrie & Houghton 2013) is couched in terms of economic value and efficiency. This is clearly important for demonstrating the significance and sustainability of the infrastructure. However, questions such as the extent of the influence of infrastructures and their regulation of archaeological workflows (as raised by Huvila [2023] and Taylor [2023], for example) remained largely embedded in the qualitative data and the handful of interviews undertaken with stakeholders, and under-represented in the conclusions and recommendations in favour of more quantitative measures (Beagrie & Houghton 2013:65–66). As Benardou (2023) observes, a deep understanding of the user base and their needs and methods is key to infrastructural sustainability, but crucially this understanding must move beyond metrics of value or efficiency and examine how user communities sustain and are themselves sustained by the infrastructure, and the implications of these interrelationships for archaeological data and the creation of archaeological knowledge.

It should therefore go without saying that there is a need for much broader and deeper research into the implications surrounding the digital infrastructures created for archaeological research. Huvila (2023), for example, asks what kinds of knowledge and knowledge-making a particular infrastructure affords and constrains, and, vice versa, what kind of digital infrastructure is needed to support a particular type of archaeological knowledge and knowledge-making. Ideally an infrastructure should be flexible whilst at the same time being capable of transforming itself in the face of new data and knowledge. In other words, '… attention should turn to the processes through which flexibility, extension and reconfigu-

ration are enacted and more "fluid" forms of infrastructure emerge as a result' (Kragh-Furbo, Walker & Curtis 2023:44). Infrastructures should always be seen as emergent and should never truly stand still. Furthermore, Stobiecka (2023) identifies the need to address digital ethics along with a range of major global challenges associated with digital infrastructures. For example, consideration of the Anthropocene raises concerns around the environmental costs of infrastructures which have received little attention in digital archaeology (although see Richardson 2022). For example, Vanderbauwhede (2022:fig. 1) estimated that current emissions from computing production and operation amount to around 4% of the world's total, growing to around 80% of the acceptable CO2 emissions budget by 2040, 'a rate unimaginable in other sectors' (Knowles et al. 2022:40). Archaeology's contribution will be miniscule in the global context but the ready availability of digital content and assumptions about always-on digital access should still be questioned in this light (Pendergrass et al. 2019:181). For instance, does all the content within a digital infrastructure have to be online all the time, or can different levels of access be linked to levels of demand (such as always-on metadata search catalogues versus slower access to archived data in a kind of resurrection of batch processing)? Similarly, Morgan (2022:225) argues for an understanding of the material waste created in the manufacturing of digital infrastructures and the exploitative practices of software and hardware companies, and Richardson (2022:207) proposes a 'slower' approach to technological innovations to reduce harm and provide time for more considered practice (following Perry 2019 and Caraher 2019). In sum, the desirability of 'frugal computing', 'achieving the same results for less energy by being more frugal with our computing resources' (Vanderbauwhede 2022:2) seems unarguable.

All of this requires a more theory-focused approach to digital infrastructures. Stobiecka (2023) draws attention to a 'digiTAG' session organised at the Theoretical Archaeology Conference in December 2016, focused on theory in and of digital archaeology. This had been preceded by an inaugural digiTAG session 'Theorising the Digital' at CAA Oslo in March 2016, organised by James Taylor, Sara Perry, Nicolò Del'Unto and Åsa Berggren. It resulted in an important 'call to action' paper (Perry & Taylor 2018) but none of the other session papers appear in the CAA conference proceedings (although several were developed and published in journals elsewhere), and the nascent Digital Theoretical Archaeology Group (digiTAG) has not evolved further. This is a missed opportunity. In Perry and Taylor's call to action, they observed that the focus in digital archaeology is usually on application rather than theory, and that consequently digital tools '… tend to escape deep critique and evade systematic analysis of their political consequences, e.g., in terms of sustainability, equality, democracy, wealth and

poverty' (Perry & Taylor 2018:16). This deep critique and systematic analysis is precisely what is needed to properly situate digital infrastructures and to actively investigate their influence and role in the creation of archaeological knowledge, recognising that any single infrastructure, digital or otherwise, is embedded in multiple others, at different scales, in different places, and at different stages of development. Calling for such a critique is not to downplay the investments in time, energy and resources that have gone into the conception and implementation of the archaeological infrastructures which are being constructed and which surround us and increasingly govern our practice. It is simply to argue that now is the time for us to evaluate how these infrastructures work for us, to examine their implications for future archaeological endeavour, and to consider how present and future technological advances influence our understanding of the past. If not now, when?

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ARTICLES

Body Modification on Viking Age Gotland

Filed Teeth and Artificially Modified Skulls as Embodiment of Social Identities

Matthias S. Toplak[1] & Lukas Kerk[2]

In recent years, research has provided evidence for permanent body modification in the Viking Age. Based on the current state of research, we identified around 130 male-gendered individuals from Scandinavia and beyond with dental alterations in the form of horizontal furrows, many of them stemming from the Baltic isle of Gotland. We suggest that this custom might have been used as a sign of identification for a closed group of merchants. In contrast, artificial cranial modifications in the Viking Age are so far known from just three female individuals from Gotland. While both forms of body modification have received wide attention in other cultural contexts, the specific expressions of these customs in Viking Age society still lack systematic investigation in terms of their social implications. Based on the archaeological concept of embodiment and modern communication theories, we discuss the perception of modified human bodies as media for the presentation and construction of social identities on Viking Age Gotland.

Keywords: body modifications, Viking Age, Gotland, tooth filings, artificial skull modification, embodiment, communication theory, medium, social identity, mobility

1 Viking Museum Haithabu, Germany
matthias.toplak@landesmuseen.sh
2 Universität Münster, Germany
lukas.kerk@uni-muenster.de

Introduction

The last decades have brought a renewed interest in the evidence of permanent body modifications in the Scandinavian Viking Age. For a long time, it was assumed that tattoos were the only form of permanent body modifications dating to this period in this cultural area (for example, Ewing 2006:127), based on a comment of the Arab diplomat Aḥmad ibn Faḍlān, in his famous travelogue (Lunde & Stone 2012:46; see also Montgomery 2000), although concrete examples are still missing from the archaeological record. However, proof of two other forms of body modification do exist: filed teeth and artificially modified skulls. The combination of the two forms within a limited cultural region invites new perspectives on the construction of social identities in Viking Age Gotland.

The first cases of tooth modification from the Scandinavian Viking Age featured in Swedish language publications in the early 1990s. It was not until the end of the 2000s, when there was an increasing number of finds, that researchers recognised tooth modification as being part of a hitherto controversially discussed discourse on identity. The second form of (known) permanent body modification in the Scandinavian Viking Age, artificial skull modification, is a rather newly discovered phenomenon that requires intensive research. Although recent aDNA studies suggest that at least one of the three known women with a modified skull was of Gotlandic origin (Rodríguez-Varela et al. 2023), skull modification does not seem to be an autochthonous custom of the Viking Age culture. As accounted for below, it is more likely that this custom originated in (south-)eastern Europe, and came to the North only sporadically, and through individual mobility. Currently, individuals with filed teeth are known from several places in southern and eastern Scandinavia, with a striking concentration on Gotland, while to date, individuals with modified skulls are only known from Gotland.

To understand the social functions and implications of filed teeth and artificially modified skulls, theories of communication and embodiment offer a productive starting point. Modifications can be viewed as signs within an ongoing communication process that formalise in the embodiment of 'social identity'. The body becomes a 'medium', one out of many media in archaeologically-documented communities. In this article, we use a communication-oriented concept of media. Media theories in communication studies deal broadly with interpersonal communication, the communication of people with media (and vice versa) and the functions and significance of media systems for individuals and society/societies (Hoffmann 2014:90–94). Media and communication are closely related, since communication always makes use of a medium (Hickethier 2010:20; Schellmann et al. 2013:18). We refer to the typical, and likely oldest, forms of

interpersonal communication (Schellmann et al. 2013:120), that is, verbal, for instance in the form of sounds and conversations, and non-verbal, in the form of gestures and facial expressions, posture and body position in relation to people. To this we add the human body as a culturally variable and modifiable entity (Lorentz 2003:10).

In what follows, we first present the current state of research on body modifications on Viking Age Gotland and beyond. We then account for theories of communication and embodiment, after which these are put in dialogue with modified human bodies from Viking Age Gotland. After this discussion, conclusions are presented that provide a more nuanced understanding of the functions and meanings of tooth filing and skull modification within processes of communication on a variety of societal levels on the island of Gotland.

The modified human body in archaeological research: Dental and cranial modifications on Viking Age Gotland and beyond

Dental modifications of the canine teeth are known from different cultures and epochs worldwide (Burnett & Irish 2017) and are still present today (for example, Garve 2011). From Viking Age Scandinavia, dental modifications in the form of single horizontal filed grooves have been known since 1989, when a case was observed on a male individual from the cemetery of Vannhög, Trelleborg in Scania, southern Sweden (Arcini & Jacobsson 2008:12–13). Dental modifications from other archaeological or ethnological contexts consist mostly of sharpening of the teeth or decoration by chipping. In contrast, the Scandinavian examples are characterised by single horizontally filed furrows on the incisors of the upper and partially also the lower jaw (Figure 1). Initially, the filings were regarded as accidental changes caused by specific craft activities (Arcini et al. 1991). However, the use of teeth as tools, such as in textile production,

Figure 1. Incisors with horizontal furrows or deep, crescent-shaped grooves from male individuals from the cemetery of Havor on Gotland (left) and Hammar in Scania (right). © SHM/Johnny Karlsson 2018-05-25/2008-08-12 (CC BY 2.5 SE).

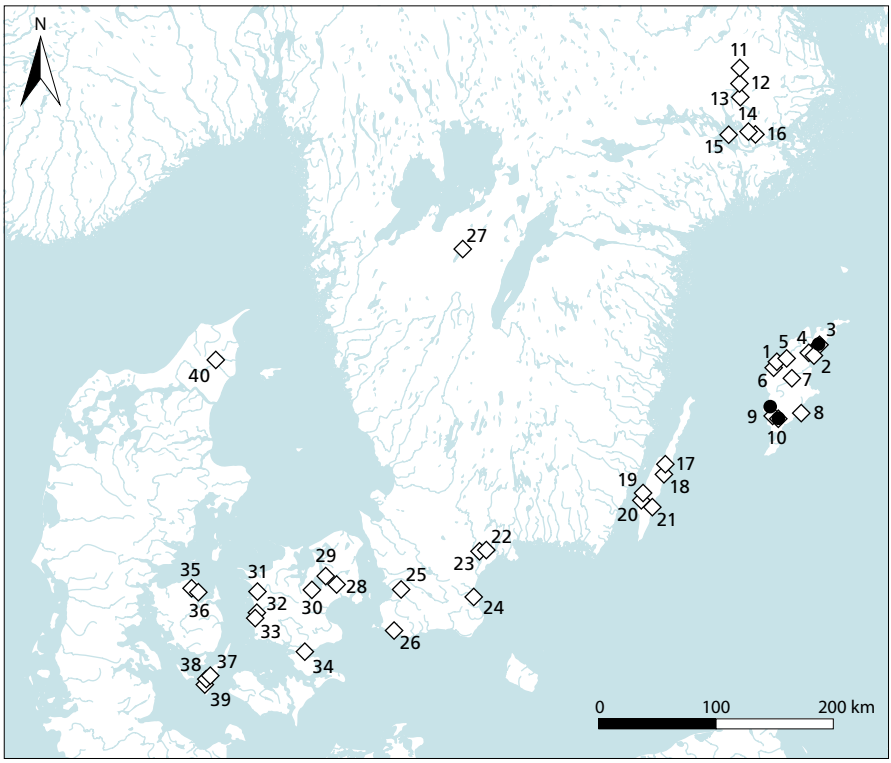

Figure 2. Map of the currently known cases of tooth filings from Scandinavia. The numeration corresponds to the numbers in Table 1 (no. 41: Gnezdovo and no. 42: Ridgeway Hill, Weymouth are not depicted). © Author's work.

leaves different marks, as demonstrated in examples from Norse Greenland (Scott & Burgett Jolie 2008; see also Alt & Pichler 1998:394–399). This suggests that the increasing cases and large variation in the number and forms of filings are more likely due to intentional causes (Toplak et al. 2021 with references). Modern experiments show that similar filings can be achieved with a file of steel (Arcini 2005:732).

Currently, more than 130 individuals with filed teeth are known from the Scandinavian Viking Age (Ahlström Arcini 2018:76). Half of them have been found on Gotland (Figure 2). Forty-six biologically male individuals with filed teeth were observed in the cemetery of Kopparsvik, south of present-day Visby. The cemetery encompassed some 330 burials, lying in what appear to be two separate areas, most of them dating from around 900 to 1050 CE. In addition to the large number of individuals with filed teeth, two further features stand out. One is the unusually large number of prone burials, with almost 50 cases, and the other is a high percentage (*c.*68 per cent) of male individuals (Toplak 2015, 2016a, b). The distribu-

Figure 3. Skull of a male individual from Gnezdovo, Russia (grave C-140), with horizontal furrows or deep, crescent-shaped grooves on all four upper incisors. © Valerie Elena Palmowski 2020; after Toplak et al. 2021:323, fig. 1.

tion of individuals with filed teeth in Kopparsvik shows a distinct pattern as 90 per cent of the graves were lying in the northern area of the cemetery, in contrast to the southern area, which shows an equal distribution of male and female graves (sexed both archaeologically and osteologically). Of the individuals buried in the northern area, 80 per cent were male. Aside from this concentration, no further patterns in terms of grave structure, arrangement of the deceased or accompanying objects could be observed. The individuals with filed teeth were buried in what was presumably their everyday dress, with penannular brooches, belts and often with knives, in almost the same way as most of the individuals in the surrounding graves (Toplak 2016a:102–105).

Another notable site on Gotland is the Slite cemetery in Othem parish, where thirteen male individuals with filed teeth were discovered (Mortágua 2006; Toplak 2016a:191–192, 235–238). Despite the smaller total number of approximately 40 Viking Age burials in Slite, the proportion of individuals with filed teeth is even higher than in Kopparsvik. Although associated settlement structures have yet to be identified, both cemeteries were likely associated with organized port facilities along the Gotlandic coast, suggesting their role as trading and transshipment centres on a supra-local scale (Toplak 2023c:218–219).

Individuals with filed teeth have also been identified in various other cemeteries on Gotland, as well as in regions beyond. Notable examples include the Swedish mainland in Uppland, where eight or nine individuals from Sigtuna and four individuals from Birka exhibited tooth modifica-

Table 1. List of the currently known cases of tooth filings from Scandinavia.

No.	Cemetery	Region	Country	No. of ind.	Literature
1	Kopparsvik	Gotland	Sweden	46	Arcini 2010; Ahlström Arcini 2018; Toplak 2016a, 2016b
2	Slite torg, Othem parish	Gotland	Sweden	13	Mortágua 2006; Toplak 2016a, 2016b
3	Ire, Hellvi parish	Gotland	Sweden	1	Radon 2019
4	Österby, Othem parish	Gotland	Sweden	1	Radon 2019
5	Gällungs, Väskinde parish	Gotland	Sweden	1	Ahlström Arcini 2018
6	Vibble, Västerhejde parish	Gotland	Sweden	1	Radon 2019
7	Broa, Halla parish	Gotland	Sweden	1	Radon 2019
8	Kullar, När parish	Gotland	Sweden	1	Radon 2019
9	Hallvards, Silte parish	Gotland	Sweden	1	Radon 2019
10	Havor, Hablingbo parish	Gotland	Sweden	1	Arcini 2010; Toplak 2023c
11	Gnista, Danmark parish	Uppland	Sweden	1	Hennius et al. 2016
12	Tuna, Alsike parish	Uppland	Sweden	1	Ahlström Arcini 2018
13	Sigtuna	Uppland	Sweden	8 or 9	Hed Jakobsson et al. 2017; Kjellström 2014; Sahlén & Kjellström 2018
14	Grimsta, Fresta parish	Uppland	Sweden	1	Kjellström 2014
15	Birka	Uppland	Sweden	4	Ahlström Arcini 2018; Kjellström 2014
16	Bromma, Stockholm	Uppland	Sweden	1	Radon 2019
17	Sörby-Störlinge, Gärdslösa parish	Öland	Sweden	1	Radon 2019
18	Folkeslunda, Långlöt parish	Öland	Sweden	2	Arcini & Jacobsson 2008; Sjøvold 1994
19	Vickleby, Vickleby parish	Öland	Sweden	1	Ahlström Arcini 2018
20	Skolgården, Resmo parish	Öland	Sweden	1	Radon 2019
21	Alby, Hulterstad parish	Öland	Sweden	1	Radon 2019
22	Hammar, Nosaby parish	Scania	Sweden	1	Radon 2019
23	Fjälkinge	Scania	Sweden	2	Arcini & Jacobsson 2008
24	Hjälmared, Vitaby parish	Scania	Sweden	2	Radon 2019
25	Trinitatis churchyard, Lund	Scania	Sweden	1	Ahlström Arcini 2018
26	Vannhög, Trelleborg	Scania	Sweden	2	Arcini & Jacobsson 2008
27	Varnhem churchyard	Västergötland	Sweden	1	Kjellström 2014
28	Snubbekorsgård	Zealand	Denmark	4	Alexandersen & Lynnerup 2017
29	Grydehøj	Zealand	Denmark	1	Alexandersen & Lynnerup 2017

No.	Cemetery	Region	Country	No. of ind.	Literature
30	Lejre	Zealand	Denmark	2	Alexandersen & Lynnerup 2017
31	Bakkendrup	Zealand	Denmark	2	Alexandersen & Lynnerup 2017
32	Trelleborg	Zealand	Denmark	9	Alexandersen & Lynnerup 2017
33	Forlev	Zealand	Denmark	1	Alexandersen & Lynnerup 2017
34	Bårse	Zealand	Denmark	1	Alexandersen & Lynnerup 2017
35	Galgedil	Funen	Denmark	5	Alexandersen & Lynnerup 2017; Prangsgaard & Bennike 2010; Price et al. 2015
36	Hessum	Funen	Denmark	1	Alexandersen & Lynnerup 2017
37	Kumle Høje	Langeland	Denmark	2	Alexandersen & Lynnerup 2017
38	Bogøvej	Langeland	Denmark	1	Alexandersen & Lynnerup 2017
39	Hesselbjerg	Langeland	Denmark	4	Alexandersen & Lynnerup 2017
40	Bødkergården	Jutland	Denmark	1	Alexandersen & Lynnerup 2017
41	Gnezdovo	Oblast Smolensk	Russia	2	Toplak et al. 2021
42	Ridgeway Hill, Weymouth	Dorset	England	1	Loe et al. 2014

tions. Single instances are known from smaller cemeteries in Uppland, Scania and Öland. While some of the early graves in Uppland, such as Bj A129 at Birka, and A29 in Bollstanäs, date back to the early Viking Age, most cases can be attributed to the later Viking Age. The most recent instance of tooth modification, dating to the eleventh or twelfth century, was found in the Varnhem monastery cemetery in Västergötland, Sweden (Kjellström 2014:50–51). Several cases provide evidence against a religious background for this form of body modification. They are found both in burials, which, based on dating and expression, indicate a pre-Christian background, such as the early graves from Birka and Bollstanäs, and in later burials, which must be seen in a Christian context, such as Sigtuna (Kjellström 2014:49) or Kopparsvik (Toplak 2016:316–319, 322–324). From Denmark, thirty-four individuals with tooth modifications are currently known. Nine cases stem from Trelleborg and four cases from Snubbekorsgård, both on Zealand. Five cases are known from Galgedil on Funen, and there are four cases from Hesselbjerg on Langeland as well as a number of single cases from different burial grounds. In addition, two male individuals with filed teeth were observed in a cemetery in Gnezdovo near Smolensk, Russia (Figure 3), and a single instance in the mass grave at Ridgeway Hill near Weymouth in Dorset, England. Table 1 lists the currently known cases of tooth filings from Scandinavia.

Figure 4a. Skull of a male individual with filed teeth and healed fracture from grave 25, Slite, Othem parish, Gotland. © SHM/Gabriel Hildebrand 2011-12-09 (CC BY 2.5 SE).

Although the overall distribution of the known cases probably reflects the state of research, rather than the actual prevalence of this custom in the Viking Age, evidence for this custom is still lacking from Norway, probably due to the bad preservation of bone. The clear concentration on Gotland must be taken into consideration when interpreting this custom. According to strontium analyses on a small series of individuals with filed teeth from Gotland, most of the analysed individuals also came from the island

Figure 4b. Detail of the filed teeth from the male individual in grave 25 from Slite, Othem parish, Gotland. © SHM/Lisa Hartzell SHM 2007-06-13 (CC BY 2.5 SE).

(Ahlström Arcini 2018:100–101). Together with the concentration of the distribution of filed teeth on Gotland, this might indicate that Gotland was the centre of this custom, even though the two earliest currently known cases come from Scania and Uppland on the Swedish mainland (Ahlström Arcini 2018:79). It can only be speculated whether these earlier cases of filed teeth were the impetus – or inspiration – for certain social groups on Gotland to adopt this form of body modification. However, variations and differences in the form and intensity of the tooth filings can be identified from different geographical areas such as Gotland/Scania, Uppland or Denmark (Alexandersen & Lynnerup 2017:84; Kjellström 2014:51–52), suggesting that there may have been different groups and intentions behind them. According to Arcini (2020:142), despite some individual variations, most filings on the teeth of individuals from Gotland and Scania (including the single case from England) show striking resemblances, suggesting that they were executed by one and the same person or at least from a very small group of persons. The grooves on the teeth of many individuals from Denmark, in turn, differ from the Gotlandic material, so that Alexandersen & Lynnerup (2017:86) suggest a divergent etiology. Furthermore, some filings are so shallow that even their intentional character is doubtful (Alexandersen & Lynnerup 2017:86; Kjellström 2014:53).

The Gotlandic tooth filings and the cases of artificially modified skulls, which appear together in at least two cemeteries, Ire and Havor, make

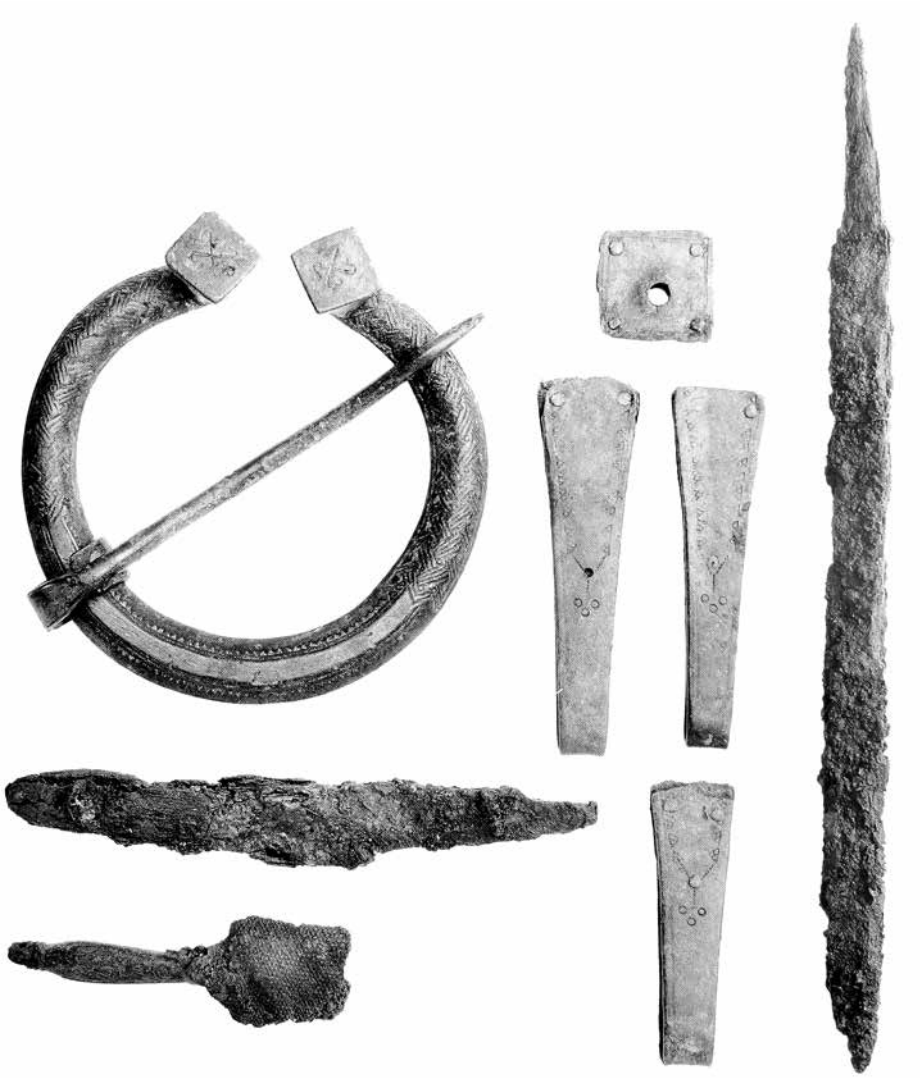

Figure 4c. Penannular brooch, belt fittings, weapon knife and key from grave 25 from Slite, Othem parish, Gotland. © Thunmark 1995, fig. 254; reworked by authors.

Gotland, as a geographically clearly defined study area, an interesting case study for understanding body modification in the Viking Age. Since the first observation of filed teeth, various interpretations have been put forward. As mentioned above, the filings were initially interpreted as the result of handicraft activities which may have used teeth as tools (Alexandersen & Lynnerup 2017:87). A later and more spectacular interpretation regarded the filings as markers of a warrior elite who wanted to show both their bravery and resistance to pain, while also appearing more fearsome to their ene-

mies (Arcini 2005:733; Williams 2014:80). Support for this interpretation was also taken from the tooth filing of one of the decapitated individuals found in the well-known mass grave at Ridgeway Hill, in England, which at first was interpreted as a mass grave of Scandinavian warriors or raiders (Score 2010; cf. Loe et al. 2014:233). Very few of all currently known individuals with filed teeth, however, have been buried with weapons (Ahlström Arcini 2018:77–78; Toplak et al. 2021:325). Furthermore, few individuals show traces of (healed or lethal) weapon-inflicted traumata on the skeletal remains that would indicate participation in armed conflicts (Ahlström Arcini 2018:78) (Figure 4a–c). In addition, the filings would have been scarcely visible beneath upper lips and potential moustaches, even if they had been coloured with some kind of black paste, perhaps made of soot (Arcini 2005:732).

According to a second interpretation, the tooth filings could be regarded as a marker of slaves (Zachrisson 2014:78–80; cf. Raffield et al. 2021:39). This was initially based on two males with filed teeth that were either executed or sacrificed, and on the connection between tooth filings and prone burials at the cemetery of Kopparsvik. Due to their disproportionately high number, the carefully arranged interment of the deceased and the objects in the graves, this form of burial could rather be seen as a variation of the norm with a presumably religious significance. According to archaeological as well as historical sources, a burial in prone position might indicate a special Christian gesture of humility towards God (Toplak 2016a:308–324, 2018a). Since then, possible intentional tooth filings have been observed on further individuals in so-called 'deviant burials' from Denmark, possibly linked to the sacrifice of slaves (Alexandersen & Lynnerup 2017:83–84). However, in the case of the individuals from Gotland, this explanation is less convincing, as most of the individuals were buried with grave goods such as elaborate belt sets, knives and jewellery (Toplak 2016a:102–105). The same is true for the deceased in chamber graves in Birka, and in a grave from Gällungs, Väskinde parish on Gotland, who were buried with weapons, elaborate dress accessories, horses and riding equipment (Arbman 1943:143–144, 344–346; Toplak 2023a) (Figure 5). Therefore, such an interpretation as a marker of slaves must be considered unlikely as a general explanation for the custom of tooth filing in Viking Age Scandinavia.

The only clear pattern so far is the restriction of tooth filings to individuals that could be sexed as (social) gendered males due to the archaeological material, often confirmed by anthropological analyses, and to an age of at least 20 years onwards (Ahlström Arcini 2018:77; Arcini 2020:142). An exception to this rule are three cases from Denmark, where both the sex of the deceased and the actual intentionality of the filings is unclear (Alexandersen & Lynnerup 2017:83–84, 88).

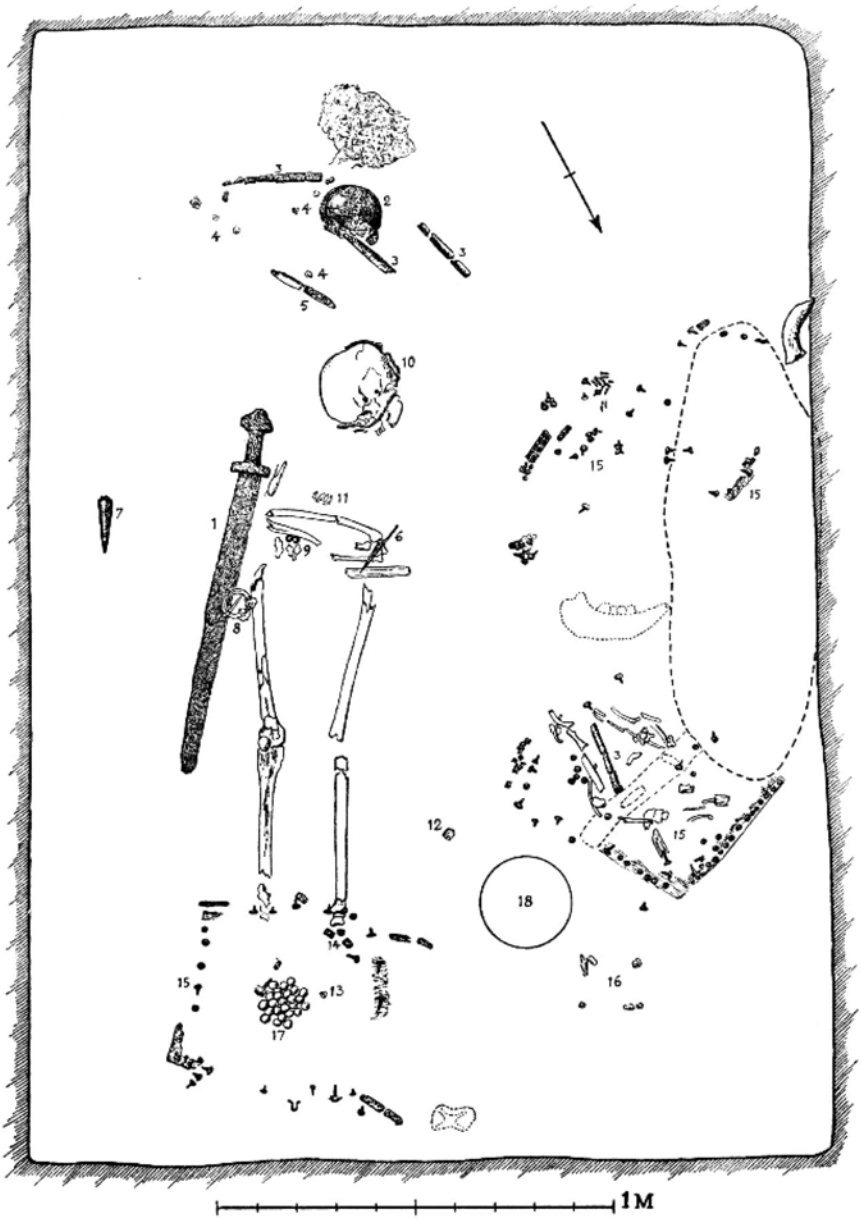

Figure 5. Drawing of grave Bj 886 from Birka, burial of a male individual with filed teeth, equipped with sword, shield and gaming board. © Arbman 1943:345, fig. 291; reworked by authors.

The custom of skull modifications is known in particular from Mesoamerica and South America, as well as from the Migration Period in Central Europe, the Caucasus and parts of Eurasia (Toplak 2019 with references).

Figure 6. Map of the currently known cases of tooth filings (black circles mark the cemeteries with females with modified skulls). © Author's work.

From the Middle Ages, a few modified skulls are known from Central and south-eastern Europe. They are from late Viking Age Wolin in Poland, from Slovakia and especially from Bulgaria, and they date to the period between the ninth and eleventh centuries. According to the reports given by several Arab scholars and diplomats, skull modification occurred in Central Asia until the twelfth century (Toplak 2019:106–107).

So far, three cases of artificial skull modification are known from the Scandinavian Viking Age. They are from cemeteries in Kvie, Eksta parish, Ire, Hellvi parish and Havor, Hablingbo parish, all on Gotland (see Figure 6). The bodies have been archaeologically and anthropologically assessed

Figure 7. Artificially modified skull from the female individual in grave 192 from Havor, Hablingbo parish, Gotland. © SHM/Johnny Karlsson 2008-11-05 (CC BY 2.5 SE)

as females (Kiszely-Hankó 1974; Toplak 2019), presumably buried in the second half of the eleventh century (Toplak 2019) (Figure 6). Kiszely-Hankó (1974:45) has estimated the modification of the skulls to be very moderate, and especially in the case from Kvie as 'minor-medium' (1974, 42–43). While the index of the skull from Kvie might lie within the normal variation as similar indices of a few skulls from the Migration Period cemeteries at Vallhagar on Gotland (Stenberger & Klindt-Jensen 1955:760–763) suggest, the cranial index of the skull from Ire and the dimensions and the shape of the skull from Havor do indicate an intentional, artificial modification of the head. Both cemeteries, Ire and Havor, were almost completely excavated at the end of the nineteenth and the middle of the twentieth century (Stenberger 1961; Toplak 2023c) (Figure 7). The individual from Kvie comes from a small group of half a dozen burials. They were uncovered by chance during gravel extraction in the early 1930s, and the excavation was documented in only a few, short letters by the finders (Thunmark-Nylén 2000:130). There were few artefacts, none datable, in this grave, but the artefacts from the surrounding graves indicate a late Viking Age date, similar to the two graves from Havor and Ire (see Thunmark-Nylén 2000:130–131). Both the female individual from Ire, grave 503, who died at an age of approximately 25–30 years, and the female individual from Havor, grave 192, who died at an age of 55–60 years (Kiszely-Hankó 1974:40–45), were buried according to local burial traditions and with rich jewellery and

Figure 8. Drawing of the grave of the female individual with an artificially modified skull in grave 192 from Havor, Hablingbo parish, Gotland (right) and artistic reconstruction of the burial (left). © ATA/Riksantikvarieämbetet, Excavations G. Gustafson 1884–1887; reworked by author (right); Mirosław Kuźma/Matthias Toplak 2019 (left).

accessories which are characteristic of the Gotlandic female attire (Figure 8). The female from Havor was even buried with four animal-head brooches, a type that is both unique to, and characteristic of, Gotland. The usual female attire consists of either a single brooch, or a pair of brooches. In a few instances you can find a pair, and a single brooch. Such an exaggerated number of brooches is only known from two other graves (Toplak 2019:101) (Figure 9a–b). Interestingly, the typical Gotlandic box brooches were absent in all three graves (see Thedéen 2012). None of the three graves allows secure conclusions about the religious background of the burials. All three women seem to have been buried in their dresses, but without real

Figure 9a & b. Typical Gotlandic dress accessories from the grave of the female individual with an artificially modified skull in grave 192 from Havor, Hablingbo parish, Gotland. © a/b: SHM/Bertha Amaya/Elisabet Pettersson 2006-11-29/2006-12-04 (CC BY 2.5 SE); reworked by authors.

grave goods. This is a custom that prevails even on the earliest churchyards on Gotland (Thunmark-Nylén 1995). Together with the dating to the later Viking Age, this cautiously signals an early Christian context. The existence of a Christian community can be assumed, at least for the cemetery of Havor, as the discovery of a cross pendant in the grave of a male, next to that of the woman with the modified skull, suggests (Toplak 2023c:176–177, 204–205). As indicated by aDNA analyses on the two individuals from Havor and Kvie, the female from Havor was of Gotlandic origin, while the female from Kvie came from the eastern Baltic area, possibly Lithuania (Rodríguez-Varela et al. 2023).

The custom of skull modification probably originated in south-eastern Europe, based on investigations of similar findings from the Migration Period and on the contemporaneous custom of skull modification mentioned above. It was predominantly, but not exclusively, connected with biological females (Beňuš et al. 1999:268; Enchev et al. 2010:6). Close trade contacts between Scandinavia or Gotland and eastern Europe down to the Black Sea are well documented archaeologically (see for example Bjerg et al. 2013; Minaeva & Holmquist 2015). It remains unclear how the custom of skull modification reached Gotland. Either the three females from Havor, Ire and Kvie were born in south-eastern Europe, perhaps as children of Gotlandic or East Baltic traders, and their skulls were modified there in the first years of life. Or the modifications were made on Gotland or in the eastern Baltic, respectively, and thus represent a cultural adoption long unknown to the Scandinavian Viking Age. A common background of the three females can be assumed due to the close chronological dating of the three burials, and especially due to the very similar execution of the skull modifications (Kiszely-Hankó 1974:42–44).

The modified human body as a medium of communication

The human body both is and represents a medium of communication. It has an ability to produce communication in a functionally complex structured way (for example, Hickethier 2010:21–30), The medial tendency to accumulate functions is immanent in the human body. By artificial modification, and hence the inscription of culturally determined messages, it is both a storage medium (a carrier of information, messages, content, etc.) and a transmission medium (communicating information, messages, content, etc.).

Media are defined by three central and interrelated aspects. They are their mediality, their technology and their use (Hickethier 2010:25). Medi-

ality refers to, on the one hand, a property that is determinant for all media in the same way, and on the other, a set of properties that are regarded as 'typical', that is as historically bound to a cultural situation. In relation to the human body as a communicative medium, a permanent body modification is genuinely media-specific and at the same time constitutive of its mediality. The medial properties are generated by technology in the form of procedure, apparatus (for example tool or implement) and energy input. Finally, the last aspect of media, their use within a society, forms the context in which meanings, themes and contents are prepared and conveyed in a media-specific way.

Theories of interpersonal communication, that is social communication or face-to-face communication, usually focus on language as a medium of communication (Hoffmann 2014:90). Language is conventionally divided into semantics (the content), syntactics (the structure) and pragmatics (the occasion, the goal). It is regarded as a sign system as well as a special way of acting. In addition to verbal signs (speech and writing), interpersonal communication usually also depends on non-verbal signals which are essential for understanding the communication and interaction process. The centre of consideration is a sender who conveys a message to a receiver (Hoffmann 2014:90). A concise and all-encompassing definition of interpersonal communication is hardly possible, due to its multifaceted complexity. However, definitions from the field of communication studies may prove helpful in the context of archaeological questions. For instance, Beck (2020:33) has provided a definition whose key points can be summarised as follows:

- Human communication is to be understood as a sign process, which can develop from the mutually interrelated and intentional communicative action of at least two people (communicants).
- Based on material or immaterial transmission of signals, a meaning (social construction of sense) is conveyed.
- The basic prerequisite for this is a common biological heritage (cognitive system) as well as a socialisation and enculturation (education and learning process) of the communicants who thereby construct sufficiently similar information, have a common conventionalized set of signs (icons, symbols) and thus communicate and share their knowledge with each other.

Applying these key points to body modification, it can be described as the signal of an immaterial transmission of meaning which can be understood accordingly by the members of a socio-cultural community based on a common conventionalised set of signs. Both tooth modification and artificial skull modification have a primarily symbolic character in the sense that they refer to something that is culturally coded. As possible iconic signs

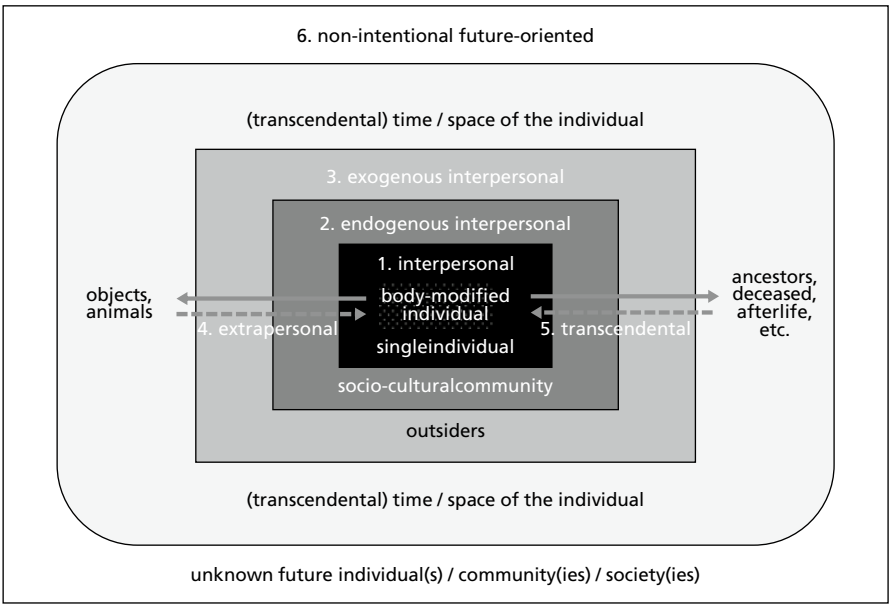

Figure 10. Diagram showing the different levels of communication. © Author's work.

they may refer to something in an abstract form. Among permanent body modifications, tattoos are most likely to be iconic signs, since what is pictorially depicted may well be an image of what is represented, or at least have a resemblance to what is depicted. In addition to interpersonal communication, further types of communicative action are conceivable. They require an expansion of the concept of communication. Against this background, six possible levels of communication can be distinguished (Figure 10):

1. interpersonal communication (face-to-face communication),
2. endogenous interpersonal communication (communication with the community),
3. exogenous interpersonal communication (communication with outsiders),
4. extrapersonal communication (communication with objects and animals),
5. transcendental communication (communication with ancestors, deceased, the afterlife, supernatural forces, nature, etc.),
6. non-intentional future-oriented communication (communication with an unknown future individual or an unknown future community/society).

Taking this classification into account, along with the assumption that body modifications are first and foremost symbolic signs, it is essential to criti-

cally reflect upon the possible statements that can be transmitted by the human body as a communicative medium. To overcome a purely descriptive view, and to focus on questions such as possible reasons for the application as well as the (social) functions and meaning of the body modifications, it must be clarified to what extent useful conclusions can be drawn about the original circumstances. Based on the theoretical framework of the modified human body as an independent medium of communication, the concept of embodiment offers new approaches to the social implications of tooth filing and skull modification.

The modified human body as an embodied social identity

People communicating with each other within social groups use signs that are associated with social meanings (Hickethier 2010:20). Whether defined by familial, ethnic, religious, cultural, political or geographical affiliations, or by social status or function, 'social categorisation' represents a basic human need to locate the individual within the surrounding world and demark boundaries to external groups (Tajfel 1975). Social identity is often expressed through physical appearance. Using elements that function both internally and externally as distinctive features or 'signs' for a specific social group, such as clothing, jewellery and other special manifestations of the respective material culture, hairstyles and body modifications, identity can be presented and/or (re)constructed (for example, Schildkrout 2004). Classification, that is the perception and recognition of socio-cultural groups by outsiders (Jenkins 2000), is one of the central aspects for the attribution of a social identity (Kelly & Kelly 1980), along with self-perception within a specific group. Following the approach of embodiment, the human body forms an additional medium for non-verbal, often action-related communication between individuals and groups (Tiesler 2014:13–17). The human body acts as an interface between the psyche, the physical materiality of the body and the social culture surrounding it, and the reciprocal interaction of these elements (for example, Hamilakis et al. 2002). As a medium it becomes a social construct for the representation and (re)construction of social, ethnic or religious group affiliations. As such, it can be utilised by an actor to present ideas of a certain identity, which is thereby simultaneously reconstructed or modified depending on situation and context.

The dynamic process of constructing identity is always subject to external perception, depending on effects of including and excluding certain phenomena. The perception is further based on certain expectations, prejudices, empirical values and the situated contextualisation, for instance.

Therefore, the reception of a specific identity constructed by embodiment is not necessarily congruent with the identity or the meaning which was originally intended by the actor. Embodiment thus creates two levels of identity: an internal identity based on the actor's intentional self-representation and self-perception, reflected by interpersonal communication; and an external identity based on the more dynamic, situated and contextual perception from the outside. These capture both the habitus of the individual and the social group ascribed through embodiment, and its reception, as part of endogenous interpersonal communication within the social group as well as exogenous interpersonal communication of the social group with the outside community. Through a common marker of distinction of a social identity, this perception of the social group can be intensified and manipulated or controlled from the outside. This leads to the possibility of constructing or reinforcing an intended external effect, for example when respected persons or larger groups present themselves as members of a social group by means of a specific embodiment or when the affiliation to a distinct, closed social group is conveyed by means of an unusual, particularly conspicuous and/or permanent embodiment. Identity presented by embodiment is thus not a purely internal construction, but is in constant interaction with both, the external perception of this embodiment and the external identity attributed to it.

In the analysis of identity discourses in prehistoric and early historic social groups, archaeology is limited to a few forms of markers of distinction. Most of these are temporary and no longer detectable in the archaeological record, such as hairstyles, clothing or tattoos, all of which could have a symbolic or iconic meaning at the time. Jewellery and dress elements, on the other hand, which are often perceived in the burial context as clearly distinguishing features of a specific, often ethnically or regionally interpreted identity, and which are usually preserved in the archaeological record, do not necessarily reflect the real dress (and thus the concrete identity) of the individual or of a social group. They must primarily be regarded as elements of an intentionally constructed and multi-causally conditioned scenery in which various aspects, such as the identity of the individual and his/her relatives during their lifetime, the identity of the dead, ideas of the afterlife and the circumstances of death can mutually define (or contradict) and superimpose each other (see for example Williams 2006 with references). A special case occurs, however, when body modifications are used as a distinguishing feature that result in a permanent alteration of the bone structure, such as tooth filing or skull modification. Such a specific identity, encoded in the corporeal signs manifested as body modifications, remain constant throughout life and also in the archaeological record. Despite this permanence, body modifications can be re-contextualised and re-interpreted by

societies within the framework of endogenous and exogenous interpersonal communication. An example is a form that is foreign to the local community, such as the skull modification, but since it cannot be changed like dress elements, it forces a reaction and interaction. This aspect also highlights the difficulty of interpreting body modifications in archaeologically documented communities. The archaeological evidence does not necessarily show the actual (final) identity of the deceased individual during his lifetime, but through the immutability of the body modification, it shows how the local community in the burial context interacted with this marker of distinction and the identity (known or foreign) communicated with it.

Discussion

The following section discusses the role of tooth filings and artificial skull modifications on Gotland as a case study for Viking Age Scandinavia. Starting with the three females with modified skulls from Gotland, their burials do not give any reliable indication of the original intentions for the skull modification. But they do show how these three females and the skull modification, as a marker of distinction for a certain identity, were perceived and contextualised by the local community. In the regions where skull modifications were still a common practice in the tenth and eleventh centuries, this distinctive embodiment was presumably intended to increase the prestige, and possibly also the social status, of the individual. It further defined the individual as a member of a certain social class or a specific ethnically, geographically or culturally defined group (see for example Tobias et al. 2010:298), even though indication of a higher social rank of individuals with skull modifications can only be found in isolated cases (for example, Alt 2006:118; Schmölzer 2016:69–70).

In late Viking Age Gotland, the social identity expressed by skull modifications probably lost its original significance. Regardless of whether the skull modifications were actually executed on Gotland, the presence of the three women does not seem to have led to an impetus, either fashionable or socially conditioned, for the adoption of this distinctive form of embodiment on the island. So far, only these three cases of skull modifications are known from Viking Age Scandinavia. Considering the narrow time frame in which the three women must have lived (or rather in which they must have been buried) on Gotland and the lack of burials of infants with modified skulls, taking into account parallel findings from Migration Period cemeteries in southern Germany (see for example Hakenbeck 2018:491), it is probable that the custom of skull modification was a foreign tradition

to Gotland, or indeed Scandinavia, and never came to be adopted into the culture of Viking Age Gotland.

Among the potential explanations for this, two stand out as particularly compelling to us. On the one hand, the practice of artificial skull modification requires enormous knowledge and experience, as well as time and effort in order to achieve the desired permanent change of the shape of the head (Tiesler 2014:18) while avoiding physical or psychological impairments (Gadison 2015:16–33). The skull of new-borns and small children can be modified from birth to the third year of life by means of permanent compression of the elastic skull bones that have not yet grown together at the sutures (O'Loughlin 2004). This knowledge of how to modify an infant's skull might have required community involvement and could not simply be passed on between isolated individuals (Lorentz 2003:10). It might have been considered a particular form of knowledge that was not passed on from mother to daughter until the birth of the first child or certain individuals were responsible for this practice, such as the child's grandmother (see Hakenbeck 2018:493–494) or a few initiated 'skilled practitioners'. If the skull modifications were executed on the three females in south-eastern Europe, it could be possible that they returned to Gotland without having transferred this knowledge or without such 'skilled practitioners', thus being unable to perform this practice on their own offspring. If the skull modifications were undertaken on Gotland, it was probably only a small community of people that valued this form of embodiment, and only few people were able to perform a skull modification, otherwise more evidence for the practice would be expected in the archaeological record.

In such a small community, the untimely death of the person(s) responsible for executing the modification would have disrupted the *chaîne opératoire*, so that the knowledge would thus be lost. Furthermore, it is also conceivable that skull modifications could not be carried out on the offspring for other reasons, for example because the females had no children, the children died early or certain circumstances prevented the practice. On the other hand, the decision not to adopt this practice may have been conscious. It may not have been valued by the local society, or the females themselves may have chosen not to transmit this practice. The identity constructed and communicated through the skull modifications was possibly no longer significant for the three females (or might even have been rejected by them as a link to traditions of a certain cultural region to which they no longer had any bonds). At least when it comes to their children, they may have refrained from this ostentatious and permanent marking. The embodiment of this foreign identity would thus have lost all value in the local community since the affiliation to a certain social group which was signalled by the skull modification was either not understood by the

rest of the local community, or was meaningless to it. This presentation of 'otherness' could have been regarded as undesirable by the local society, as it represented a break with the idea of a collective identity. This could depend on the circumstances under which the skull modifications came to Gotland and its associations as perceived by the local society.

Were the women's relatives respected members of the local community who had come into contact with the custom of skull modifications in south-eastern Europe? Or, were there in fact foreigners who had married into the women's families that were responsible for this embodiment? Due to the close chronological dating of the three burials, and especially due to the very similar execution of the skull modifications, we presume that they once belonged to one community. Did they belong to local merchant families, and were thus associated with successful trading voyages, far-reaching contacts, and thus with positive connotations? Or were they regarded as outsiders whose unusual appearance was seen less as an expression of a positively associated foreign culture than as a curiosity that made them special and different?

We can only speculate that the lives of the three females on Gotland must have challenged their conception and understanding of identity. They were always marked as different by the permanent and clearly visible body modification, and at the same time, they did not pass on this distinctive aspect of their identity to their own children. Potential children would have been visually part of their new Gotlandic culture, whereas the mothers with the physical manifestation of a foreign identity would have remained outsiders, even if the females were buried in local attire, which they presumably also wore during their lifetime (Thunmark-Nylén 2000:303). At the same time, the presence of the three females and the confrontation with such a distinct form of embodiment of a social, and inevitably also ethnic affiliation, must at least indirectly have had an impetus on the cultural and social understanding of identity in Gotlandic society. The skull modifications were not an indigenous cultural tradition on Gotland, and would thus manifest 'otherness' which, however, in a society as clearly focused on trading activities as that of the Gotlandic Viking Age, was certainly associated with far-reaching contacts and mercantile success. While on the individual level of the three females, their embodiment of a social identity might have become worthless due to the lack of contextualization, a shift in meaning, or rather a 're-contextualization' of the embodiment, can be hypothesized on a social level. The perception of the embodiment as 'affiliation', as opting-in from the females' perspective, could have shifted to 'otherness' as opting-out from the perspective of the Gotlandic society.

The interaction with the females with modified skulls could be regarded as the socio-political use of certain immaterial aspects of this embodiment

of 'otherness', positively connoted foreign culture, far-reaching (trade) contacts, mercantile success or membership of a supra-regional (cross-cultural) elite, in order to construct or legitimize a prominent position or claim to leadership, for example in trade activities, similar to the use of rare and thus prestigious imported goods as status symbols. As the public burial ritual functions as a medium of multidimensional socio-religious communication between relatives and society, it is suitable for constructing or manipulating social identity and social relations (Toplak 2018b, 2021, 2023c). The burials of these three females as members of the local Gotlandic society, especially in the case of the strikingly rich attire of the female from Havor, are a clear combination of the embodiment of a social identity, here in the form of the affiliation to the Gotlandic society through the use of local dress and burial customs, and the use of the resource 'otherness' as status symbols for far-reaching and prestigious contacts. In this context, both constructions of identity, the skull modification as an affiliation to a certain ethnic or social group and the burial as a member of the local community, and the resulting signals of 'affiliation' and 'otherness', respectively, are beyond the control of the persons concerned. In both cases it is the external imposition of a social identity.

The skull modification thus points to a non-verbal communication that was certainly subject to change over time, and even went beyond the death of the three females on Gotland. First and foremost, the skull modification as a form of body modification is a mark of the individual that is beyond his or – in this specific case – her own control. Because this body modification was tied to early childhood, the decision to perform it was in the hands of the community to which the individual belonged. It was this community that, based on its set of signs, ascribed a (symbolic) meaning to the young individual by means of the body modification, which remained permanent and visible for life and beyond. There remains the possibility that the local population on Gotland possessed the same, or at least a similar, conventionalised set of signs and was thus able to decipher the meaning immanent in the cranial modification at the interface between endogenous and exogenous interpersonal communication. However, due to divergent sets of signs, the Gotlandic society would not have understood the original meaning. The body modification may have been perceived as an exotic or foreign trait which did not prevent the individual from being integrated into the community and its prevailing burial customs. This can also be observed in almost all cases of Migration Period women with modified skulls in the 'western group' defined by Hakenbeck (2009:74). It must always be taken into account that these women could also express themselves through the medium of language, and if they spoke the same language as the local population, they could communicate the actual meaning of their skull modifi-

cation to the community – if they knew it themselves. At the same time, a reinterpretation of the original meaning of the skull modification by the new socio-cultural community on Gotland probably took place. Furthermore, the skull modification possibly also functioned as a constant reminder of their own origins within the framework of interpersonal communication. The case of the artificially modified skulls on Gotland thus probably illustrates a re-coding of an alien and incomprehensible sign whereby the three foreign females and their embodied social identities could be integrated into the local society of the Gotlandic Viking Age.

In contrast to the situation of the females with artificially modified skulls from Gotland, the known Gotlandic tooth filings can be interpreted as a cultural anchor that manifests itself in the marking of individuals, and thus their integration into a community, hence as an intentional and desired embodiment of a certain social identity within the socio-cultural framework of Viking Age Gotland (and beyond). We argue that it is an intentionally performed display of a certain identity, and thus as a marker of mutual identification within a limited group of people. As almost all individuals with filed teeth could be sexed as (social) males, often confirmed by anthropological investigations (Ahlström Arcini 2018; Toplak 2016), the custom of tooth modification was clearly related to perceptions of gender. However, it remains unclear if the tooth filings were regarded as an active expression of a male gender identity, such as male members of a certain social group in ostentatious distinction from possible female participants, or if the precondition for the affiliation to this social group was being of male gender, so that the tooth filings were merely a passive sign within a gender discourse.

The application of the modification marked the transition into a social association by way of a rite of initiation, and henceforth acted as a sign of identification. Despite its permanence, the body modification could be concealed, in contrast to cranial modification, which gave it a certain exclusivity with regard to its communicative aspect. If necessary, tooth filings could be shown, but they could also remain hidden. Thus, they presumably functioned primarily within the endogenous interpersonal communication of a closed social group. The exact role of the different forms of tooth filings within the context of an immaterial transmission of meaning cannot be reconstructed clearly. It is only possible to speculate about the true nature of this social group, but the distribution of dental modifications reveals one possible pattern. Many cases are known from early trading places such as Kopparsvik and Slite on Gotland, as well as Birka and Sigtuna, and all individuals with filed teeth seem to have been adult men. Furthermore, most of the men with filed teeth from Kopparsvik were buried in the northern area of the cemetery, which could cautiously be interpreted as a cemetery for non-local individuals that stayed at Kopparsvik only seasonally, with-

out their families due to the striking underrepresentation of females in this part of the cemetery. We therefore theorize that the custom of tooth filing might have been linked to trading activities of larger groups of professional merchants. According to this theory, they might have functioned as a rite of initiation and sign of identification for a closed group of merchants, as some kind of precursor to the later guilds. The existence of trading communities or early guilds in late Viking Age Scandinavia has been shown by the so-called 'Gildesteine' in Sigtuna and Östergötland, where rune stones explicitly mention 'Frisian gilds' and 'gild brothers' (Jesch 2001:241). Following this theory, the members of this closed group of merchants could have identified themselves through the tooth filings and may thus have received commercial advantages, protection or other privileges which were relevant to the development of the concept of trading guilds in high medieval times (Toplak 2016a:328–331).

The varying numbers, depth, and shape of the grooves, however, give the tooth modifications a symbolic character that suggests a conventionalized set of signs, which was possibly readable by the members of the community as assigning an individual to a particular field of activity, function, or status within the corresponding group. Based on the differences and variations in the forms of the tooth filings between, for example, Gotland and Uppland or Denmark, it could furthermore be theorized that they actually reflect different circles of distribution (Kjellström 2014:51–52). Thus, it could be speculated that the tooth filings on Gotland were deliberately used as a marker of a certain identity, while a similar custom may have had a completely different meaning in other regions. This suggests that the sign code of the tooth filing was not unknown within the larger regional sphere of the Scandinavian Viking Age and could be decoded and re-contextualized. It is even possible that one and the same tooth filing was used as a medium of endogenous and exogenous interpersonal communication. While the full meaning of the tooth filing as a signal of a symbolic sign process was known in detail to one's own community, it was perhaps sufficient that outside of this community the recipient(s) knew only part of this more complex meaning. Furthermore, a few men with filed teeth were buried in a way that suggests they were ritually killed during the funeral ceremony, perhaps as slaves or convicts (Toplak 2023b). This might indicate that this embodiment of a social identity, presumably the affiliation to a specific social group, did not prevent these respective individuals from having had a dramatic change in their social identity. It is quite conceivable that a person with filed teeth went through changing social identities in the course of their life due to external circumstances, for example from merchant to slave or human sacrifice, whereby the body modification could theoretically have been applied at any stage of life.

Conclusion

Tooth filings and skull modification from the Scandinavian Viking Age illustrate two different approaches to the concept of body modification as the embodiment of social identities in interpersonal communication. The modified individuals' bodies possessed a medial function in the Viking Age, and thanks to the irreversibility, and hence permanence of the modifications, they have a medial function also today. The signals inscribed through the body modifications are subject to the interpretation of the contemporary observer, but we presume that the modified human bodies were subject to various levels of communication and understanding. They could also have been charged with new meanings by members of other or different sociocultural communities of the time.

The society of Viking Age Gotland utilised the custom of tooth filings as an internal sign system in their social communication. As a conscious and actively chosen embodiment of adults, predominantly male, we have argued that tooth filings were primarily intended for endogenous interpersonal communication – members of a certain social group could identify each other. At the same time, exogenous interpersonal communication always took place when individuals with this type of body modification interacted with people outside this social group. However, since this interaction took place within a common geographical and cultural space, mainly the Baltic west coast, it can be considered as an 'exogenous interpersonal communication expressing otherness'. By this we mean a special sign that was used only in a closed group, although not completely unintelligible to outsiders, as the general meaning of tooth filings was probably also known to people outside the social group.

The skull modification, on the other hand, was imposed on the three females during their earliest childhood to express their affiliation to a certain social group. This embodiment also expressed a form of endogenous interpersonal communication, that is as communication within a larger cultural group. On Gotland, however, this sign was probably unknown to the wider society, to the extent that it must have been interpreted as an 'alien exogenous interpersonal communication'. As such, it would require a re-coding.

By incorporating communication theory approaches and the concept of embodiment, the exciting examples of permanent body modifications on Gotland discussed here demonstrate that the combined use of different theoretical approaches and concepts can contribute to a better understanding of the function of reshaping the human body and tooth filing and allow insights into central questions of social identity and social communication in Viking Age society, in particular on Gotland. In both cases, the

body modifications were an embodied signal that should have communicated a certain meaning to the community. However, our analysis equally illustrates how these embodied signals were re-decoded and re-valorised in different contexts. Examples include instances when their original meaning is unknown, as with the artificially modified skulls from Gotland, or when dramatic changes in the social identity of an individual emerged, as with the example of filed teeth outside of Gotland. Even if the exact meanings of tooth filings and skull modification cannot be reconstructed, the approach of combining communication theory with the concept of embodiment highlights the corporeal dimension of gender, prestige, social status, affiliation, otherness, and so forth, and their ongoing, fluid and dynamic entanglement with the modification of the human body.

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The Swedish Apparatus of Contract Archaeology and Its Entanglement with Society

Matthew Nelson

The Swedish system for contract archaeology (CA) has witnessed several changes in recent decades. A market-oriented approach to CA has emerged alongside new demands in cultural heritage legislation which include policies to produce knowledge that is relevant to society and aims to increase public participation. Despite adapting to these new conditions, critics have claimed that Swedish CA is still inefficient in its present form. This includes deficiencies in the relationships between the official parties involved, and with actors and stakeholders outside the system. There is also a discrepancy between democratic ideals and practice when it comes to the new heritage goals on inclusion. In this paper I examine the Swedish CA system and its three main parties. Anchored in theoretical perspectives from critical heritage studies, I use the concept of 'apparatus' to analyse CA in light of recent changes and tensions. Ultimately, I argue that the role and boundaries of the current system should be explicated and broadened, taking into account the conditions of local contexts, interests and the needs of communities. An active stance for a more dialogical and inclusive nature of communication is needed to diminish the risk for dissonance, conflict and negative impacts while creating conditions for positive outcomes and values in society.

Keywords: contract archaeology, apparatus, system, programmes, entanglement, society, public, dissemination

Stiftelsen Kulturmiljövård & Linnaeus University, Department of Cultural Sciences, GRASCA
mats.nelson@kmmd.se

Introduction

The last few decades have witnessed significant changes and new goals in Swedish contract archaeology (CA), which, on the one hand, has become more guided by the market, where projects are increasingly run by contract archaeologists from the private sector who adhere to the demands for cost efficiency. On the other hand, there are growing requests that new archaeological knowledge should be relevant and made accessible to a wider part of society, and that the CA process should benefit and contribute to its development. As a contract archaeologist I have experienced the tension between these goals first hand, and as a researcher I see a need for an updated analysis of the Swedish CA system in light of new cultural heritage directives and policies.

In this paper I will examine the Swedish CA system through the lens of critical heritage studies (Smith 2006; Harrison 2013). In particular, I draw on Rodney Harrison's (2013:3–7, 227–231) application of the Foucauldian concept 'apparatus', a governing tool that in this case produces heritage and history through a professionalized and authoritarian system, and Laurajane Smith's (2006) concept of 'authorised heritage discourse' (AHD). In most cases, Swedish CA conducts its business among three major parties: the government agency in the form of the County Administrative Board, the developer and the archaeological contractor. The foundation and ideological framework for the CA system has traditionally been built upon the balance between economic and scientific values and benefits, according to the 'polluter pays' principle where developers finance the costs for removing heritage sites (Carman 2018:13–14). In the last decade changes have been made in the Swedish cultural heritage legislation (SFS 1988:950), resulting in a shift in focus where the scientific documentation of a removed site is no longer a goal in itself, but a means to producing relevant knowledge for society (SFS 2013:548; KRFS 2015:1, Riksantikvarieämbetet 2015). There have also been new directives in cultural heritage management, with the aim that all citizens should have a claim on national heritage (Riksantikvarieämbetet 2016:10). This has created a shift in target groups for archaeological results, calling on more participation by people outside the CA system. Furthermore, the CA apparatus has been criticised for being too rigid and sluggish, with deficiencies both in the relationships between the parties within the system and with actors and stakeholders outside (Riksantikvarieämbetet 2022).

Previous research has pointed to the discrepancy between the system and the new heritage goals, calling for less hierarchy and a more horizontal organization that includes larger parts of society (Gruber 2010; Arnberg & Gruber 2014). Taking this critique and the identified discrepancies as its

starting point, this article provides an updated analysis of the CA system in Sweden through a perspective informed by critical heritage theory. This is done by studying and evaluating the positions, goals and functionality of the major parties in the tripartite structure which constitutes the CA apparatus, comparing these to current governmental policies and agendas as well as assessing the role of CA in Swedish society, laying out a vision for the way forward. Analysing the internal structures for heritage-governing processes in Sweden may also serve as a complement to international and Scandinavian research focusing on the intersection between archaeology and modern states, both in terms of CA systems and in reproducing national narratives (Plets 2016; Carman 2018; Roland 2018).

In order to assess the situation for the Swedish CA system and how it relates to the new directives and policies in cultural heritage, I will start with analysing the apparatus of CA. My research questions here are:

1. How does the CA apparatus function as an instrument within the larger cultural heritage management system in Sweden?
2. What are the relationships between the main parties within the system?
3. What forms do relationships with the rest of society take, and how well is the apparatus adapted to new goals and demands?

I then move on to reviewing the three main parties within the apparatus of CA. My questions here are:

1. What are the values and goals set by The Swedish National Heritage Board (NHB) and emphasized in the programmes of each of the three main parties?
2. How well do the programmes address challenges in cooperation within the apparatus and with stakeholders outside the system?
3. To what degree is public participation addressed?
4. How well do the programmes adhere to changing cultural heritage goals and demands from society?
5. How can problems within and outside the CA system be solved?

In order to answer these questions, my analysis will first establish the structure, background and evolution of the CA apparatus and its relationship with society, using previous studies and research. I will then compare this against the current goals and directives for Swedish cultural heritage management, looking for deviations and discrepancies. In the second part I deconstruct the apparatus by conducting an analysis of the representative actors for the three main parties, examining their programmes to understand their values, goals and positions. Also, I review critical research studies and projects on the CA system. The second analysis is made in the light of a recent survey conducted by The Swedish National Heritage Board

(*Riksantikvarieämbetet*, hereinafter NHB) in 2022, addressing problems and deficiencies in the CA system (Riksantikvarieämbetet 2022). I then continue to discuss the Swedish CA system based on views on the heritage-making process, its entanglement with society, and how changes in the structures of CA could make the process more fluid as well as create better conditions for a wider public participation. This discussion also takes into account CA systems in other European countries, especially Scandinavia.

The Swedish contract archaeology system and process

The cultural environmental legislation and policies that control the CA system form one of the tools, or apparatuses, used by the state to legitimize its power over the citizens, controlling the narrative creations of the past (Arnberg & Gruber 2014:161). Archaeological heritage is protected by Swedish law, in the Historic Environment Act or *Kulturmiljölagen* (SFS 1988:950), and excavations are only granted in certain circumstances, on the condition that knowledge is generated. The legislation advocates that any removal of archaeological sites is to be financed by the developer according to the polluter-pay principle (Gruber 2009:125; Andersson et al. 2010:14). The archaeological investigation is conducted by various actors in the market which are either private institutions or part of a state or regional museum. Economic incentives in development currently drive which archaeological sites are explored, and these are therefore a determining factor for new discoveries. In 2020, CA accumulated 1296 projects with a total budget of 267,7 million SEK (Riksantikvarieämbetet 2021). Around 90 per cent of all archaeology is conducted through CA, which therefore plays a major part in retrieving information from archaeological sites that, when used for research, can generate new knowledge (Andersson et al. 2010:19; Myndigheten för kulturanalys 2016:58).

The Swedish CA system, presented in a model (Figure 1), is based on the established view of a tripartite relationship, a power triangle, in which the actors involved have different roles and responsibilities. This relationship consists of the government agency in the cultural heritage sector, the developers and the archaeological contractors (Arnberg & Gruber 2014:163; Gruber 2017; Smits 2022:74–77). The government agency is represented by both the NHB and the County Administrative Boards (*Länsstyrelsen*, or CABs), the regional decision-making authorities. The NHB provides rules and guidelines for CA and monitors how the CABs implement these. While the NHB in theory holds a central position of power, the process of the everyday archaeological project is conducted outside its domain. The

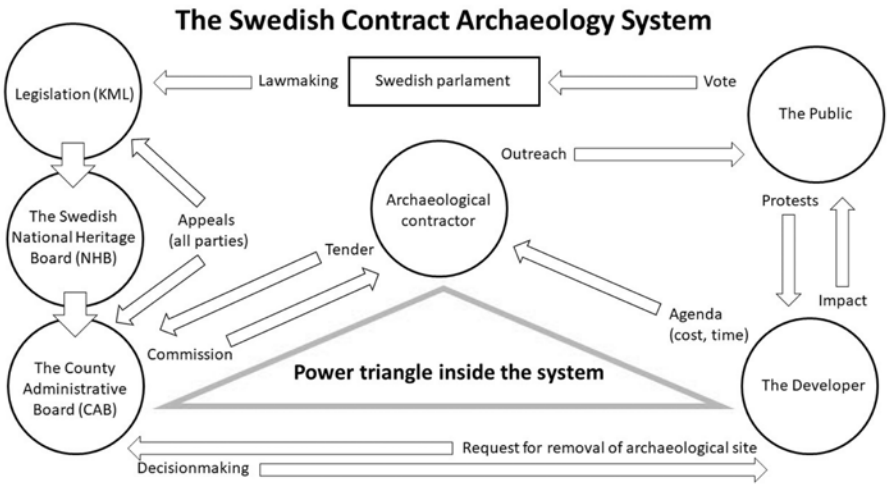

Figure 1. The Swedish contract archaeological system and the power triangle. At the top, the lawmakers, elected by the public, form the legislation for cultural heritage management (KML), which in turn is interpreted and regulated by The Swedish National Heritage Board (NHB). Policies instruct the CABs, which have the decision making and commissioning role. The developer requests the removal of the archaeological site and finances the excavation. The archaeological contractor is commissioned to undertake the project by the CAB, often through a tender process. The projects often include dissemination of information to the public. Model by author.

CAB has the main responsibility to uphold legislation and policies when assessing and granting permission for development as well as commissioning archaeological excavations. In this comes a great responsibility for setting the balance between preservation and development and establishing the conditions for excavations. These must ensure good scientific quality but also cost efficiency for the credibility of the CA system to be maintained (Andersson et al. 2010:18; KRFS 2015:1). The developer, for instance the Swedish Transport Administration (*Trafikverket*, or STA), is in turn responsible for the excavation cost conducted by the third party, the archaeological contractor, who relies on archaeological investigations as their main source of revenue.

Adaptations to a market have forced archaeological contractors to become more professional and cost-effective, which has also made the CA process very goal orientated (Gruber 2009:112; Andersson et al. 2010:13–16). This has also led to more pressure on both administrators and professionals who always feel they are lacking in resources (Gruber 2021:36; Gunnarsson 2022:72, 109; Riksantikvarieämbetet 2022:6). This current situation has sparked debates concerning the quality of CA, as well as work conditions, and also on how far the responsibilities of the developers to

fund archaeology should extend, causing tensions between the three parties. More collaboration is therefore vital, especially at an early stage, where the outcome of CA projects is to a great extent determined by the degree of cooperation between the parties (Andersson et al. 2010:25).

In Sweden, the NHB and their previous CA-branch *Undersöknings-verksamheten* (UV) dominated the market and set the norms for the development of CA up to a couple of decades ago (Petersson 2005:86). The deregulation of the CA system has continued to uphold a closed and hierarchic structure consisting of authorities and archaeologists that define which part of material features are prioritized for representing the past as well as deciding methods for collecting, interpreting and presenting the results. Society's trust in expertise allows archaeologists to formulate narratives about the past and directives for how the common heritage should be perceived (Gruber 2010:273; Arnberg & Gruber 2014:160). Traditionally archaeologists have regarded the purpose of their work as providing new knowledge and understanding about the past that can be used for further scientific analysis and research by academia (Vander Linden & Webley 2012:1–10).

A changing relationship towards society

The relationship between archaeology and wider society has grown and changed, in theory cemented through new official rhetoric, legislation and policymaking regarding Swedish heritage (Gruber 2017). The law on cultural heritage was partially rewritten in 2014 (SFS 2013:548), shifting the goals for cultural heritage work from the traditional aims formulated by the sector to instead be incorporated into wider national political and environmental goals (Högberg et al. 2021:8–9). These formulate the rights for all Swedish citizens to share access to, and responsibility for, national heritage, and state that knowledge produced through CA should be relevant to society. CA projects must now include a great emphasis on dissemination and public participation, and this can be financed as part of the developers' expenses for the removal of archaeological sites. The purpose of the new legislation is to shift the focus from the interdisciplinary scientific community, and to include target groups outside the CA system, being part of social meaning-making processes that create many forms of social values and narratives (Riksantikvarieämbetet 2012; Arnberg & Gruber 2014:158; Gill 2021). The vision for the new cultural heritage goals, Vision 2030, states the aim that 'all citizens, regardless of background, feel that they have a claim in Swedish heritage' (Riksantikvarieämbetet 2016:8; Gruber 2017). The CAB, as the decision-making authority for most CA projects, has a

key role in making sure that these goals are applied, rewarding tenders that include qualitative and meaningful dissemination to, and participation of, the public (Andersson et al. 2010:19).

There is, however, a broad discrepancy between the wider national goals and the narrower guidelines for CA (Dutra-Leivas 2020:44–48, 145–146; Högberg et al. 2021:9). It is today usually only larger excavations that include public dissemination, where the public is generally seen as passive receivers of the knowledge which the archaeologists produce and which is transmitted through one-way communication, for instance guided tours, exhibitions, websites and lectures (Arnberg & Gruber 2014:160–161; Gruber 2017). The lack of evaluations or feedback in most projects makes it unclear whether the knowledge produced is relevant for society and therefore fulfilling the new cultural heritage goals and directives. There are several studies in Sweden which have been looking at the relationships between CA and the public, for instance in the large-scale infrastructure projects of *Motala* (Arnberg & Gruber 2014) and *Slättbygdsprojektet* (Andersson 2005; Gruber 2010) in the county of Östergötland. It has been shown that there are often difficulties, if not outright resistance, to implementing many of the changes in public work that are now being called on by the new legislation and directives. There is foremost a need for acknowledging a more complex view on actors and stakeholders outside the apparatus. For instance, the term 'general public' is problematic in that it conceals variation and makes it more difficult to define target groups that have different needs and interests (Arnberg & Gruber 2014:167–169).

First analysis: Swedish contract archaeology as an apparatus

In order to critically examine the CA system in Sweden and its connection to society, it is necessary to understand the governmental structure and the legislation that protects it, the role of the practice for Swedish heritage and history making, and the relationships of the main parties to each other and to the public. In this analysis I view heritage as an 'assemblage' of mixed social and material collectives (Harrison 2013, after Deleuze & Guattari 2004; DeLanda 2006). To follow the relationship between heritage and governmentality, I apply the term 'apparatus'. Drawing on Michel Foucault, Harrison (2013:34–35) argues that the term can improve our understanding of how methods, devices or infrastructure give authorities the means to control behaviour in specific ways. Using this view on the 'apparatus', we can deconstruct the CA system and assess the relationships between the com-

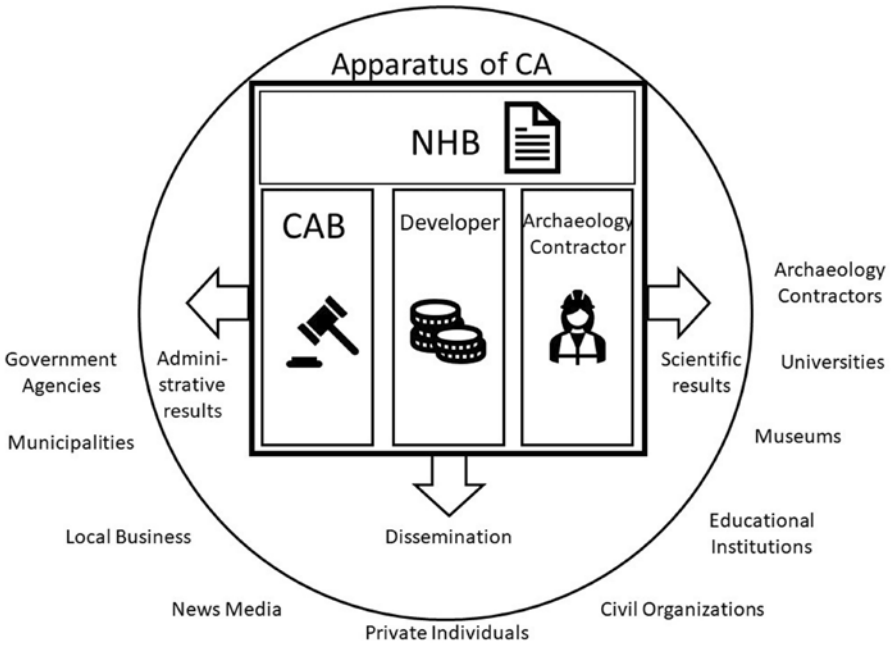

Figure 2. The Apparatus of Swedish contract archaeology and its relationship with society. At the top is The Swedish National Heritage Board (NHB). The NHB regulates the system, but does not usually take an active part in projects. Below are the three main parties in contract archaeology: the County Administrative Board (CAB), the developer and the archaeology contractor. The apparatus produces administrative results (mainly for government agencies); scientific results (ideally for universities, educational institutions, museums and other archaeological contractors); and dissemination to the public and news media. Model by author, after figure in Arnberg and Gruber (2014:168).

prising parts, and how the apparatus relates to the state, heritage-making and society at large. A model of this CA apparatus is presented in Figure 2.

Michel Foucault has demonstrated how in society apparatuses aim to create bodies that assume their identity and their position as subjects in the very process of their desubjectification (Agamben 2009:1–24). This is achieved through a series of set practices, discourses and bodies of knowledge. The apparatus is a device that produces subjectifications, and as such it is also a tool of governance. Societies, through the use of apparatuses, present themselves as inert bodies going through massive processes of desubjectification without acknowledging any real subjectification. Giorgio Agamben (2009) interprets this as something that is done through the *oikonomia*, the set of practices, professions, measures and institutions that aim to manage, govern, control and orient the behaviours, gestures and thoughts of human beings. This *oikonomia* obscures the politics which presupposes

the existence of subjects and set identities, for instance 'the experts' and 'the public', and it also creates government activities that aim only at its own replication (Agamben 2009:8–10, 22–24). This reasoning resonates with the critique of the heritage-making process by Laurajane Smith, who argues that it is dominated by an authorised heritage discourse (AHD), which lists and defines heritage in narrow and specific ways specific to Western European traditions of heritage (Smith 2006; Harrison 2013:117). This leads to power relations where cultural capital is held by authorities and professionals, while the public is generally regarded as the passive receiver of generated and disseminated narratives. According to these views CA could be considered an apparatus of heritage making, where the archaeological narratives become a mechanism in the story-making of the state.

Previous studies have shown that the Swedish CA system and apparatus in many respects is formalized, hierarchal and highly traditional in its role as a state-controlled machine producing a national narrative on Swedish heritage and history. There has also been a lack of coordination and cooperation between the different authorities, actors and stakeholders within and outside the apparatus where the main parties carry a silo mentality. Ingrained methods and routines in the sector are difficult to change, the rigor is often greatest where the institutions are strongest (Pettersson 2003:148; Petersson 2005:81, 95; Svanberg & Wahlgren 2007:25–28; Holtorf 2007:108, 113; Andersson et al. 2010:23–27; Gruber 2010:281). There are clear defects in the CA system and its apparatus that aggravate these problems. Actors have differing goals, interests, working methods and understandings of each other, which means that they can easily end up in conflict. There are boundaries between processes and sectors, legal inequalities and deficient knowledge in how other sectors of society work. This hinders co-working and joint actions on common goals as well as transmittance of ideas and perceptions, something that may cause dissonance and friction between different views and values (Wigert 2018:46–49). The push towards a neoliberal market orientation and competition in Swedish CA has been blamed for leading to low profitability for contract archaeologists, also affecting investments in competence, research and method development. This has in turn led to an increased gap between the various CA actors and scientific institutions, creating a lack of dynamic research atmosphere. The archaeological results also tend to become very fragmented because they are often published only in reports that relate to single separate investigations (Andersson et al. 2010:26). In response to these problems there have, on the one hand, been calls for a more centralized administration of CA (Petersson & Ytterberg 2009), and on the other, a more horizontal system that acknowledges and permits greater freedom for action outside the frameworks and conventions (Aronsson 2004:46–55). In line with Gruber (2010:272–274),

I would argue that there is need for a shift in the current system of values, with better adaptation and negotiation adhering to the pressing issues and needs of society. A horizontal system has greater potential when it comes to such responsiveness.

It is important to note, however, that a sluggish and rigid apparatus can serve as a break for resisting rapid changes based on hasty and unreflexive decision making. The latter could threaten to undo previous investments and risk commitments for the future. Such dangers have especial bearing for local politics where the regulatory instruments are in the hands of fewer elected representatives. For instance, populist politicians can more easily hijack nostalgic heritage narratives to support their anti-immigration agendas (Niklasson & Hølleland 2018:138), and market-orientated political forces can drain the resources for archaeology, preventing the production of meaningful and qualitative knowledge. There are therefore legitimate considerations for a continuation of a strong professionalized control of cultural heritage management and a cautious approach to vigorous reforms (Pettersson 2003:153; Gruber 2009:114; Gonzáles-Rubial et al. 2018; Smits 2022:208).

To sum up the first analysis, my claim is that:

- The apparatus of Swedish CA is an instrument for heritage-making, producing professionalized narratives (authorised heritage discourses) about the past for the story-making of the state. The CA apparatus, funded by development projects through the polluter-pay principle, is a major driving force for producing new knowledge about archaeological sites in Sweden.
- The apparatus is strictly formalized and hierarchical with a silo mentality, and consists of three main parties (the CABs, the developers, and the archaeological contractors), which together make up a power triangle but with diverging goals and interests that can result in tensions. This is supervised and regulated by legislation and the NHB through policies and directives. The knowledge, communication, understanding and collaboration among the three parties has been found wanting, calling for a more horizontal system that also interacts more with the wider public. An established and autonomous apparatus may, however, counteract political fluctuations and detrimental agendas in society.
- The market orientation of Swedish CA has produced a goal-orientated and slimmed-down system where the lack of administrative and operational resources for archaeological projects is evident. This has also meant that CA results have become very fragmented, created a gap with respect to scientific institutions and has impacted investments in competence, research and method development.

- Although connections with society have been growing, mainly through the forms of one-way dissemination, there is still a large discrepancy between the goals and actual practice. Also, there is a growing governmental demand for producing knowledge which is meaningful and relevant for society, a larger inclusion of communities and for defining target groups.

We have now looked at the Swedish CA apparatus and its mechanisms for creating heritage, viewed its position in society and studied the relationships between parties, actors and stakeholders within and outside the system. Also, we have addressed problems and deficiencies noted within the apparatus as well as in compliance with new cultural heritage goals. We will now move on to the second analysis and scrutinize the programmes of the three major parties within the apparatus.

Second analysis: The three main parties in the apparatus of contract archaeology

I have analysed the programmes for one representative each of the three main parties, i.e. the CABs, the developers and the archaeological contractors. This has been done in order to understand their different values, goals and relationships between each other, outside stakeholders and the public. Furthermore, I evaluate how well the programmes comply to cultural heritage goals and directives, as well as meeting the new demands from society. Another aim of the analysis is to find solutions for solving problems with the apparatus, presenting suggestions for a better relationship with the rest of society and wider public participation.

The choice of region and actors for representing the three parties within the CA apparatus was based on a case study for a major CA project in Hjulsta in northern Stockholm, conducted in 2016 (Nelson 2023). These representatives consist of the CAB of Stockholm, the STA and the archaeological contractor *Stiftelsen Kulturmiljövård*. It should here be noted that the analysed programmes are all of different character, have different agendas and were produced with varying purposes and conditions, spanning over almost a full decade between the programmes of the two latter parties. An important instrument for my assessment is the recent NHB survey and analysis of the CA system and development requirements *Uppdragsarkeologi – nuläge och utvecklingsbehov*, produced in 2022 (Riksantikvarieämbetet 2022). In my study I will use the NHB survey for displaying lingering problems in the Swedish CA system and compare this against the formulations in the programmes. Furthermore, I will use previous research

studies, notably the projects *Kalejdoskop* and *FuTark*, to enhance a critical view of the CA system. I will also offer comments based on my own personal experience in the field.

THE CAB

The programme for the CAB of Stockholm was developed in 2012 in response to a growing market orientation of CA in Sweden, setting new demands for increased clarity in administrative practices and in the responsibilities of the main parties. Another important goal was to build knowledge about archaeological heritage and level up competence among both administrators and archaeological contractors (Olausson 2012:9–14). According to the NHB survey, however, there are still concerns regarding deficient competence and engagement among CABs as well as the lack of knowledge for decision making. There are also lingering uncertainties about roles and responsibilities among both developers and archaeological contractors, questions about the desired effort levels in projects and on what grounds the CABs make their assessments and commissioning. It has therefore been suggested that evaluations should take place at several stages of the CA process in order to locate deficiencies and enhance the conditions and quality of projects (Riksantikvarieämbetet 2022:12–13, 24, 38).

Lack of communication, planning and clear directives may lead to conflicts between developers and the authorities. Often the heart of these conflicts relates to disputed excavation costs and unclear responsibilities between the parties. There may also be a lack of respect for authorities' decision making or the legitimacy of the cultural environmental legislation. Often, this is rooted in insufficient awareness about the heritage status of a particular site, the process of the CA system or the work methods of archaeological practice. Furthermore, there can be cause for friction and uncertainty in responsibilities between different authorities, like the CAB and municipalities, as well as diverging interpretations of the cultural heritage legislation and the assessments of archaeological sites and features (Gruber 2009:110–112). In the risk-analysis for the large-scale railway line project *Ostlänken* in eastern Sweden, concerns are voiced that the lack of resources, competence and coordination between the main parties may cause delays and decreased quality in knowledge production, leading to distress and distrust of the CA system nationwide (Gill 2020). There is, according to the NHB survey, still a lack of communication and coherence both within the CAB organizations and towards other actors and stakeholders, especially municipalities, albeit a clearly defined target group. CABs are also considered hesitant in providing consultations or making definitive agreements with developers at early stages of planning. Increased dialogues are spe-

cifically requested by archaeological contractors in tender processes (Riksantikvarieämbetet 2022:12, 16).

In order to create acceptance and reliability on costs, the CAB programme specified the need for developing higher economic efficiency for CA projects. It also acknowledged the importance of the balance between reasonable cost and the value of archaeological heritage, something that requires a good knowledge base and competent administrators (Olausson 2012:9). The NHB survey here pointed out that the ongoing discrepancy between archaeological measures and reasonable cost leads to inconsistencies in the CA system. There is a need for better coordination and sharing of knowledge, views and experiences between all the actors, especially in the initial stages of a project. There is also a call for better economic instruments and greater transparency in the calculations of cost and quality valuations (Riksantikvarieämbetet 2022:38).

The time factor in CA was an essential issue for the CABs in the early 2000s, and the added pressure on the process has made the production of results more efficient and stringent. However, today there are still large problems with administrative delays among many CABs due to understaffing and lack of financial resources (Andersson et al. 2010:12, 21, 25; Olausson 2012:9; Riksantikvarieämbetet 2022:24, 48). Many reports and evaluations have previously pointed out the shortcomings in terms of resources in the CA process (SOU 2005:80). A serious consequence is that the system still suffers from prolonged delays in the decision-making and commissioning of archaeological projects, while there are also fewer adaptations to calendar time (Andersson et al. 2010:21). Lack of time leads to stressful working conditions for case managers, affecting their ability for good decision making and communications with other parties (Riksantikvarieämbetet 2022:12).

The CAB programme addressed the importance of dissemination and collaboration, identifying target groups and the need to work with public aspects of archaeology. However, it acknowledges a lack of experience and routines for decisive implementations of these matters into CA projects (Olausson 2012:87). The programme failed to address the larger issues regarding public representation, participation and narratives, and instead upholds a traditional and authoritative view on heritage-making and use. A cultural heritage project, *Kalejdoskop*, was initiated between 2010 and 2012 with the aim of changing prevailing attitudes among CABs. It promoted a wider inclusion of the public to engage and participate with Swedish heritage-making and use, also focusing on democratization, cocreation and alternative narratives and perspectives (Molin 2012). In the NHB survey it is noticeable that public work still is not a prioritized or coherent issue among the CABs, where clear demands and directives are lacking and, in

some cases, there is opposition to new initiatives (Riksantikvarieämbetet 2022:27).

To summarize, the CAB programme expressed values and goals for:
- Clarity in directives.
- Creating legitimacy for legislation, policies and decision making.
- Economic efficiency.
- Good communication within and outside the apparatus of CA.
- Knowledge building.
- Levelling up competence both within the organization and other parties and stakeholders.

The NHB survey, on the other hand, expressed lingering collaboration concerns regarding:
- Uncertainties of roles and responsibilities between parties.
- Deviating interpretations of legislations and policies.
- Lack of communication.
- Lack of respect or knowledge about decision making among developers.
- Lack of competence, engagement and knowledge base for decision making.
- Lack of time and resources.
- Project delays.

Solutions presented in the survey included:
- More evaluations of projects.
- Increased dialogue between parties and with stakeholders outside the apparatus.
- Better coordination and sharing of knowledge.
- Implementation of economic instruments.
- Transparency.

Regarding public participation, the programme mentioned:
- Dissemination is important.
- Target groups need to be identified.
- There is a lack of experience and routines among the CABs.

The survey pointed out inconsistencies among CABs on setting dissemination requirements in projects. However, both the programme and survey failed to address the new national goals for public participation and engagement in archaeological heritage, although these issues have been highlighted in the cultural heritage project *Kalejdoskop*.

THE DEVELOPERS

The Swedish Transport Administration (STA) is the largest client of CA in Sweden, with a spending of approximately 100–150 million SEK per year, often conducting large-scale development with high environmental impact, such as highway and railway projects. As a department of authority, the STA is responsible for taking heritage and cultural environment into consideration and has been working actively with these issues since 2010. This sets their role apart from that of many private developers and there is pressure to lead by example. In 2018, the STA, as part of ten departments of authority, was given the directive by the Swedish government to produce a new strategy programme for cultural environment (Bergkvist et al. 2019:7–8, 16).

The programme centred on goals for making heritage work efforts and dissemination more effective and sustainable. It called for better communication and collaboration with other authorities and external actors, as well as building competence and knowledge. It was concluded that deficiencies in this heritage work could lead to higher costs, lower output, delays or even conflicts of interest. The programme here pointed to the inconsistencies and irregularities in the administration of different projects. There was a call for the clearer setting of roles and responsibilities between different parties, as well as to safeguard qualitative values through regulatory documents and assuring competence. More initial surveys and inputs in early planning would lead to better flow in preparatory work for projects and avoidance of negative environmental impact (Bergkvist et al. 2019:6). The NHB survey fully agreed on these matters and especially pointed to the importance of consultations and cost estimations between CABs and developers, while also identifying that the knowledge level about the CA process among different developers differs widely. It also stated concerns about mistrust among developers towards the CA system, mainly regarding unreasonable costs and being at a disadvantage in terms of their position with respect to the authorities (Riksantikvarieämbetet 2022:11). To improve the flow of knowledge, the dialogue between various actors needs to be strengthened within the CA system and with society at large. There is today no collected forum or formulated goals between the parties for any long-term generation of knowledge, although there have been suggestions to implement collaborative configurations and scientific venues within the *Ostlänken* project, and there are potentials in utilizing digital platforms (Gunnarsson 2022:50–52, 158–161; Andersson 2023:12). Hybrid forums could provide regional strategies where actors and stakeholders, both within and outside the system, can together formulate goals of achievement (Andersson et al. 2010:26–27).

The programme also viewed the cultural environment as a resource for the development of society and to enable positive outcomes, for instance regarding sustainability, health and economic growth (Bergkvist et al. 2019:11). Heritage-producing processes in CA establish perceptions and values about the past that can lead to positive impacts for society such as place-branding, economic stimulus, ascertaining protection of heritage and to influence local democratization processes (Gruber 2010:280). The government directives for the *Ostlänken* project conducted by the STA emphasize the importance of the dissemination of archaeological results in line with the national heritage goals (Regeringen 2018:20). Synthesis and summaries could here make archaeological reports more meaningful and useful to the people outside the archaeological community. This cannot happen within the present system where the budget is restricted to the investigation of a single site (Andersson et al. 2010:26). However, the NHB survey noted that the STA has advocated compensational measures in affected areas, which could perhaps be a way of financing augmented results. It also commented that some developers viewed the CABs as being too careful in setting higher requirements for dissemination (Riksantikvarieämbetet 2022:27–28).

Heritage preservation and conservation groups have been long-time rivals to development organizations. On the one hand there is an intolerance for change of material remains, on the other hand heritage is considered a burden if interfering with construction plans (Silberman 2013:216–218; Burtenshaw 2014:48–50; Gould 2017:1–2). Complex regional structures with boundaries between different authorities, and also with stakeholders outside the sector, mean missing out on cooperation and coordination in cultural heritage projects (Gruber 2010:281). Increasingly, there have been talks about the importance for the cultural heritage sector to cooperate with other stakeholders in connection with local issues of cultural heritage management, which requires understanding and the synergizing of economic, social and cultural values, capitals and impacts (Burtenshaw 2014:51–55). Opening and inviting stakeholders to take part in the heritage-making process at all stages of projects could increase participation of both planners and citizens, lessening the risk for friction and dissonance (Gruber 2009:127).

To summarize, the STA program expressed values and goals for:

- Sharing responsibility for cultural heritage.
- Cultural environment used as a resource, for instance sustainability and economic growth.
- Efficient work efforts.

- Good communication and dissemination within and outside the apparatus of CA.
- Knowledge building.
- Levelling up competence.
- Avoidance of conflicts and unnecessary costs.

The STA programme addressed collaboration concerns regarding:
- Inconsistencies in administration of projects.
- Unclear settings on roles and responsibilities of the main parties.
- Upholding quality through regulations and competence.

The NHB survey expressed concerns about:
- Mistrust between developers and CABs.
- Unreasonable costs.
- Disadvantaged position of developers with respect to CABs.
- Restricted goals on dissemination by authorities.

Solutions presented in the STA programme included:
- Initial surveys.
- More consultations between parties.
- Better cost estimation.
- Knowledge building.

The STA programme addressed several of the new national goals for public participation in archaeological heritage, mentioning:
- Dialogue and cooperation with more actors and stakeholders inside and outside the CA system.
- Lifting positive impacts on society.
- Creating meaningful narratives for society.
- Implementing compensational measures.
- The wish of setting higher requirements for dissemination in CA projects. This was also noted in the survey.

THE ARCHAEOLOGICAL CONTRACTORS

The scientific programme for the archaeological contractor *Stiftelsen Kulturmiljövård* came out in 2009. It centred on presenting the state of knowledge about archaeological heritage, its role in society, and goals on how to communicate and collaborate better with other parties and the public. Another goal was to engage with and strengthen the value of history and cultural heritage. Furthermore, the programme sought to provide guidance for administrating projects, building new knowledge and

developing competence (Elgh & Lihammer 2009:5–7). However, it did not specify how these goals were going to be implemented into daily work and projects. The NHB survey has shown that there is a need for better communication between archaeological contractors and the authorities, and a desire for clarity and better directions from the CABs, especially regarding request documents and the level of effort in different projects (Riksantikvarieämbetet 2022:22, 33).

Neither the programme nor the NHB survey included cost as a direct concern for archaeological contractors, perhaps as they are on the receiving end in the system, and development expenses are the 'bread and butter' for the sector. It is, however, clear from the survey that many archaeologists feel that more time and finances are needed for projects in order to engage properly with their professional task and to fulfil the requirement of high quality reports (Riksantikvarieämbetet 2022:24, 44). There is economic pressure to continuously take on many projects and uphold a high debit rate, which has resulted in a production-line style of management. It also means that a lot of time is spent on producing tenders, normally 80–200 hours per project (Ottander 2012:37–40, 51). Archaeologists need to balance several different projects at the same time, often in various production stages, something that causes stress and loss of focus. Competence and the quality of work is strongly connected to efficient time-logging, adhering to budgets and multi-tasking. The effect is that little time is 'wasted' on non-debited follow-ups and evaluations of the work process and results. The NHB survey mentioned concerns about lengthy process times for administrating projects, including the prolonged storage of finds in contractor work offices rather than at museums (Riksantikvarieämbetet 2022:16, 48).

Dissemination and public participation were main overarching goals in the contractor programme, promoting a wider interest in Swedish heritage and inclusion of all citizens. The aim was to work actively towards diversity and democracy, acknowledging multidimensionality and defining new target groups. Other goals included addressing current issues in society and creating awareness about normative perceptions and practices as well as history-making and use (Elgh & Lihammer 2009:7–9). In the thematic guidelines there were focuses on identifying and understanding the context for places and their connections to the landscape over time and in the present, widening the antiquarian scope of the cultural heritage environment. There was also an emphasis on challenging established perceptions on people in the past and present and creating greater inclusion, as well as on focusing on everchanging and multivocal views in society (Elgh & Lihammer 2009:12–15). These goals connect well to the new cultural heritage legislation and policies, but no concrete measures are presented in order to implement these goals. The NHB survey failed to address most

of these public issues and new demands from society, instead emphasizing the importance of popular science and social media. It did, however, acknowledge the necessity for new thinking in dissemination, where several archaeological contractors wished for enhanced effort levels and more public participation. Also, it was recognized that target groups, methods and channels for dissemination need to be defined more clearly by the CABs (Riksantikvarieämbetet 2022:28, 51, 57).

The project *FuTark*, led by *Stiftelsen Kulturmiljövård*, was an assessment of the dissemination process in CA, with the focus on addressing deficiencies and inequities regarding functional impairment access and to widen public inclusion. The project concluded that disability issues are almost non-existent in the CA sector, and that there is a lack of clarity regarding responsibilities, which leads to uncertainties and irregularities. There is here a need for an active stance among both authorities and professionals with clearer legislation, directives and routines about accessibility to CA projects in order to implement strategic and long-term planning (Engström 2021). The importance of access for all groups of the public was also noted in the NHB survey (Riksantikvarieämbetet 2022:27). As CA projects deal with compressed time schedules, it is imperative that accessibility planning takes place at an early stage in a project instead of treating it as a problem that requires ad hoc solutions.

To summarize, the archaeological contractor programme expressed values and goals for:

- Defining its role within society.
- Conducting research with good scientific quality.
- Knowledge building.
- Good communication and collaboration within and outside the apparatus of CA.
- Levelling up competence within the organization.
- Engaging with and strengthening history and heritage in society.
- Public participation.

The NHB survey, on the other hand, expressed lingering collaboration concerns regarding:

- Clarity and direction from the authorities.
- Lack of communication.
- Lack of time and resources.
- Lengthy process times.

No real solutions to these problems were presented either in the programme or survey.

Regarding public participation the programme mentioned:
- It is an overarching goal.
- Target groups need to be identified.
- Greater public inclusion in CA.
- Adhering to current issues in society.
- Working towards adversity, diversity, democracy and multidimensionality.
- Awareness of normative perceptions and practices.
- Awareness of history-making and use.
- Lifting place-connected values and contexts.

The NHB survey noted that new thinking was required for dissemination, and that archaeological contractors wished for enhanced effort levels and more public participation. The research project *FuTark* called for clearer planning, legislation and directives in order to make CA accessible for all citizens.

Overall, the programmes emphasized the importance for coherence and clarity in roles and directives, increased communication, competence and knowledge building, as well as acknowledging that dissemination is an important part of CA projects. The NHB survey pointed out that there are, however, still uncertainties among all parties about responsibilities, as well as a lack of knowledge about other parties, something that can lead to friction. The suggested solutions were increased dialogue, coordination and the sharing of knowledge between the parties, and a need for better cost estimations. In both project administration and management there is generally a lack of time and resources, while at the same time developers are concerned about unrealistic costs. Although the NHB survey took on a very traditional view about dissemination, there was a general acknowledgement of higher ambitions in public outreach and participation in CA.

Discussing the Swedish CA system: Heritage-making, entanglement with society and the extent of public participation

In light of the previous two analyses, I now turn to the Swedish CA system and its entanglement with society and a discussion of the arguments for and against changes which would incorporate wider public participation. Following the roles of the three main parties in Swedish CA, I find that the use of the term 'entanglement' is a good way for grasping how heritage-making is created through the relationship between humans and material remains. Inspired by Latour´s Actor Network Theory (2005), which

focuses on bridging the complex networks and relationships between the social world of humans and the material world of things, Ian Hodder (2012) defines entanglement as the 'dialectic of dependence'. Heritage, he argues, is fundamentally entangled – caught between the materiality representing the past in the present and different socio-political positions in society (Hodder 2012:88–90). Entanglement thus creates potentials and investment, but can also lead to entrapment, a situation that corresponds to the 'apparatus' as an impediment to society. Sharing a similar view, Harrison's perspective on heritage-making is that this process has been fettered to an apparatus serving state-controlled cultural management. He means that this process should instead be freed to be an interactive and dialogical practice (Harrison 2013:216–222). However, if we accept the present condition of entanglement, where archaeologists in CA are clearly interdependent on both government agencies and developers, the question is: how may the system most effectively further its objectives? (see also Gould 2017:4). When discussing a dialogical democracy model for heritage procedures, Harrison refers to Michel Callon concerning 'hybrid forums' (Callon et al. 2009). These are open spaces in which experts, non-experts, ordinary citizens and politicians come together and lessen the divide in heritage decision-making and production of knowledge. Criteria for facilitating this type of co-production is made up by the intensity, openness and quality of dialogism. This model may 'provide an important basis for thinking productively and actively about heritage in the future' (Harrison 2013:226).

Harrison's critical take on the heritage-making process looks towards a system, less defined by the CA apparatus, for instance, and which comprises a more horizontal and open network with a wide range of stakeholders interacting with the process rather than a closed, hierarchic and professionalized production line. It is here essential to understand and broaden the perspective on how this network of different social groups and individuals in society may use archaeology in ways which are meaningful for them. As previously noted, this multivocal approach has been advocated in the last decade by researchers both in Sweden and internationally (Arnberg & Gruber 2014:162, 177). While previous research has focused heavily on the conditions or discourse in which archaeological knowledge is generated, there is also a need for more concrete measures to implement a more critical and reflexive view on the structures and institutions within which archaeological heritage is produced (Shlanger & Aitchison 2010:17).

According to the recent NHB survey, the core functions of the Swedish CA system work well, and the main problems identified concern the fragility of the system, caused especially by the CABs having to deal with limited resources and time. All the parties systematically requested better communication and coordination, the need for coherence among authorities

in decision making as well as clear directives, policies and defined responsibilities. They also expressed the goal of enhancing competence, quality and knowledge levels in administration and practice. The importance of project accessibility was also acknowledged, with the incorporation of initial surveys, follow-ups, evaluations and economic disclosures (Riksantikvarieämbetet 2022:33, 54–58). It is crucial for the stability of the sector to also address the concerns and discontent within the system, and the friction between stakeholders, for instance added costs and delays, which otherwise risk creating distrust both between parties and from society. This could be amended through better work efficiency with more sharing of knowledge and experiences between the parties and with the public, especially regarding interpretations in legislation and regulations, and for transparency and clear routines in decision making and cost estimates. The survey, however, failed to suggest concrete measures in order to bridge the discrepancy between the current framework of the CA system and the new national heritage goals emphasizing a wider inclusion of the public. It was on their own accord that the parties expressed constructive positions for strengthening cultural heritage and utilizing it as a resource for a wider society, and to increase dissemination and public participation in CA projects.

In order to comply with the new legislation and cultural heritage policies, the Swedish CA system also needs to upgrade its view on its changing role in society and what this relationship is supposed to encompass. The CA apparatus has rigid and habituated structures that have been shown to be difficult to move, and those conditions and attitudes create thresholds for extending the public engagement (Gruber 2010:281–282). Both the programmes of the main parties and the NHB survey have emphasized dialogue, communication and collaboration, not only between the main three parties within the CA apparatus, but also including more actors and stakeholders in society and a higher level of public participation. This is in line with recent worldwide research on the benefits of collaboration and joint ventures between stakeholders which may have diverging interests, but abilities to find common ground and advantages (Gould 2017:8). To fulfil the new goals, a solution is required for how the system can contribute to broader perspectives in relation to the public and produce results based on critical and multivocal perspectives (Arnberg & Gruber 2014:177). The current efforts in public outreach have been assessed by several researchers as inadequate if CA is to have any real impact on current issues in society (Högberg et al. 2021:17). There is therefore a need for creating clarity about the demands on, and responsibilities for, the main parties, especially concerning adequate funding for ensuring new relevant knowledge of good quality and meaningful public outreach. A shift in attitudes and routines among administrators and archaeological contractors is also needed when

it comes to concrete implementation of the new cultural heritage goals in CA projects. This would give the CA system mandate and resources to involve a wider range of target groups and stakeholders, also ensuring a robust network structure that can take on various challenges in the future (Högberg et al. 2021:18).

While a translation from goals into practices is needed, it could be argued that the Swedish CA system, as a traditional apparatus, has fared reasonably well in the twenty-first century – despite the economic crisis of the first decade and the pandemic at the end of the second. This is especially the case when compared to other parts of Europe, like the Mediterranean countries and Ireland, where the emergence of a large commercially based CA sector was driven by newly established EU-legislation, neoliberal politics and an economy on steroids (see Hamilakis 2015; Novakovic et al. 2016; Parga-Dans 2019). Originating in the US and UK, this fragmented system of commercial CA units, in which increased competition is expected to bring higher quality and cost-efficiency, has gradually spread to CA systems in Northern Europe. In Sweden, the Netherlands and France, state-controlled sectors have shifted towards more market-dependent systems. Compared to the Scandinavian neighbours Norway and Denmark, the Swedish CA system is now more deregulated, regionalized and market-orientated (Petersson & Ytterberg 2009). Since the 2020 Regional Reform, Norway, however, has been moving towards more localized control, based on political aims to reduce bureaucracy and increase democratization of public management by empowering local government (Hølleland & Skrede 2019:128–129). The overall trend towards market-dependent systems has spurred debates concerning the quality of current CA as well as the work environment for professionals. The economic crisis in 2008 demonstrated the weakness of a model based solely on the market, leading to calls for state regulation and more stable, regional or local frameworks of archaeological organisations (Everill 2007:129–135; Demoule 2012:617–619). There is no single answer as to which models create better conditions for public participation, however. While heavily commercially dependent systems like that in the UK can sometimes be more flexible and better at creating 'hybrid forums' for public participation, the extent and sustainability of this participation becomes susceptible to market swings. The relative rigidity of the mixed Swedish CA apparatus – stuck somewhere in between state control and self-regulation – has created thresholds for participation, but it may also have acted as a break for rapid market-motivated changes.

Interesting examples of collaboration between the parties within state-controlled systems can be found in Denmark and Finland. Since 2014 Denmark has implemented a synchronized *National Strategy* for addressing and evaluating archaeological objects in the form of a dynamic web-based infor-

mation hub, also functioning as a forum for experts and developers. This strategy, which was inspired by Swedish scientific programmes, has been deemed successful for optimizing and qualifying the outcome of archaeological fieldwork, supporting new knowledge and clarifying the decision-making criteria to the public (Roland 2018). In Finland there is also a good example of a successful collaboration programme between national heritage authorities and the forest industry for upholding a sustainable cultural environment. This has taken place through the SKAIK project, conducted in 2009–2014, supporting training programmes on both the law and on techniques for identifying and, with the help of GIS-mapping, protecting archaeological sites during logging operations, as well as building important relationships among the parties and facilitating communication to prevent destruction (Laulumaa & Koivisto 2016:61–87).

Conclusion

Through the lens of critical heritage studies, this article has analysed the values, goals, functionality and impacts of political demands on the current CA system in Sweden. Specific focus has been placed on how new directives and policies influence the relationships between the three main parties that constitute the apparatus of Swedish CA, and how this in turn affects the entanglement with the rest of society. When it comes to the functioning of the Swedish CA system, while still fairly hierarchical, it is much more deregulated, regionalized and market-orientated today than 30 years ago. Evaluations of the nature and outcomes of these changes have been few and limited in scope. All too often, changes are made to governmental systems without realizing the final consequences.

Looking at the development in neighbouring countries with similar conditions can offer insights into where the Swedish CA system stands today, and may lead to innovative ideas, while also instructive about mistakes or dead ends. Scandinavian countries seem to wrestle with similar issues of transforming their CA systems for ensuring better and more sustainable administrative flow and collaboration between parties and stakeholders, upholding good scientific quality and preservation of archaeological sites and creating stronger democratic links to the heritage-making process. The Swedish CA system could be seen as representing a middle ground between state control and regional self-regulation, as well as balancing market values with public interests. It is important to point out, however, that addressing heritage systems and advocating change requires that decisions should be reached for what it should achieve in correspondence to what it does (Carman 2018:11–12). Every kind of heritage management system has its ben-

efits and flaws; the main prerequisite for it to be considered as 'working well' is that all parties and stakeholders agree on their roles and responsibilities, and that the results of the system are accepted. This requires that the system is well managed and constantly scrutinized, upgraded and communicated to both stakeholders and society at large, and last but not least, in tune with both policy-making decisions as well as adhering to the needs of society. Otherwise, it risks becoming irrelevant and the new heritage legislation and goals will sound like empty and inconsequential rhetoric.

I have argued that Harrison's critical view on heritage-making has a bearing on changing the role of Swedish CA, in so far as the process needs to be extended beyond the limitations of the apparatus and become more symmetrical in its relationships with the rest of society, taking into account the conditions of local contexts and the interests and needs of communities. There is a necessity for a more dialogical and inclusive nature in communication and collaboration, a hybrid forum, already at an early stage in the planning of projects, something that has been applied at the *Ostlänken* project in Sweden, the SKAIK project in Finland and in the National Strategy of Denmark. These forums should not try to find a total consensus for all parties, but to find common ground in collaborating and discussing diverging positions (Andersson 2023:9, 20; Laulumaa & Koivisto 2016:61–87; Roland 2018). This could diminish the risk for dissonance, conflict, negative impact and added costs while creating conditions for generating more positive outcomes and values. Furthermore, there should be an ambition for co-creating and cultivating archaeological heritage in accordance with local interests, and producing narratives which are meaningful to a wider audience. Closely following the implementation and consequences of the new Norwegian model of regional and local control could offer important insights (Hølleland & Skrede 2019). It also requires initial surveys that define target groups, consultations, evaluations, continuous feedback and contact with people, which includes listening to and understanding a range of perspectives. A more horizontal CA system would also permit greater inclusion of non-authoritarian movements and narratives in society. These adaptations must, however, be implemented through first ensuring a robust and well-functioning cultural heritage collaboration network and management system that is able to coordinate a variety of parties, target groups and stakeholders, while being aware of the unwanted trajectories that heritage work could take in the wrong hands.

There has been some progress in the field concerning the demands of change formulated by new legislation, policies and research, especially in the establishment of public dissemination within the cost frame of CA projects. Nevertheless, there is a need for more direction, coherence and an active stance among government agencies to implement new takes on both

process and practice in order to come to terms with an unbalanced flow and deficient communication within the system, how to achieve long-term sustainability and to address the discrepancies between the cultural heritage goals and reality. Problem areas in the CA apparatus and system could – through focused and active rebuilding of structures, mandates, directives and processes – be reprogrammed to follow in step with the demands and needs of the society that sustains it, instead becoming a potential resource for progressive and sustainable developments in society.

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Settlement, Climate Crisis and Lordship in Early Medieval Scandinavia

Jan-Henrik Fallgren

This article examines and describes the nature of lordship in Scandinavia during the Early Medieval period (*c*.400–1000 CE). It counters the assertions of earlier research, which claim that lordship with estates had already developed at the beginning of the period. Earlier arguments have built on assumptions that the development of estates was propelled by the 'Dust Veil' and the subsequent climate crisis of the mid-sixth century. Scholars have argued that a more hierarchical society followed, reflected through the emergence of more lavish burial customs. Through a broad comparison with other north-western European regions and peoples, this article demonstrates that these burial customs can be understood differently, and further, that a more hierarchal society was not necessarily the outcome of the crises of the sixth century. The resulting analysis of Scandinavian lordship is then anchored in a detailed case study of the well-preserved settlements, houses, farms and field-systems on the Baltic Island of Öland. It concludes that incentives to create estates in Scandinavia were not present before the Christianization process.

Keywords: climate crisis, early medieval Scandinavian hierarchies, lordship, estates

Uppsala universitet / Kalmar läns museum
jan-henrik.fallgren@arkeologi.uu.se

Introduction

In recent years, it has increasingly been argued that a more hierarchical society was introduced in Scandinavia after the Migration Period (400–550 CE). This has also been linked, wholly or partially, to the climate crisis caused by volcanic eruptions or extra-terrestrial bombardment of comets or meteorites in 536–537 CE. The climate crisis and the following population decline are also thought to have contributed to the emergence of a manorial estate system (Gräslund 2008; Gräslund & Price 2012; Löwenborg 2010). However, the idea of prehistoric estates in Scandinavia is not new. It has been suggested by Scandinavian researchers in archaeology and geography using other types of evidence (see for instance Berg 2003; Ericsson 2012; Herschend 2009; Iversen 2009; Myhre 2002; Skre 1998; Tollin 1999).

It is hard to deny that there would have been negative societal effects following the 'dust veil' of 536 CE and the subsequent plague epidemics and harsher climactic conditions. Certainly, various source materials, such as descriptions by ancient writers, pollen analyses, abandoned villages, volcanology and glaciology, show that this was the case (Axboe 2001, 2007; Gräslund 2008; Gräslund & Price 2012; see Gundersen 2022 for a more nuanced picture). What deserves further scrutiny, is the notion that these conditions caused a more hierarchical society, and that they brought about the phenomenon of estates. Indeed, the real question is whether there could have been any estates at all during the pre-Christian period in Scandinavia, that is before the twelfth or thirteenth century.

This article challenges the ideas and theories of earlier research in the following ways: firstly, by discussing whether the seemingly lavish burial customs were an expression of a more hierarchical society, or if these burials could be a sign of something quite different. Did the climate crisis in the sixth century, with its accompanying population decline, lead to good conditions for creating estates? This is accomplished through a comparison with other similar crises in Europe, drawing on richer source material from the Early and High Middle Ages. Secondly, I scrutinize the arguments and source material used by researchers who claim that manorial estate systems already existed in prehistoric times in Scandinavia. This requires a discussion of the manorial-estate system, and how different socio-economic relationships between peasants and their lords worked before great economic changes were introduced in various European regions. Finally, I analyse in detail what type of lordship may have been operating in Scandinavia during the Late Iron Age, i.e. Early Medieval period. At the same time, prevailing early medieval Scandinavian social hierarchies are explored through the evidence of very well-preserved settlements: houses, farms and villages from the period 200–700 CE.

Throughout this article, I compare Scandinavia to other areas in north-western Europe. That is, the regions and peoples which were never incorporated into the Roman Empire, and which therefore were not directly affected by Roman administration, legal systems, infrastructure, agricultural economics (with large farming units), estates run by slaves, tax systems or political systems (i.e. present-day Scandinavia, Northern Germany, Scotland, Ireland and Anglo-Saxon England). These societies had much in common in several important aspects, such as socio-economic conditions, social structure and hierarchies, settlements and cultivation systems, rules of inheritance as well as spatial and political organization (Blair 2018:306; Brink 2008a, 2008b; Callmer 1991; Charles-Edwards 1972; Fallgren 2019:90; Sawyer 1978, 1982; Wickham 1992; Woolf 2000; Wormald 1986).

Comparisons between these and the early medieval Scandinavian societies are therefore highly relevant. The early medieval written sources from these regions are especially valuable for providing a better understanding of how lordship may have functioned in Scandinavia during this time frame, before 'feudal'[1] regimes and the Catholic Church, great landlords, landmarkets and taxation gained a firm grip on the peasantry and farmland in the Nordic region. In what follows, the similarities between social structure and hierarchies, socio-economic practice and rules, as well as inheritance rules, appear to be the most important phenomena behind understanding why the landscapes (settled and cultivated) had so much in common in this vast area of north-western Europe (Fallgren 2019:90, 2020:169–170).

Lavish burial customs

The emergence of a more lavish burial custom and the construction of imposing grave mounds in the seventh century AD, like the mounds in Uppsala in Sweden or Borre in Norway, can be interpreted as signs that some mem-

1 The quotation marks for the concept of *feudal* in this article are used because the concept has been questioned within modern historical research (see for example Bagge et al. 2011). In this article, the concept is used as Chris Wickham defines 'feudal mode' of production, that is as a system where landowners collect a surplus, a rent, from their tenants. That is, a system where landlords dominate peasants and live on the surpluses of dependent tenant cultivators, who did not own the land they were farming (Wickham 2005:304, 261). Wickham uses 'peasant-mode' societies as opposed to 'feudal mode', where peasants are independent producers, when analysing the social patterns and discussing economic structure and 'ranked' societies (Wickham 2005:304–305, 536–540). The social relationships of dependence and obligations that operated within so-called 'ranked' societies were the same as those operating in a so-called 'extensive lordship' society, where the opposite, 'intensive lordship', was the same as 'feudal mode' lordship, see below.

bers of a community were better off at the expense of others. Nevertheless, there is, as will be discussed below, nothing in the remains of settlements or field-systems from these time periods to support the theory of a more hierarchical society or the existence of any early estates involving lordship.

Regarding the phenomenon of extravagant burials, it has been demonstrated that in the early Merovingian regions (Austrasia, the middle Rhine region) this kind of burial may in fact mark an unstable social structure subject to competition. The absence of rich graves in these regions coincides instead with periods when the rich and powerful were less exposed to pressure, as when the dynastic strife ended with Clovis wiping out his rivals in 507 CE (Halsall 1995:251–254, 264–267). Björn Ringstad (1991) and Terje Gansum (1997) have offered similar interpretations of the large Norwegian mounds from the Roman Iron Age and the Migration Period. In addition, Dawn Hadley (2000:60–65) drew a similar conclusion regarding early Anglo-Saxon lavish burials. Similarly, Daniel Löwenborg (2010:13) connected the building of large mounds in central Sweden to the critical events that emerged after the 'dust veil' of 536 CE. Thus, the excessive burial custom which emerged in some regions of present-day Sweden could be interpreted as being related to societal stress, competition over resources, starvation and perhaps migration by desperate people, all caused by the climate crisis at the end of the sixth century CE, rather than as a sign of a more hierarchal society. In periods of a stable social environment, the need for this kind of demonstration of power disappears. This is very clear in the case of Old Uppsala, as John Ljungkvist (2013) has demonstrated. Even though no new monuments were erected here after *c.*700 CE, this important place did not lose its significance for the people in this region of central Sweden. This is confirmed by a number of new investigations, as well as the written sources from the Viking Age and the High Medieval period. The Viking Age rulers in the area no longer needed to project themselves with monumental mounds or elevated house platforms. Instead, they could quietly rest on the reputation and fame of the place, probably because their power was unchallenged (Ljungkvist 2013:57–62).

Climate crisis

When comparing the climate crisis and the consequences of the Justinian Plague with the better documented but equally fateful Black Death in the middle of the fourteenth century CE, it is well known that the latter resulted in a levelling of societies, rather than increased societal hierarchies. Due to the lack of people and workers resulting from the pandemic, the pressure on surviving tenants dropped drastically across Europe. Rents fell by at

least half of what was taken before by the great landlords. While this was a time of structural economic crisis for the great landowners the farms of the surviving tenants became more sustainable (Blair 2005:79; Lindkvist & Sjöberg 2015:162; Lunden 2004:149–151; Taylor 1983:171, 199). Even more relevant to the 'dust veil' event and the bubonic plague (Black Death) are references to climate degradation and pandemics in Irish and Anglo-Saxon written sources from the seventh to the eleventh centuries CE in the period shortly after the 500s. These repeatedly impacted farming societies within Britain and Ireland. The affected communities, as mentioned above, were also similar to early medieval Scandinavian societies in important ways.

From early medieval Irish sources it is known that each time cattle plagues hit the island in the seventh to the eleventh centuries CE, Irish lords lost status and slipped downwards on the social ladder, because livestock was what lords gave to their clients as *fief*, and a man without a certain number of clients could no longer claim noble status (Charles-Edwards 2000:73–74; Kelly 1988:113, 117). Pestilences, which affected the population, could of course produce the same result – a loss of clients. According to the *Annals of the Four Masters* in the year of 1085, some of the nobles were reduced to 'working occupiers of the soil', due to the plague amongst men and cattle (Ó Corráin 2005:577). For low-tech communities, lack of people and abandoned farms and farmland were never good prerequisites for forming larger agrarian enterprises like estates. Major epidemics struck every generation of the Irish population in the second half of the seventh century, throughout the eighth, and into the first quarter of the ninth century CE (Ó Cróinín 2017:125–126). The annals also describe how plague and starvation, due to worsening climactic conditions, were the causes of social unrest, outbreaks of wars, looting of monasteries, displacement and migration of people within and outside the island, as well as cannibalism (Byrne 1971:141; Kelly 2000:194, 354; Ó Corráin 2005:577–580). After the Justinian plague of the 540s, the plague of AD 664 seems to have hit the people of Britain and Ireland particularly hard. The *Annals of Tigernach* (AT) states:

> An eclipse of the sun at ninth hour on 1 May, and during that summer the sky was seen aflame. A great plague reached Ireland on 1 August, at *Mag nItha* in Leinster. There was an earthquake in Britain. The plague first erupted in Ireland in *Mag nItha* among the people in the kingdom of Fothairt. It was 203 years since St Patrick and 112 years since the first plague.

This and the first mentioned plague in 664 CE, and the other plagues during the seventh and eighth centuries CE, naturally generated chaos, starvation, unrest, plundering, migration and war among the Anglo-Saxons, Irish and Britons (Maddicot 1997; Ó Cróinin 2017). Harsh weather conditions causing starvation are recorded in the Irish and Anglo-Saxon sources fif-

teen times or more between 670–1048 CE (Culleton 1999; Maddicot 1997; Ò Corrain 2005:575–577). Cattle disease is also recorded several times, causing starvation and unrest (Kelly 2000:194). Of course, after the 'dust veil' event, several of these catastrophic plagues may have affected the communities in Scandinavia in similarly destructive ways.

Concerning estates

Several factors have contributed to the theory of prehistoric estates in Scandinavia, which this article challenges. Firstly, the theory of the existence of Iron Age to early medieval estates in this region was not based on observations of settlement or field-systems but instead on much later written sources from the seventeenth century CE. These sources state the relative size of the different settlements. This early modern data, combined with the existence of certain types of place-names, as well as the existence of visible prehistoric graves in modern times, forms the basis for the idea of prehistoric estates in Norway, which are assumed to have started already in the third and fourth centuries CE (Iversen 2008, 2009; Skre 1998, 1999). This theory is not based on any observation of prehistoric houses, farms or farmlands in the landscape. It has therefore been assumed that the large land holdings appearing in early modern sources also existed earlier in prehistoric periods (compare the criticism in Dørum 1999; Sandnes 2000). If true, these early estates would have been the oldest in Western Europe. Turning to Sweden, geographers were among the first to advocate the existence of large land holdings and the formation of estates before the High Middle Ages. Quite a few archaeologists have since adopted this idea, although the 'manorialization' in Sweden was thought to have started mainly in the Viking Age. Once again, this idea is not based on observations of prehistoric or Viking Age settlements, but on hypothetical constructions where conditions (such as property boundaries and ownership) from the High Medieval, Late Medieval and Early Modern periods were used and projected back to the Viking Age (Berg 2003; Ericsson 2012; Tollin 1999). These theories have recently been the subject of internal criticism (Widgren 2014:61–62).

Secondly, the arguments that are often presented in favour of this view, seem to be built on a misunderstanding of the contemporary early medieval conditions on the Continent or in Britain and Ireland, since they refer to social and economic conditions of the High or Late Medieval periods. This method of reasoning is anachronistic (compare Brink 2012:245–248, 2021a:439–442, 2021b:279–282). Furthermore, some of these scholars criticize what they thought to be a common view in today's historical scholarship, that societies with a core of free farmers must also have been

fundamentally egalitarian (e.g. Iversen 2009; Skre 1998). However, peasant societies were not egalitarian (see Hadley 2000:50–60; Lunden 2001; Mann 1986:24; Sandnes 2000; Wickham 1992:237). Throughout early medieval Europe, there was a hierarchy among free peasants. In addition, free peasants could and regularly did have slaves, but this exploitation was kept within the household and generally integrated into the social networks of family units (Wickham 1992:244; Kelly 2000:438–440; Charles Edwards 2000:68–80; Iversen 2011; Poulsen 2012:456; for a thorough discussion of the importance of slaves and their number in Scandinavian Viking Age agrarian society, see Brink 2021b:299–310).

In Denmark, it is primarily Lars Jørgensen (2001, 2003, 2010) who has discussed the introduction of the estate system in the Danish islands. Unlike previously mentioned examples, he has used extensive excavated settlement remains from the Iron Age and Viking Age to discuss the emergence of estates (Jørgensen 2001, 2003, 2010; Nørgård Jørgensen et al. 2011). He formulated an interesting model of how large 'farms' or 'magnates places' (Gudme and Tissø) – might have held key positions for early medieval societies in the economic development from a tribute system to a new estate system. However, he is a little ambivalent on the question of what to call these places: residences, estates or manors. For the residence or manor of Gudme, which is located within a large-sized village and larger agricultural area, Jørgensen (2010:275) suggests that it was a residence for a magnate whose wealth was based on levying tribute. At the 'manor' at Tissø, on the contrary, there is no evidence for agricultural production or buildings associated with residences that would indicate permanent habitation. Rather than a permanent aristocratic residence, it could have been a complex belonging to the royal system of a peripatetic monarchy (Jørgensen 2003, 2010). Thus, Gudme could have been a village where a king had his residence. A related paper (Nørgård Jørgensen et al. 2011) discusses the large number of pit houses at the site, comparing Tissø and late medieval, early modern, north Scandinavian church towns and Thingvellir on Iceland. Based on the results, they suggest that Tissø functioned as an assembly site for a large number of people, perhaps more than 200 farms (Nørgård Jørgensen et al. 2011:102–104). Thus, it cannot have been an estate, residence or manor, but was more like an Irish 'Royal Place' and 'Óenach' (assembly place), or an Anglo-Saxon 'great hall' and royal 'tuna' – a place where food-rent collections, redistribution of tributes and large-scale feasting took place (Etchingham 2011; Faith 1997; Gleeson 2015, 2018). This, I would argue, is also valid for Lejre and other Scandinavian so-called 'central places', discussed below.

Frands Herschend (2009, 2022:218–228), who has analysed an enormous amount of material relating to Early Iron Age houses, farms and villages in Scandinavia, is another advocate for the existence of early estates and

large landowners. He does not provide a detailed examination of how these worked, but takes for granted their existence. Based on the presence of a few regularly laid-out villages, he argues that this pattern must have originated and been planned by a large landowner living outside the village. In other cases, where larger farms are located within the villages, he sees them as the dominant farms, and the people of other farms as subordinate tenants. Herschend's third example (2009:260–270, 291) is found in the Beowulf poem, in a passage where the hero Beowulf was given seven thousand hides (*bold*) of land by Hygelac, son of Hrethel. However, I am not convinced. Regularly planned settlements can occasionally be identified in some northern Swedish provinces where only free peasants were present during the Middle Ages and later (Sporrong 1994). Nevertheless, these were common where large landowners existed during the High Middle Ages and after (Fallgren 2006:171–177; Göransson 1985; Hastrup 1964; Poulsen 2012). In the cases of larger farms within villages, such as Herschend's examples from Öland, there is no reason to regard all the smaller farms in the same villages as subordinate tenants' farms. Instead, free peasants or clients probably inhabited the majority of these. This can be shown, among other things, by the presence of exclusive objects in excavated smaller farms on the island. In the case of Beowulf's gift of land, this poem goes on to mention that those people living on that land held customary rights to it while the realm exclusively belonged to the king. This shows that the anonymous author of the poem was conversant with the distinction between customary ownership of land and sovereignty of a territory (Hybel 2011:225). This means that the poem's author regarded the inhabitants of these farms as free landowners. That is important and in line with what we know about what is commonly referred to as 'extensive lordship' by British historians, which was based on tributes paid to kings, who just ruled over people, not the land they farmed, from territories inhabited by free farmers. Therefore, if there were any background reality in the gift Beowulf received from the king, it would have applied to hospitality from a large number of farms, not the ownership of them.[2]

Perhaps the most important thing to point out in this context is how neither pre-feudal nobility nor kings built their wealth or social position through major land ownership or estates. Instead, they gained their social positions and economic resources through food-rent and hospitality from free clients, landowners and these clients' obligations to participate in war and plundering (Bazelmans 1999:149–172; Blair 2005:252–254; Brink 2021a:92–93, 2021b:302–309; Charles-Edwards 2000:71–80;

2 Seven thousand hides is the size of a small early Anglo-Saxon kingdom, like for instance Essex or Sussex, and not an estate (see the 'Tribal Hidage'). I thank Alex Woolf for bringing this to my attention.

Faith 1997:1–14; Fraser 2009:349–355; Reynolds 1994:475–482; Verhulst 2002:31; Wickham 1992:232–236; Wolf 2007:120–121). Another important point, which deserves emphasis, is that all pre-'feudal' kings in north-western Europe regarded their position as legitimized through their link with the free peoples of their kingdoms. One result of this is that the early medieval law codes often pay a good deal of attention to the village-level peasant society, and the peasants who appear in these early laws are almost exclusively free landowning farmers (Goetz 1995:457–459; Wickham 1995:529–531, 2009:213). Furthermore, similar principles of inheritance were recorded in many early medieval laws, and the connection of these rules to the emergence and layout of contemporary villages is something that precludes 'feudal' conditions.

Another major contributing factor to why this anachronistic perception gained a foothold among Scandinavian scholars is the adoption of, and continued reference to, the normative 'multiple estate model'. This was typically believed to consist of a main farm surrounded by a large number of smaller units that specialized in certain crops or other agricultural products, such as honey, pigs, hops and so forth (Jones 1979). First presented by the geographer Glanville Jones (1979), the model applied late medieval Welsh agrarian economic conditions to early medieval England. The model was criticized as faulty by historians when it was first presented, both due to its anachronistic nature and the author's lack of knowledge about social and economic conditions during the early Anglo-Saxon period (Basset 1989:20; Blair 1989a–b, 2005:154; Faith 1997:8–14; Gregson 1985). However, it remained popular for decades, particularly within place-name research but also among archaeologists. The kinds of economic and social conditions described by Glanville Jones in his model existed in some part of Wales during the thirteenth century CE, but not during the Early Medieval period or earlier (Davies 1982:138; Faith 2008). There is no evidence that this kind of estate ever existed within the Anglo-Saxon kingdoms (Faith 2008). Today, the model is more or less rejected by scholars in the United Kingdom (Wickham 2005:320; Williamson 2013:25–30), but there are still those who believe that the model has some relevance for early medieval conditions (see Barnwell & Roberts 2012).

I therefore suggest that the basis for the theory of prehistoric estates in Scandinavia stands on unsound ground. Although it is a hypothesis which is widely embraced in medieval studies (within several sub-disciplines), I believe it is important to recognize the lack of evidence. In fact, to date there is nothing in the archaeological record in Scandinavia that supports the idea of prehistoric estates with farm-buildings or field-systems. Neither is there any evidence of large agricultural units run by slaves, 'demesne-centered estates', or any 'bipartite estates' (demesne farms with dependent serf vil-

lages around) (Brink 2012:260; Fallgren 2006:100–115, 2014, 2015; Hybel 1995, 2011; Jørgensen 2003:204; Poulsen 2011; Poulsen & Sindbaek 2011; see Verhulst 2002:33–60 for the definition of different types of estates and their content and function during Late Antiquity and the Middle Ages). Conversely, several studies have argued that during the Early Medieval period, across Europe, landed property was normally thought of as being held by free farmers who had acquired it by inheritance (Reynolds 1994:75–84, 122–128, 207–209, 398–403; Wickham 2005:552–556).

However, before leaving the question of Scandinavian prehistoric manors I should address a related idea, namely that the Scandinavian Iron Age 'central places', like Lejre, Tissø, Uppåkra and Old Uppsala, would have constituted very large royal estates (Andrén 2020:71–74; Callmer 2001). Even though several impressive buildings and various types of monuments have been found at these locations, they are not typical agricultural buildings, like large stables, barns, cowsheds or storehouses, as we saw earlier in the case of Tissø. Instead, they are symbolic and ritual monuments as well as buildings that project power – such as halls for ostentatious display, which often include the production of high-quality objects (Christensen 2008; 2015:263–270; Gelting 2011:163; Jørgensen 2010; Larsson & Lenntorp 2004; Ljungkvist 2013; Ljungkvist & Frölund 2015; Nørgård Jørgensen et al. 2011; Sundqvist 2013, 2018; Wikborg 2018). When it comes to food at these locations, excavations reveal traces of large-scale consumption rather than large-scale storage (Christensen 2015:161–179; Helgesson 2002; Larsson et al. 2018, 2020; Magnell et al. 2013; Zachrisson 2011). All this reveals that these 'central places' should probably be compared to the same type of phenomena as Anglo-Saxon 'Great Hall Complexes' or early medieval Irish 'Royal Places' (Bhreathnach et al. 2011; Blair 2018:103–138; Frodsham & O'Brien 2009; McBride 2018; Newman 2007, 2011; Schot 2011; Waddell 2014; Fallgren in press). These were neither residences nor estates. These were 'kings-seats' and served as places for the theatrical display of rituals of kingship, palaces where kings were inaugurated and practised kingship, where they fulfilled their role on behalf of their people and where negotiations with other kings took place. They were also the ceremonial location for a people and kingdom, the place where crowds of people gathered on special occasions such as religious rituals, assemblies, sport events and markets (Bhreathnach et al. 2011:146; Blair 2018:103–138; Brink 2005:74; Charles-Edwards 2000:473; Woolf 2007:27). Worth noting in this context is how even smaller Anglo-Saxon royal economic centres, such as the 'vills' and 'tunas' which the kings travelled around, remained places for commensal feasting at the 'feorm', rather than estates for agrarian enterprises (Faith 1997:38; Lambert & Leggert 2022). In the same way Welsh kings moved from 'llys' to 'llys' consuming, with his household, the food-rents supplied

by both nobles and free farmers, whereas a king of an Irish 'túath' received hospitality directly in the homes of his nobles (Charles-Edwards 1993).

There is therefore nothing to suggest that the agrarian economy in Scandinavia during the Early Medieval period could be characterized as a 'feudal' economy or that some kind of 'manorialization' started before the High Middle Ages. Instead, I would argue that the agrarian economy was of a similar type to that in north-western Europe during the Early Medieval period. That is, one of agriculture carried out mainly by free farmers, a farming based on animal husbandry together with small-scale cultivation of mainly barley, which was grown in only a few, and very small, fields (Fallgren 2019, 2020b:169, 173). This was characteristic of all north-western early medieval *kin-based*, *tribal* societies, and variously identified stateless *petty kingdoms*, *ranked* societies or *traditional societies,* before what has been labelled the 'cerialization' and 'manoralization' of Europe occurred, when the 'feudal' estate system was born in the late Early or High Medieval period. In most regions, it was associated with the increasing acquisition of land by the church, urbanization, the commercialization of agrarian production and the growth of a land-market (Banham & Faith 2014:298; Blair 2013, 2018:311–350; Faith 1997:245–265; Fouracre 2013:137–138; Pelteret 1995:24–37; Reynolds 1994:84–113, 425–447; Verhulst 2002:33–49, 87–113; Wickham 2009:469–471, 529–543; Woolf 2007).

These transformations began in the western parts of Europe, when Merovingian kings and aristocrats took over large Roman estates run by slaves during the seventh and the eighth centuries CE during the expansion into Roman Gaul, which over the next two centuries were transformed into 'bipartite estates'. This type of estate then spread to all the parts that were forcibly incorporated into the Frankish kingdom, where conquered settlement districts and villages were donated to monasteries, bishops and nobles (Nitz 1988:249–260; Verhulst 2002:33–49, 87–113; Wickham 2000:280–302). In the Anglo-Saxon kingdoms it started on a smaller scale with the establishment of monasteries, 'minsters', in the late seventh century, but was not fully integrated until the tenth or eleventh century (Blair 2005; Blair et al. 2020; Faith 2020:53, 210–214; Wickham 2009:529–564). These transformations accelerated decisively when the reformed Catholic Church, from the tenth century onwards, got a firmer grip on the political and ideological situation in Europe and incorporated several larger kingdoms and regions into their economic and administrative system (Bartlett 1994:133–167). In terms of agricultural production, it was a change that went from a surplus production oriented towards consumption at festivals and feasts, to a production focused on the accumulation of goods to be sold at a market. However, these momentous changes did not arrive to Scandinavia until the twelfth and thirteenth centuries CE, when the ecclesiastical insti-

tutions were established here (Bartlett 1994:133–167; Fallgren 2006:171–177; Hybel 2011; Hermanson 2011; Lindkvist 1998; Lindkvist & Sjöberg 2015:101–110; Poulsen 2011; Poulsen & Sindbaek 2011; Rösener 1994:37–45, 196–200; Verhulst 2002:33–41, 132–135).

Lordship before manorialism

In early medieval stateless kingdoms and societies, before the establishment of estates, there were several different kinds of socio-economic systems. These were built on hierarchical and reciprocal dependencies of client relationships, mainly between kings, lords and free farmers. Kingdoms were without taxes and had no institutional administration. Royal government worked by giving direction to civil society, rather than through state servants (see further Charles-Edwards 2000:80–83; Hadley 2000:63; Hermanson 2011; Wickham 2009:150–170). Status and power were maintained via generosity, reciprocity, gift giving, hospitality and provision of benefits, rather than via coercion or land ownership (Bazelmans 1999; Blair 2018; Brink 2021a; Faith 1997, 2020; Hayden 2014; Hermanson 2011; Lambert & Leggett 2022; Mainland & Batey 2018; Verhulst 2002; Wickham 1992, 2005:303–379; Woolf 2007; Zori et al. 2013).

Peasants in this environment did not pay tax to a state or rent to a landlord. Usually, they owed tribute or hospitality to some superior, but this was a lesser burden because they could expect to share it with their lord or king at feasts or get some of it redistributed as gifts (Lambert & Leggett 2022:25–32; Wickham 1992:245). These economic and social dependencies are usually called 'extensive lordship' by historians, as a contrast to 'intensive lordship', or 'feudal-mode lordship', which over time, and due to changing land-ownership and socio-economic conditions, replaced the former and older systems in most regions of Europe. The essence of 'extensive lordship' was that it was based on obligations from people living in well-defined territories. Not because the elite owned the land or their farms, but because they ruled over people (Barrow 1973:25; Blair 2005:254–255; Charles-Edwards 2000:71; Faith 1997:2–10, 2008, 2012, 2020; Thacker 2005:477; Wickham 1992:232–236; Woolf 2007:120–125).

As mentioned above, an Irish petty king received hospitality directly in the homes of his nobles, whereas kings in Wales moved from court to court consuming the food-rents supplied by both free farmer and nobles. It has long been recognized that Anglo-Saxon kings travelled around different economic centres consuming, with their household, the annual renders of food ('feorm') from the free peasantry. However, new research of the phenomena and concept of 'feorm', and recent detailed analyses of food listed

in *Ine 70.1*, in The Law of King Ine (*c.*690 CE) and other early Anglo-Saxon charters, has instead shown how 'feorm' was a large feast, where suppliers participated and consumed the food in company with the king, rather than the storage of goods or food-rent that were collected by royal officials or consumed solely by the king and his men (Lambert & Leggett 2022). Free peasants do not appear to have been obliged to provide early kings with food. Instead, they were expected to host kings at lavish communal banquets with several hundreds of people eating enormous amounts of food. The food available at these feasts was primarily meat, in contrast to what both kings and peasants ate during the rest of the year. These lavish feasts were infrequent occurrences and there is no reason to believe kings spent the year moving from one feast to another, eating vast quantities of mutton and beef. Rather, they probably spent most of their days eating a cereal-based diet, like the peasantry, sourced primarily from their own landholdings. Furthermore, it is unlikely that kings attended these feasts because they had a pressing economic need for large quantities of food. Rather, these feasts were important for political and symbolic reasons, affording opportunities for the king's legitimacy and authority to be celebrated publicly (Lambert & Leggett 2022:5–12, 27). Thus, the hospitality that the peasants gave to kings, and the fact that they shared these meals with the kings, was a sign of their freedom and honourable status. From this it also follows that a king who accepted a feast from a peasant community was not only recognizing their status, but implicitly accepting that he had a duty to be loyal to them and to defend their interests (Charles-Edwards 1989:30–33; Faith 2020:50–53, Lambert & Leggett 2022:27, 31). Eleventh- and twelfth-century kings in Norway feasted with provincial farmers in roughly the same way (Hermanson 2011:65; Orning 2008; Pálsson 2016).

There is no doubt that meat was the most valued feasting food in the Viking world (Mainland & Batey 2018:786–798; Zori et al. 2013:153–154). The large tribal municipal religious and sacrificial festivals at Old Uppsala, Lejre and Lade are well known from various late Viking Age and Old Norse sources (see Christensen 2008; Schjødt 2020; Sundqvist 20021). From these sources it is clear that all the people in these regional kingdoms (peasantry, lords and lesser kings) were obliged to participate and bring gifts, food and tributes to these major festivals. Divinations and extensive animal sacrifices were made by the rulers in order to obtain divine guidance. Large communal sacrificial meals involving much drinking were part of this. Thus, as with the 'feorm' mentioned above but on a larger scale, there was a reciprocal relationship between the kings and the farmers. The ruler used the cult feast as repayment for tribute, while the farmers relied on the cult of the king as a means of protection and entertainment (Sundqvist 2002:186–188; Schjødt 2020:802–822).

The Icelandic chieftains' power and status rested on their ability to recruit followers or clients among farmers. This was achieved through conspicuous consumption and gift giving, where the feasting at the chiefs' halls was a key element (Hermanson 2011:64–65; Sigurdsson 1999; Wickham 1992:238–340; Zori et al. 2013). Thanks to Ireland's extensive legal material surviving from around 700 CE there is unusually detailed information about lord and client relations from Ireland. These touch on everything from reciprocal relations and obligations between free peasants of different status and their lords, the relations between lords and kings and between kings of different status (see further Charles-Edwards 2000:68–80; Kelly 1988:29–33, 2000:445–448). As we saw in Iceland, an Irish lord's status was dependent on the number of clients he had, but the Irish clients provided their lords with food-rent, hospitality in their homes and some service. In return, clients gained a number of benefits. They received livestock or cattle as 'fief' from their lords and they attended when the lord was entertaining his lord or king. With good husbandry, the clients could also increase their wealth in different ways through the client relationship. It is clear from legal texts that lord and client could be kinsmen with one law stating how it is preferable to enter into a contract with a kinsman (Kelly 1988:28–34). In Ireland meat consumption was relatively heavy in the winter, especially in the 'guesting season', between 1 January until the beginning of Lent. During this period, the lord was entitled to bring a large company to be entertained in the house of his client. During other periods, the peasant's meat consumption was reduced to smaller amounts, while the lord, having enjoyed the meat of his client's houses during the guesting season, could now enjoy his own as well as the meat element in the client's winter and summer renders (Charles-Edwards 2000:73). In addition to these food and feasting obligations, military services to lords and kings were perhaps the most important obligations of the peasantry in Europe during this period. At the same time, this was the most important sign of their free status (Reynolds 1994:48–74).

As indicated earlier, kings and lords also had obligations and gave something to their clients. This could be a gift, or something that was lent for a longer period. This is usually called 'fief' in the literature, a word related to the Frankish term **fehu ôd*, in which **fehu* means cattle and *ôd* means goods, implying a 'moveable object of value' (Ausenda 2003; Banham & Faith 2014:86–87; Bloch 1966:106, 165–66; Zori et al. 2013). The aristocracy usually gave 'fief' in the form of livestock or implements to their clients. From the high kings to the lesser kings and down through the upper layer of the aristocracy, prestigious objects, such as gold rings, precious weapons, drinking horns, horses, hunting dogs, board games, falcons, hawks and even ships, could be distributed as 'fief' (Byrne 1971:43–46, 153; Kelly

1988:29–35; Charles-Edwards 2013:118–125; Van Dam 2005:212; Yorke 2013:80). Later, in the High Middle Ages, the concept of 'fief' came to mean 'land granted by a lord or king' (for example Reynolds 1994:48–74).

Lords or aristocrats in 'intensive lordship' societies never gave gifts to their dependent peasants or received hospitality from them. For them, the gift-exchange in land or movables was restricted to the military entourage and to his aristocratic equals (Charles-Edwards 2000:68–80; Wickham 1992:241). This is an important difference from earlier, which also explains why high and late medieval settlements are usually so poor compared with earlier settlements, and why we hardly ever find any valuable objects in commoners' houses from these time periods. The lavish burial custom mentioned previously, for example the many large mounds in the surrounding countryside of Old Uppsala containing weapons, board games and other exclusive objects (see Hennius et al. 2018; Ljungkvist 2006:162; Ljungkvist & Hennius 2016), as well as the discovery of valuable objects on farms in the surrounding area of Uppåkra (Aspeborg 2019; Helgesson & Aspeborg 2017), should be seen as evidence of client-ship relations between kings in different positions and between kings and different layers of the contemporary nobility, where valuable objects, deposited in the graves or used in the houses, constituted the symbolic and concrete evidence of these social relations, the 'fief'.

Early medieval Scandinavian hierarchies

I will now use the visible remains of houses and farms from the Baltic Island of Öland to exemplify how early medieval hierarchies in Scandinavia were expressed and manifested in everyday life (Figure 1). The main reason for choosing settlements from this particular region of Scandinavia is that Öland has an unusually large number of visible early medieval houses, perhaps the most in Europe. This Baltic Island therefore provides exceptionally good conditions for detecting and determining different types of house and farm sizes within larger settlements, hamlets and villages. Consequently, the early medieval hierarchy asserts itself in a very natural and exceptionally distinct way through these observable and often well-preserved farms. These houses were primarily erected and used during the Late Roman Iron Age and the Migration Period, but at least some of them were still in use during the early and middle parts of the Vendel Period. There are 1325 known early medieval houses on Öland. On the neighbouring island of Gotland there are 1408 visible houses, but Gotland is more than twice the size of Öland (Gotland is 3183.7 km², whereas Öland is only 1347 km²). Thus, Öland appears to have been the more densely populated

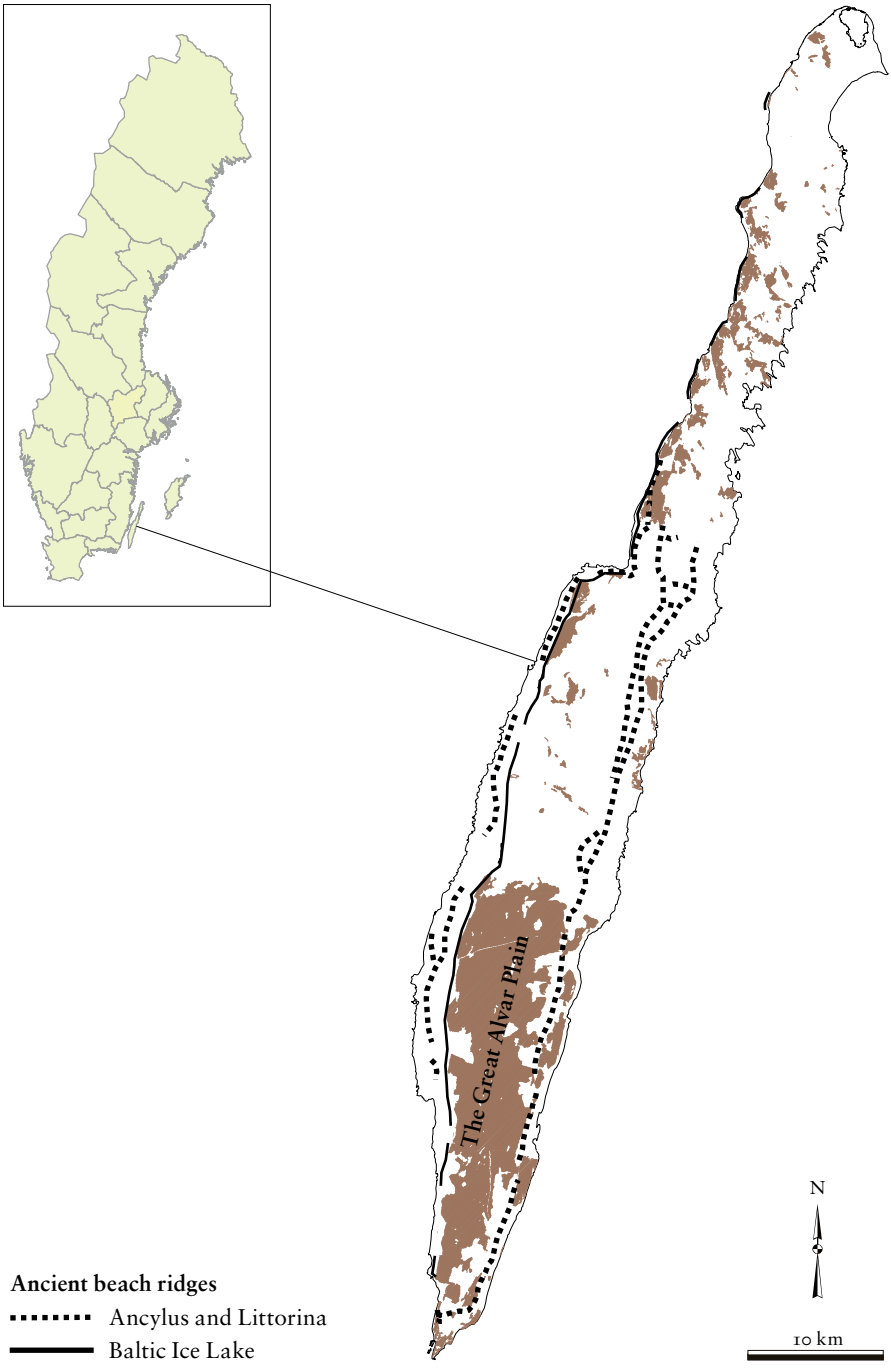


Figure 1. Map of Öland, and its location in Sweden. Drawing: Ylva Bäckström.

of the two islands during these periods. This can also be confirmed by the oldest data on the number of farms from the sixteenth century, when there were 1500 farms on Öland and 1508 on Gotland. The number of farms during the Migration Period, when population was at its peak and before the 'dust veil' decline, is estimated at between 1000–2000 for Öland (Fallgren 2006:146, 2008b:124) and 2000 for Gotland (Svedjemo 2014:108).

There are at least three important reasons for the very large number of well-preserved early medieval house remains on Öland. In contrast to the Swedish mainland, the three-aisled houses constructed during these time-periods were built with stone walls, about 1.5–1.6 m high and about 1.5 m broad. This, of course, has made them more discoverable than other contemporary houses on the mainland, and more likely to survive destruction. This is also true of the large number on Gotland. Secondly, the island was at an early stage densely populated and fully colonized. Everywhere on the island where it was possible to carry on farming and set up a farm, there are traces (or you can find traces on older cadastral maps) of early medieval houses and fences. Even on the large Great Alvar plain, which is unfertile but suitable for grazing, there are many houses, albeit smaller in size than those lying in the hamlets or villages. These should probably be seen as the visible remains of contemporary shielings belonging to the different villages on each side of the large barren limestone plain. Thirdly, between 1569 CE and 1801 CE, the whole island was used as a royal hunting ground. This placed many restrictions on how the farmers could use the land, especially the commons, but also other kinds of farmland, all of which served to preserve the early medieval buildings and its farmland (Fallgren 2020a).

Because of this, one can discover many variations within the houses on the island, regarding the placing and numbers of doorways, visible interior stone walls and variants of different house types built together (Figure 2). With knowledge of the function of different house-types and how these are grouped within the villages, it is actually possible to identify four different farm sizes on the island (Fallgren 1998). The smallest farms consisted of just one building, divided into a living area and a byre. The next farm size, and one step up in the hierarchy, were farms with two buildings. They usually contained one living-house and one house where the sheep were kept. These farms appear to have been the most numerous on the island (Figure 3).

Sometimes the living houses in those farms had a stable within, but this applied only to the largest of the farms in this category. They were very few and existed only in the smallest villages, established at the end of Migration Period (Fallgren 2006:140). The number of small farms, with one or two buildings, is just over 1000 of those that remain today. On the next step in the hierarchical ladder are the farms containing three buildings. These farms usually contained a larger house for habitation that included a byre

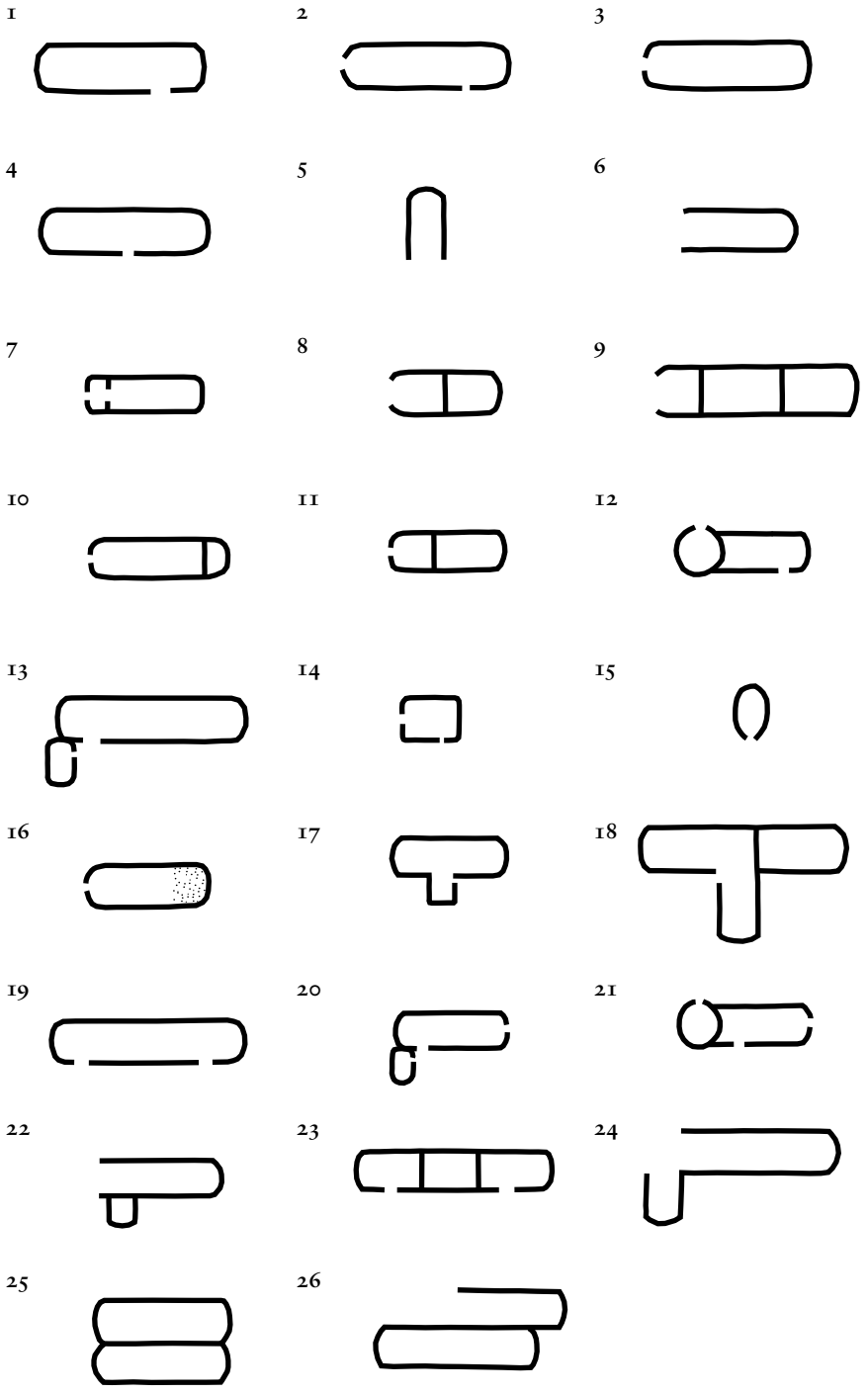


Figure 2. Identified types of early medieval houses on Öland. Drawing: Ylva Bäckström.

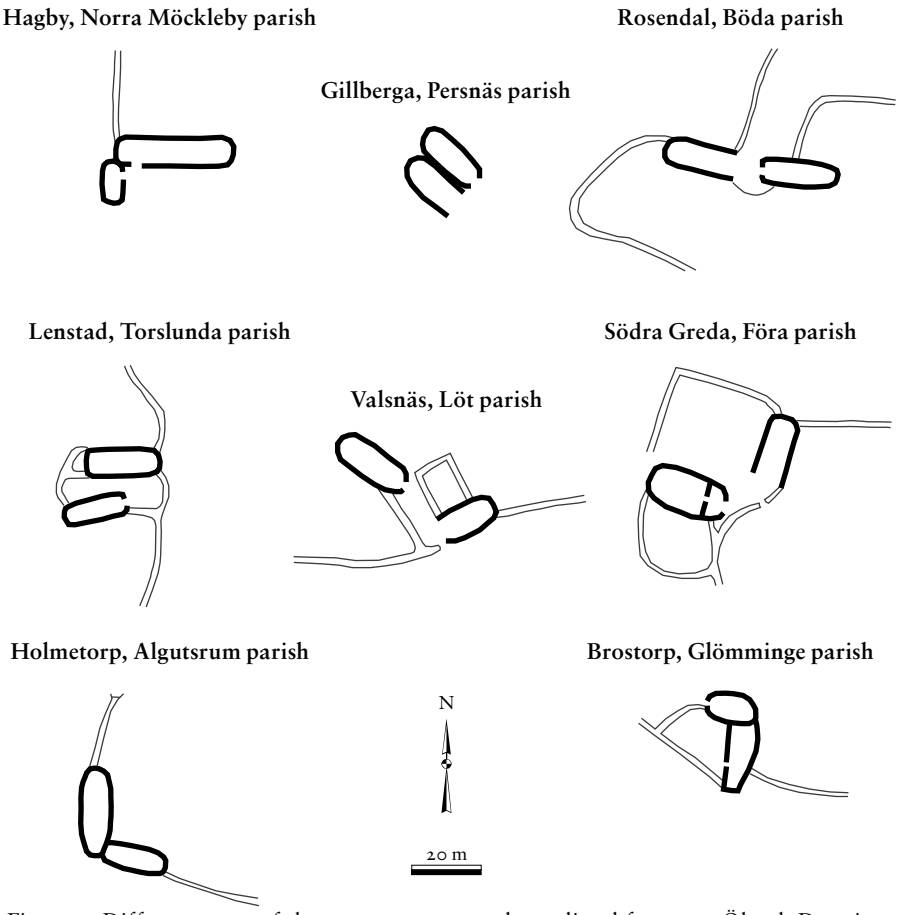


Figure 3. Different types of the most common early medieval farms on Öland. Drawing: Ylva Bäckström.

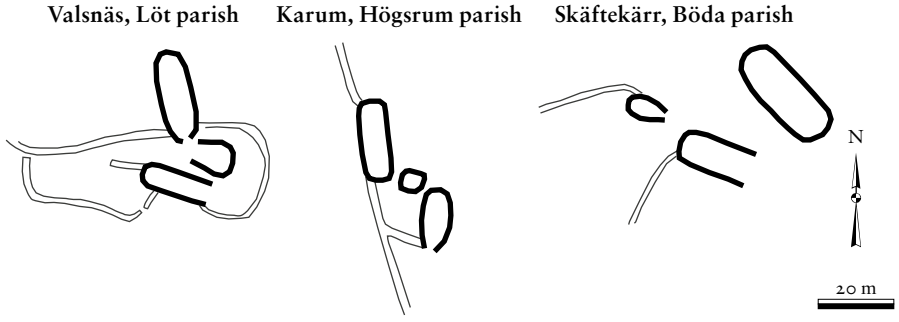


Figure 4. Examples of the slightly larger three-house farms on Öland. Drawing: Ylva Bäckström.

together with a larger sheep-house and a smaller outbuilding (Figure 4). About 100 of these remain visible on the island. At the top of the hierarchy were those who lived on the largest farms. These farms were very large and consisted of four or five buildings. More than one of the houses in these farms could be larger than 30 m and the largest could be 55 m in length (Figure 5). They also contained houses of different types – habitable houses, with or without byres, sheep-houses, smaller outbuildings, and the most important: a special high-status house in the form of a separate hall. Only four of these very large farms have been archaeologically investigated, namely Övertorp, Rönnerum, Skäftekärr and Skogsby. These different houses on the largest farms, as presented in Figure 5, were very large buildings, with lengths ranging from 99 m (Övertorp) to 152 m (Skogsby). Of these gigantic farms, 20 are still visible in the landscape and are fairly well distributed over the island (Fallgren 1998, 2006:143–146, 2019:100). The smallest farms ranged between 110–168 m^2 in floor space. The two-house farms ranged from 150–250 m^2. The three-house farms ranged between 240–300 m^2, and the twenty largest farms ranged from 558–834 m^2.

Out of the farms shown in Figure 5, Rönnerum, Skogsby and Fagerum represent the three largest prehistoric farms found in Scandinavia so far. Even the biggest Scandinavian Viking Age farms are smaller than these farms. For instance, the very large house (85m) in Borg on Lofoten had a total floor area of 660 m^2 (Öye 2002:278). Therefore, there is nothing in the archaeological material from Scandinavia that shows or indicates that the communities here would have become more hierarchical after about 550 CE. I have previously suggested that the only Scandinavian prehistoric farm larger than the large Migration- and Vendel Period farms described above is the very large farm investigated at Tissø in Zealand (Fallgren 2008a), but as we have seen, the Tissø complex was not a residence or farm, or any other type of agrarian enterprise.

Thus, these different farm sizes reveal, in an unusually clear way, the contemporary social hierarchy on Öland, from small and common farms with one or two houses, to the rarer but somewhat larger farms with three houses and, at the top of the societal pyramid, the few but exceptionally large farms with four or five houses. One can also see that the sizes of the enclosed fields and meadow land correlate with the sizes of the farm-buildings (Fallgren 1998, 2006:143–46). A very similar farm hierarchy can be detected on the neighbouring island of Gotland (Svedjemo 2014:9), and in Norway (Løken 2006:312), of approximately the same sizes seen in southern present-day Sweden (Carlie & Artursson 2005; Helgesson & Aspeborg 2017), as well as in Denmark (Ethelberg 2003; Herschend 2009; Hvass 1988; Jørgensen 2010; Kaldal Mikkelsen 1999). In this context, it is also very interesting to note that several of the early medieval Germanic and Celtic laws, from the

sixth century to the ninth century CE, describe a largely similar hierarchical grading of the free land-owning population, into three or four groups. This was true for the continental Saxons, the Alemanni and the Bavarians (Reuter 1991:66; Rivers 1977). Likewise, the early Irish laws from the seventh and eighth centuries CE (Kelly 1988, 2000:445) describe an identical hierarchy to the one in Öland. Archaeologically, this stands out very clearly in the Irish early medieval settlements (O'Sullivan et al. 2014). Several of the early Anglo-Saxon laws describe a very similar division of the free population, expressed in different proportions of 'wergild' (Blair 2018:302–305; Hadley 2000:66–67; Hough 2014; Thacker 2005:489–492).

In all likelihood, the inhabitants of the smaller and common farms on Öland were free self-sufficient farmers, like, for instance, contemporary Anglo-Saxon 'ceorls' or 'ócaire' and 'bóaire' in Ireland. All had their own animal herds and separately fenced fields and meadowlands, which shows they were self-sufficient units. There could therefore not be any question of subordinate units being forced to produce only one type of agricultural product to satisfy a lord's needs. Most importantly, in terms of the free status of these inhabitants, archaeologists have found not just ordinary artefacts on these smaller farms, but also smaller numbers of more valuable objects, like a few Roman gold or silver coins, weapons and small numbers of imported jewellery, glass beakers and beads, for example from Brostorp (see Stenberger 1933:122–124), Sörby Tall (see Beskow-Sjöberg 1977:22–24) and Rosendal (Fallgren 1993a). These artefacts belong to the type of exclusive objects that were earlier mentioned in connection with gifts that lords and kings distributed to bind free clients, i.e. 'fife'. All this excludes the possibility that they would correspond to something like high medieval dependent tenant-farms (compare Fallgren 2019:10). Likewise, the occurrences of several grave-fields around the villages, containing only ordinary smaller farms, means that these farms were inhabited by free inhabitants who, through inheritance, were able to pass on the properties to their children (Fallgren 2006:118, 136–141). The inhabitants of the slightly larger farms of three houses may have belonged to a lower stratum of aristocracy, like Anglo-Saxon 'hlafordas', 'eorls' or 'thegns', and 'flaiths' on Ireland. The twenty largest farms on Öland undoubtedly belonged to the people of the top tier of aristocracy. We do not know what the owners of these farms were called or what they called themselves, but kings ('konungar'), petty-kings and possibly high kings, seem to be the most likely designation. As mentioned above, the largest category of farms is really vast compared with other Scandinavian contemporary farms, and the three presented at the bottom in Figure 5 are the largest of all early medieval farms found in the whole region. When compared with known Anglo-Saxon royal residences or farms which were in one way or another associated with royalty

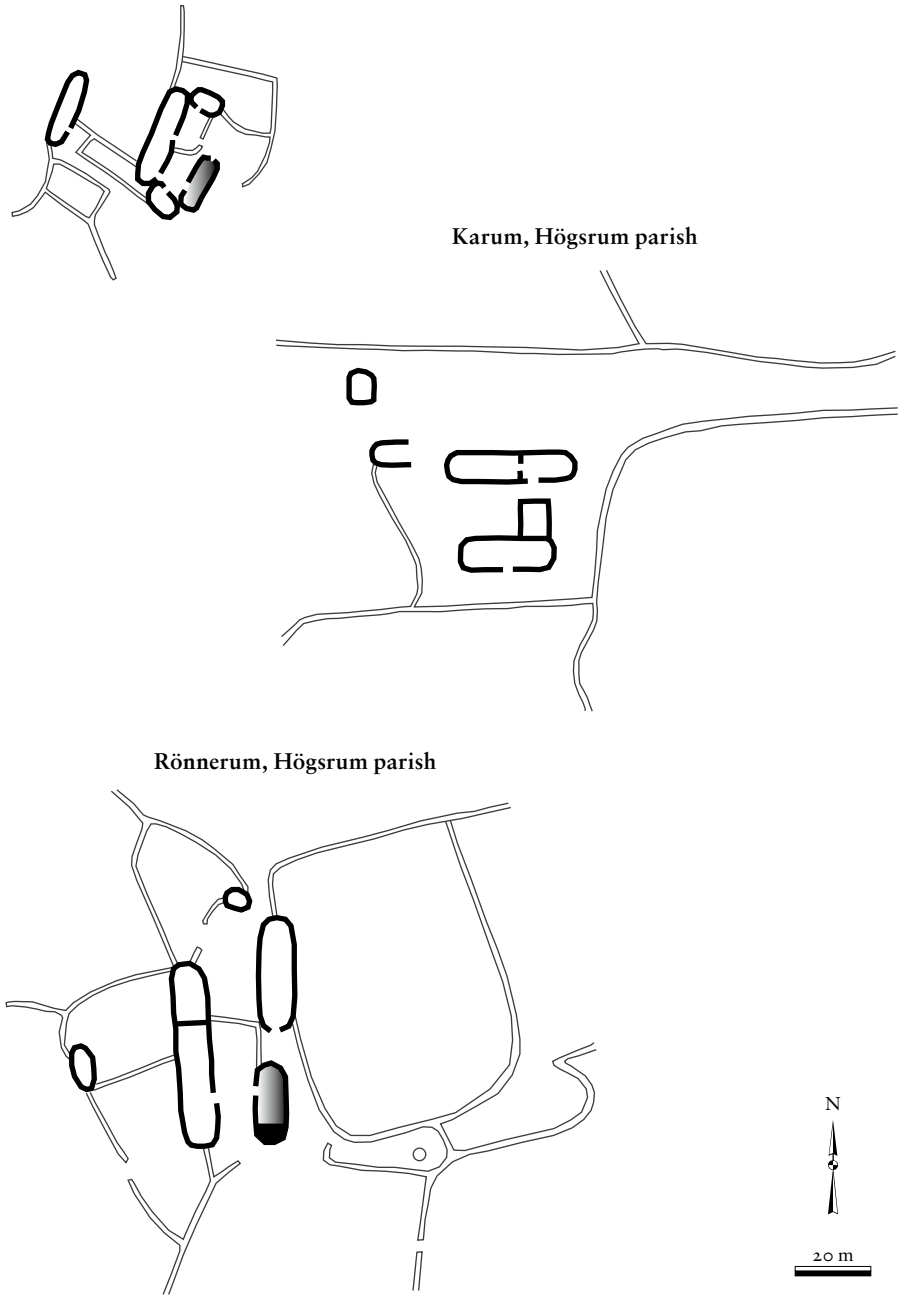
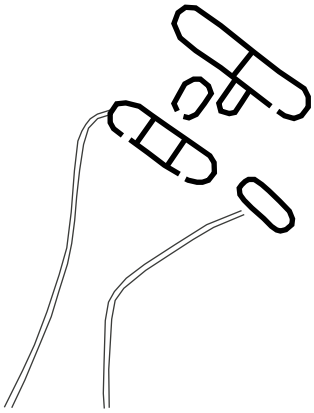
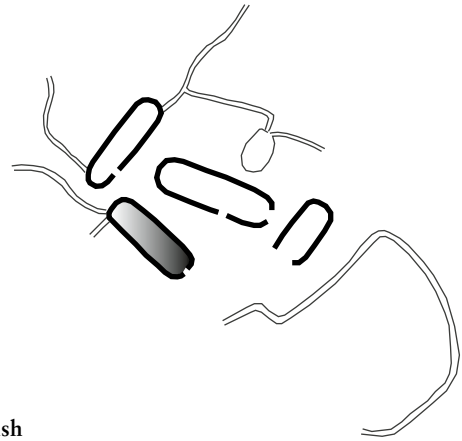


Figure 5. Seven of the largest aristocratic farms (farms with four or five houses). The four halls identified at Övertorp, Skäftekärr, Rönnerum and Skogsby are shaded. Drawing: Ylva Bäckström.

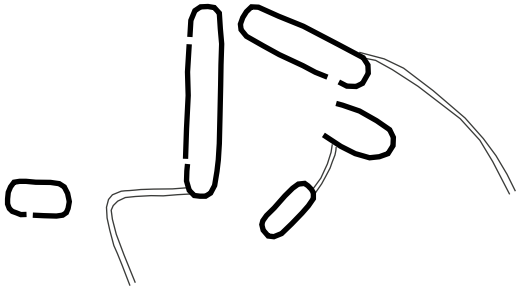
Abbantorp, Högsrum parish



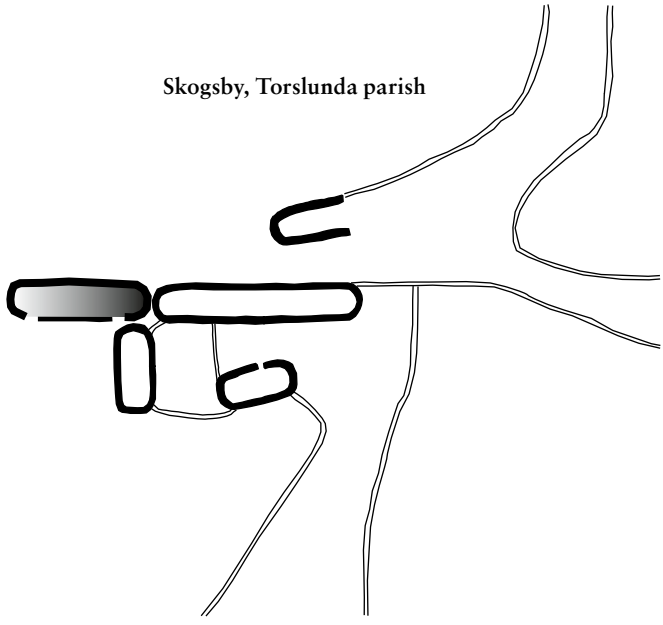
Skäftekärr, Böda parish



Fagerum, Böda parish



Skogsby, Torslunda parish



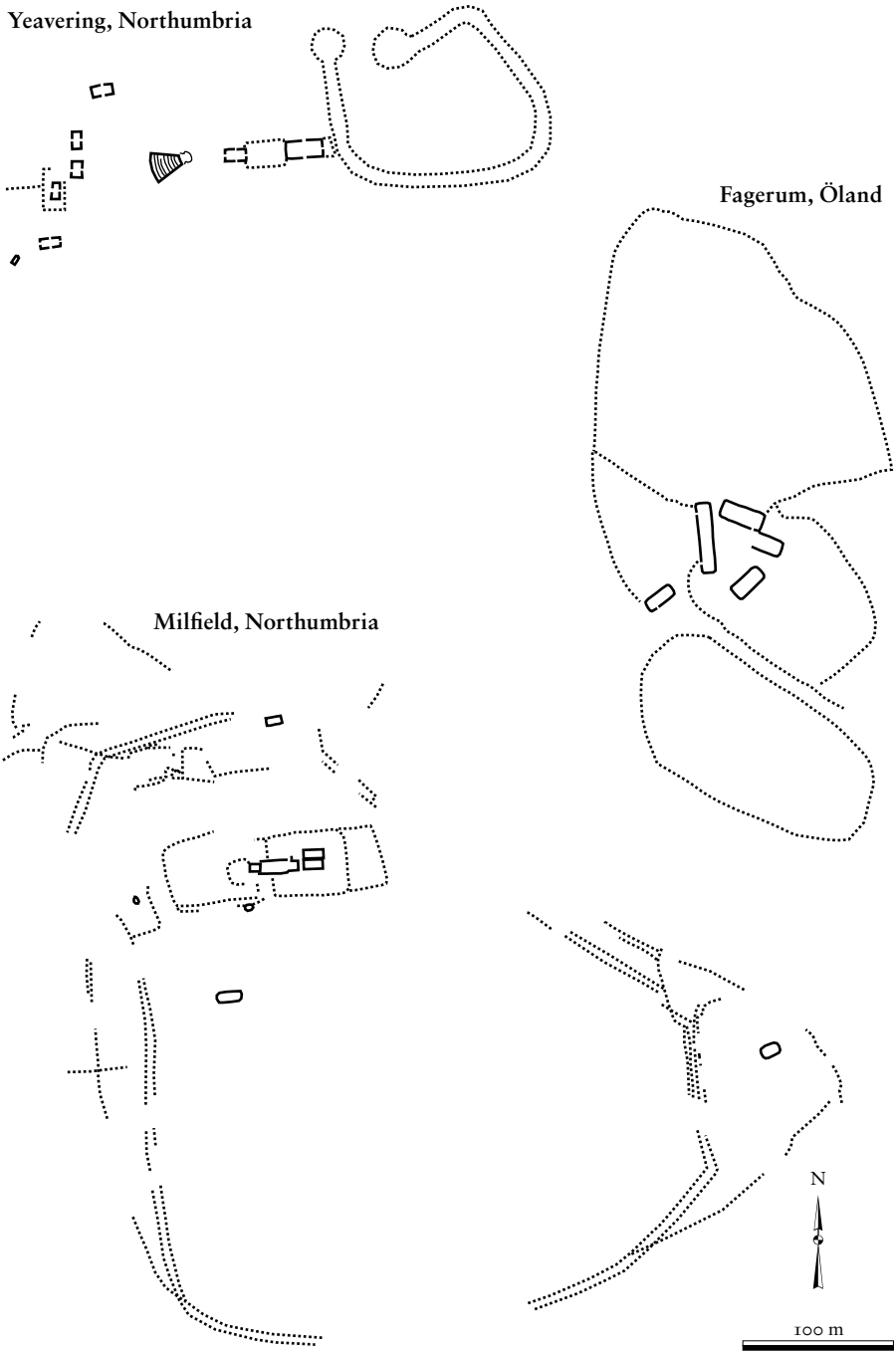


Figure 6. The second largest of the Oelandic farms, Fagerum, with its enclosures together with the two largest of the Anglo-Saxon Great Hall complexes, Yeavering and Milfield, both in Northumbria, pictured at the same scale for comparison. Drawing: Ylva Bäckström.

(see examples in Blair 2018:117–122; McBride 2018:4–36) or known Irish royal residences (O'Sullivan et al. 2014:47–138) they are huge. Based on this comparison, it seems reasonable to characterize these farms on Öland as royal residences. Even in comparison to the so-called 'great hall complexes' they are large (Fallgren 2019:102 fig. 2), which also includes the true Scandinavian 'central places'. Nevertheless, as we have seen above, these cannot be interpreted either as residences or as some kind of large agricultural units/enterprises (Figure 6).

Kinship and villages

When it comes to the settlement structure, it should be mentioned that all of the farms in Öland were included in larger units, villages or hamlets. A village, or hamlet is best described as a group of farms with a common name, whose properties and fences border each other. The fields and meadows of the farms have either been mixed together within one or several common enclosures or have been individually and separately fenced. One or more shared resource, such as a pasture, existed outside the enclosed lands (Erixon 1960:195; Fallgren 1993b, 2006:87–115; c.f. Blair 2018:139–156, 294–308; Wickham 2005:516–518). The neighbourhood itself, the common name and the common resources outside the fenced lands, form the hallmark of what characterizes a village. However, before the 'manorialization' of Western Europe and the introduction of intensive lordship, there was another essential and typical component to every village, namely kinship.

Before 'feudalization', partible heritage dominated as the inheritance principle among the people in north-western Europe. This is reflected in all the early medieval Germanic and Celtic laws, as well as in high medieval Nordic laws (Charles-Edwards 1972:29–33, 1993; Enequist 1935; Holst 2004:193–198, 2014:187; Murray 1983; Reynolds 1994:57–74; Sawyer & Sawyer 1993:180–187; Scull 1993:72; Williamson 2013:24). The wording regarding the 'origin of neighbours' in the introduction to the eighth century CE Irish law *Bretha Comaithchesa* (Judgements of neighbourhood) is very enlightening. It starts with a question: 'From where does neighbourhood emerge?' and the answer is immediately given: 'From plurality of heirs' (Charles-Edwards 2000:100). The earliest Anglo-Saxon laws, as well as laws from twelfth-century Wales, also show the connection between the emergence and growth of villages through partible inheritance, where the eldest son takes over the paternal farm, while the younger brothers built new farms close by (Charles-Edwards 1972:29–33, 1993, 2000:87). This is also apparent in the Lombardic law, *Edictum Rothari*, from 643 CE (Reynolds 1994:183).

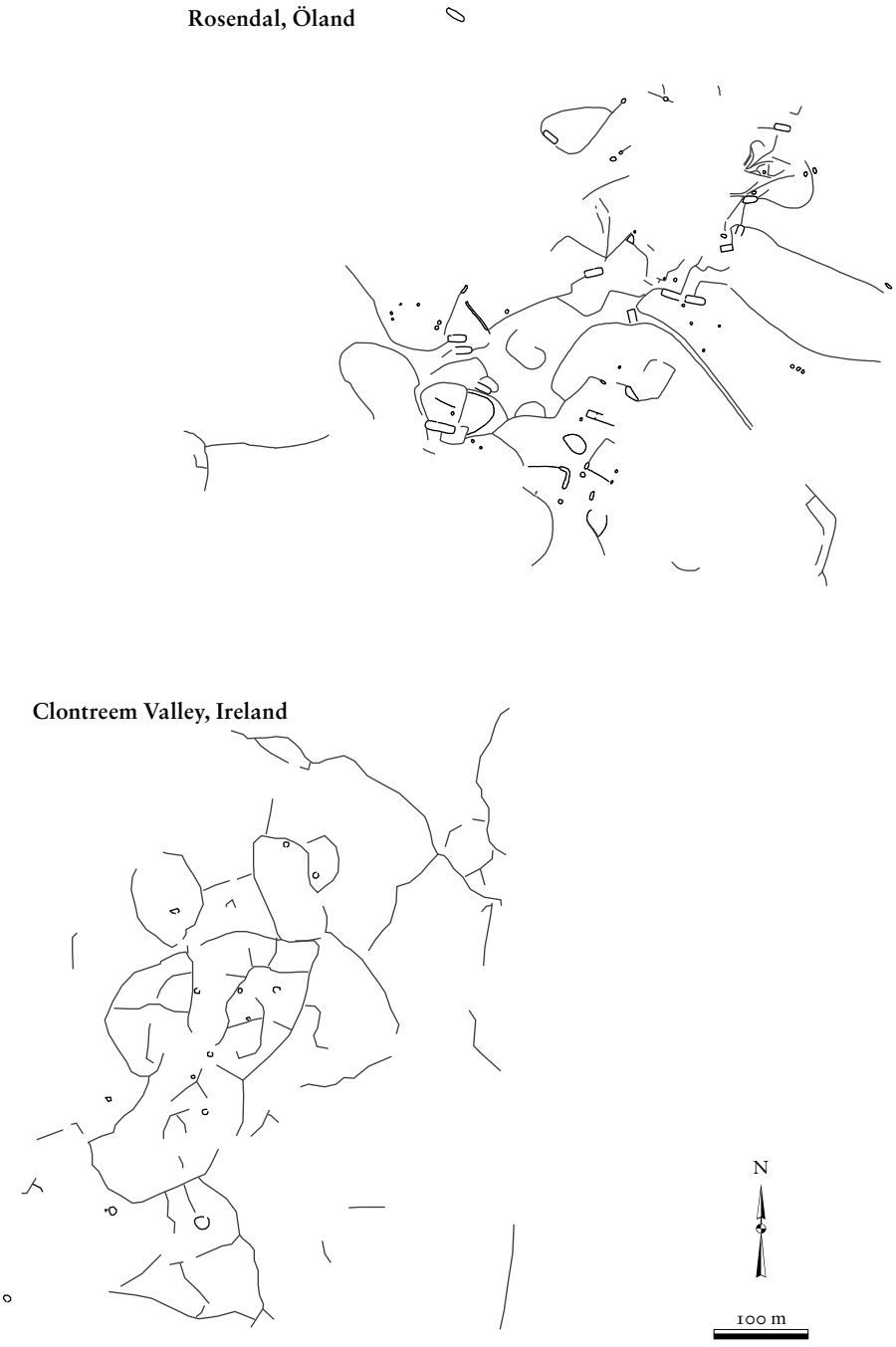


Figure 7. Examples of 'pre-feudal'/peasant mode villages with scattered farms: Rosendal, Öland; Drumturn Burn, Scotland; Butterwick, England; Clontreem Valley, Ireland; Pitcarmic south, Scotland. Drawing: Ylva Bäckström.


Drumturn Burn, Scotland
Pitcarmic south, Scotland
Butterwick, England

Thus, as long as there was space in the landscape, these early medieval peasant-mode, kin-based villages and hamlets could grow into larger units. It was kinship and partible inheritance that created them, and kinship was the glue that held them together. This was a major contrast to the more uniform villages shaped according to 'feudal' economic and ownership principles, and inhabited by tenants (Fallgren 2019:94–97, 2020b:173). In addition, these pre-manor hamlets and villages usually had a quite different layout to that of high- and late medieval villages (Figure 7). Mostly they had a more dispersed layout, where the farms in the same village were set apart from one another, but connected to one another and the commons outside the fenced lands through cattle paths (Blair 2018:139–163, 288–305; Dodgshon 2015:177–180; Fallgren 1993b, 2006:83–84, 95–99, 2008:73; Parker Pearson 2012:38–40; Wickham 2005:470). Further, common fields did not exist within these villages during those time periods. This is also evident from early medieval Germanic and Celtic laws. Instead, each farm had its own separately fenced field and meadowland, directly connected to the farmyard of each farm, which is why a distance of between 50–200 m was often created between farms in the same village. It is well known that in parts of Scandinavia where intensive lordship was never introduced, from the post-Medieval period up to early modern times, and where free farmers still dominated that they were groups of related people (Enequist 1935; Sporrong & Wennersten 1995). These villages had more in common with early medieval or pre-feudal villages in terms of the overall layout than the high- and late medieval villages with geometrically-shaped layout and common and subdivided fields (Fallgren 2006:87–96, 2008:72–73, 2019:95). This has also been observed in those parts of medieval England where seigniorial control was weak or absent (Dyer 1991).

Conclusion

This article has demonstrated that, contrary to the claims of earlier research, there is little evidence to suggest that the climate crisis of the sixth century, with subsequent population decline and famine, contributed to a more hierarchical society in Scandinavia. Instead, there is strong evidence for the opposite, as seen in climate crises and plague epidemics of the later Medieval period. Thus, the climate crisis was not a likely incentive behind the creation of large agricultural units or estates, which in turn gave rise to lavish burials. By contrast, the construction of wealthy burials during the same period should instead be seen as an expression of crises and conflicts between groups of people, where certain families, by such sumptuous manifestations and rituals, tried to maintain or establish power over oth-

ers. Added to this, there is nothing in the archaeological record to indicate that the elite during the Vendel Period and the Viking Age resided in larger farms or houses, compared to their Migration Period precursors.

Furthermore, there is no source material to support the idea that estates and 'feudal mode' production were established in Scandinavia before the introduction of ecclesiastical institutions in the twelfth century. The estate system in most European regions was introduced via monasteries and the Catholic Church, through which they integrated these new regions into an international economic system. There can therefore hardly have been any incentives to create similar estates in Scandinavia before Christianization. The Catholic Church also campaigned for a new approach to land ownership and a land market. Before that, all landowners in the form of kings, lords and peasants lived on farms, which they inherited and passed on by inheritance to their children. Significantly, these societies were by no means egalitarian. There was a clear hierarchy among and between peasants, aristocrats and kings. One of the largest differences between these earlier societies and those transformed based on 'intensive lordship' with manorial estate-systems was that neither kings nor the nobility or chiefs built their wealth or prestige through major land ownership.

Taken together, the results from this study offer new openings and possibilities for research on lordship in Scandinavia during the Early Medieval period (*c*.400–1000 CE). While the current study offers an overview of Scandinavian lordship, it illuminates the situation on Öland specifically. Further studies of other Scandinavian regions, beginning with the arguments presented here, may provide deeper and more nuanced insights into how lordship developed and evolved in Scandinavia during the centuries following the 'dust veil' and other crises.

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REVIEWS & NOTICES

Malou Blank

Mobility, Subsistence and Mortuary Practices: An Interdisciplinary Study of Neolithic and Early Bronze Age Megalithic Populations of Southwestern Sweden

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Review by Jan Apel

The title of Malou Blank's doctoral thesis neatly reflects its content. It is an interdisciplinary study that produces results from a battery of scientific research methods and statistical techniques, whereby new light is shed on the Neolithic megalithic grave tradition of Falbygden in Västergötland, southwestern Sweden. The research area is located between Sweden's two largest lakes, Vänern and Vättern, an area with a chalk-rich, Cambro-Silurian bedrock that tend to preserve archaeological bone materials. The main objective of the thesis is to gain new knowledge of the Neolithic and Early Bronze Age societies, that built and used the numerous megalithic graves that are found in this part of Sweden. Several hundred samples of

Stockholm University
jan.apel@ark.su.se

human remains, from 46 megalithic sites, make up the backbone of the data that are analysed in the thesis. Archaeological observations and artefacts are also included in the analysis.

The thesis consists of six papers that have been published in international peer-reviewed journals. Blank is the first author of five of these, and the single author of one. The introductory chapter presents research questions, methods, and conclusions, all of which are anchored in the general cultural history of period, stretching from the Early Neolithic to the Early Bronze Age (*c.*3500–1100 BCE). In two appendices isotopic and bio-archaeological data are presented, and detailed site and artefact descriptions are given. The author has had access to large data-sets, due to her involvement in two large research projects; the *Neolithic Lifeways* (Gothenburg University) and the *ATLAS*-project (Stockholm University and Uppsala University). It is impossible to give an account of all the results that have been presented in the thesis, but in the following I will highlight some points that I found particularly intriguing.

Analyses of over 200 radiocarbon dates of human remains from megaliths confirm two phases, when megalithic graves were erected and used in Falbygden in Västergötland. Dolmens and passage graves are dated to an early phase, between *c.*3500–2600 BCE. The gallery graves are dated to a later phase, extending between 2200–1100 BCE (Blank et al. 2020:12–16). The ^{14}C-dates are analysed with several methods, including Kernel Density Estimation (KDE) plots and models, and ordinary Summed Probability Density (SPD) models. It is concluded that the smoothing of the curve that KDE offers, that removes artificial spikes, comes at the cost of accuracy. High quality ^{14}C-dates, especially dates that coincide with a steep calibration curve, will lose resolution, an important fact that it is pleasing to see mentioned in the second paper. It is, thus, important to choose method according to the research questions, and Blank comes to the conclusion that SPD models, complemented with KDE plots, work best in this case, because the main purpose is to investigate the most likely use-time, without shortening the possible use-time by conducting for instance Bayesian modelling (Blank et al. 2020:2).

While the dissertation presents novel and interesting results regarding the chronology, subsistence and mobility of the populations buried in the Middle Neolithic dolmens and passage graves, the most interesting parts, in my opinion, concern the Late Neolithic gallery graves in Falbygden. A revised chronology of the Late Neolithic period in southern Scandinavia is presented in this regard. While earlier researchers usually have dated the period to 2350–1700 BCE, the author concludes that a more accurate date is 2200–1700 BCE (Blank et al. 2020:2). These new chronological results are worth a comment. These graves have not received the atten-

tion they deserve in earlier research, and this thesis remedy this situation. Originally defined as the gallery grave period by Oscar Montelius, the Late Neolithic period in Sweden is characterized by several hundreds of gallery graves, mainly concentrated to the counties of Västergötland, Småland and Scania, although they are also present in large parts of southern and central Sweden. The fact that gallery graves are not closed contexts, but rather contain numerous burials, have made them ill-suited for detailed chronological analyses. While the individual inhumation graves from the Middle Neolithic and Early Bronze Age periods were suitable for the find combination method, the Late Neolithic collective gallery graves were more difficult to sort chronologically. Thus, the dating campaign presented in the thesis is more than welcome, and from a Swedish perspective the chronological revision that is presented in the thesis is understandable. However, from a Danish perspective the re-dating of the period might be surprising. While Swedish archaeologists, from Oscar Montelius and onwards, usually defined the Late Neolithic on the basis of the Swedish numerous gallery graves, Danish archaeologists have since the days of Sophus Müller tended to define the period on the basis of flint daggers. According to this definition, the transition from MN B to LN I happened when flint daggers replaced battle axes as male grave goods in the upper graves of the Danish Single Grave Culture. Thus, it is pretty bold to suggest that the radiocarbon dates from Falbygden's gallery graves actually date the onset of the Scandinavian Late Neolithic. Especially since the most common flint dagger type recovered in Swedish gallery graves is the Type III dagger with a rhombic handle (Blank 2022:86). The earliest flint daggers of Type I on Jutland commonly appear in LN I contexts, such as individual inhumation graves, single-grave stone cists and settlement with two-aisled houses with sunken floors (Jensen 1973; Sarauw 2006). I know for a fact that Blank is currently assembling evidence for Bell Beaker activities in Sweden, and it will be really interesting to see how an earlier Late Neolithic phase might be reconciled with the gallery grave phase.

A further interesting observation presented in the thesis is that human remains dated to MN A also appear in graves that – according to the traditional terminology – are classified as gallery graves and thus belong to the later phase (Blank et al. 2020:20–21). In fact, artefacts dated to the early phase have also been recovered in gallery graves, and Blank suggests several interpretations of this observation. It may be the result of a flawed megalithic typology, for instance that passage graves erroneously have been classified as gallery graves. It is also possible that some multi-chambered gallery graves may have been built already during MN A, something that would correspond with dates of similar *allée couverte* gallery graves in Western Europe (Kaelas 1962; Apel 1991; Blank et al. 2020:20). However, she also

puts forward the idea that human bones from the older graves might have been redeposited in the gallery graves together with artefacts, perhaps in order to connect to earlier traditions. The latter is indeed a more thought-provoking interpretation.

After establishing a strontium isotope baseline covering an area of 120×130 km by analysing 61 water samples and five animal samples, Blank also uses human strontium values to discuss mobility patterns during the two phases. While the strontium isotope values of individuals from the early phase reveal signs of a fairly low mobility, the Late Neolithic population indicate a somewhat higher mobility, especially from *c.*2000 BCE, including values that suggests contacts with areas such as Eastern Central Sweden. These results are related to the occurrence of exotic amber beads during the early phase and flint daggers, slate pendants and metal artefacts, especially from 2000 BCE and onwards. Blank points out the connection between a greater mobility, as indicated by strontium values, and the distribution of flint daggers. The inferred connection between Falbygden and Eastern Central Sweden – that may be result of a second agricultural expansion around 2000 BCE – has in fact been corroborated by a recently published analysis by Sundström and Guinard (2020) of radiocarbon dates from Eastern Central Sweden where it is established that the Late Neolithic started around 2000 BCE and, consequently, that there is a considerable lag in the spread of the new agricultural techniques originating from the southwest. In this respect, the Late Neolithic agricultural revolution spread in quite a different way to the Early Neolithic revolution, which took place 1500 years earlier.

To sum up, the thesis is impressive. It is an important contribution to the research on the European megalithic traditions, that is currently carried out in Scandinavia as well as in other parts of Western Europe, not least concerning the adjustment of the megalithic chronologies, enabled by large amounts of high-quality radiocarbon dates and statistical techniques. Blank manages to handle and make sense of the large amounts of diverse data, and she presents well-grounded arguments for her interpretations. It should be mentioned that she has not been directly involved in the actual laboratory work, and I believe that this has been a great advantage in this case. It means that time and attention have been focused on archaeological interpretations and contextualisation of the analysed data. While archaeology always is in need of detailed scientific results, it is equally important for archaeologists to handle, analyse and interpret available data, and from them produce valid and interesting cultural historical interpretations. This thesis is a prime example of such work.

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Martina Hjertman

Afloat and Aflame: Deconstructing the Long 19th Century Port City Gothenburg through Newspaper Archaeology

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Review by Magdalena Naum

Studies of marginalization and material and social conditions of the working poor are still rather rare in Scandinavian historical archaeology. Unlike in anglophone scholarship, where these research subjects are well established and primarily explored in urban settings (for example Yamin 1998; Mayne & Murray (eds) 2001; IJHA 2011; Owens & Jeffries 2016), in the few Scandinavian studies that exist, focus is on rural areas (Lihammer 2011; Sethre 2017; Hansson et al. 2020a; Hansson et al. 2020b; Svensson et al. 2020) or institutions (Nielsen & Hansen 2017). Inspired by the international scholarship, Martina Hjertman's PhD dissertation entitled *Afloat and Aflame: Deconstructing the Long 19th Century Port City Gothenburg through Newspaper Archaeology* draws attention to urban marginalization and disenfranchisement using novel methods of analysis. The thesis focuses on the processes, discourses and materialities of marginalization

Lund University
magdalena.naum@ark.lu.se

in the late eighteenth–early twentieth century Gothenburg, as reflected in and shaped by the city's newspapers. The case study is Majorna, one of Gothenburg's neighborhoods. During the long nineteenth century, Majorna develops into a dynamic port and industrial area drawing attention of the city's entrepreneurs and investors, and attracting diverse groups of unskilled workers, laborers, craftsmen, and servants – those 'of little note', to use the term that the author operationalizes.

Traditionally, the studies of marginalization and poverty in historical archaeology are undertaken using a combination of excavated artefacts and buildings, landscape surveys and an array of historical records. This approach allows for grasping lived realities, consumption patterns and material practices as well as contextualizing poverty in time and space. That standard approach was unattainable in this case. The lack of archaeological excavations and surveys of standing structures dated to modern period in Majorna, which the author partly ascribes to the legal stipulations of the Swedish heritage legislation (Sw. *Kulturmiljölagen*), which does not protect post-1850 monuments and remains, steers the author towards other sources and methods. The bulk of these sources are digitized issues of 12 different newspapers published in Gothenburg between 1749 and 1906 approached through a lens of newspaper archaeology. The material is massive, as Majorna is mentioned in over 60,000 instances. Inspired by American and British historical archaeological research (Mayne 1993; Beaudry 2014; Gaff 2016), the author conducts a discourse analysis she calls a 'text-cavation'. She excavates the newspapers, mindful of the sociocultural contexts and genre, uncovering narrative layers of Majorna, the material, spatial and social descriptions of this nineteenth-century suburb.

The aims of the thesis are ambitious and multifaceted. The analysis centers around several research questions: of the significance of newspapers as sources for historical archaeology in general and the studies of urban poverty and marginalization in particular; of a discursive construction, representation, inclusion and exclusion of individuals, groups and urban neighborhoods in those newspapers; of counter voices and their narrative strength; of social norms and ideals, their materialization and role in shaping the narratives published by the newspapers; and, of the role of newspapers as worldmakers, their ability to create and promote a specific version of the world.

The thesis consists of 11 chapters, including introduction, presentation of sources, methods and theoretical concepts (chapters 1–4), historical background (chapter 5), analytical chapters (6–9), discussion, conclusion and summary in Swedish (chapters 10 and 11). The investigation tackles several themes that dominate representation of Majorna in newspapers during the studied period. The sources strengthening the points are carefully chosen and, importantly, include not only the perspectives of outsiders but

also voices of residents of Majorna. These constitute important counternarratives and grant a voice to those considered in the historical archaeological scholarship as 'of little note'.

Chapter 6 focuses on the shifting and discrepant ideas of what Majorna was in terms of geographical and social space expressed in a variety of journalistic forms: house advertisements, petitions, opinion pieces and editorials. This investigation reveals that the popular image of Majorna was inconsistent, intensely debated and continuously negotiated throughout the period. The same impression is given by a cartographic material explored in parallel to newspapers. Utilizing letters to the press and police reports, that start to be published in the city's newspapers from 1839, chapter 7 explores representations of the social landscape of Majorna. The author concludes that from 1830s and onward, the newspapers operate with a specific discourse associating the suburb with alcoholism, vagrancy, and misery – a result of low moral standards and parental neglect of the residents. Exploration of urban fires and connected security and donation cultures are the subjects of chapter 8, in my opinion the strongest and most interesting chapter. In the eighteenth and nineteenth centuries, fire reports were published in newspapers and developed into their own journalistic form, as disaster narratives followed by lists of lost and found and relief petitions. These sources are extremely interesting in terms of shedding light on the material and social conditions of Majorna's residents, and, as pointed by the author, they contradict the image of the neighborhood as nothing but misery, poverty and squalor, socially and geographically distant from the inner Gothenburg. Chapter 9, the last analytical chapter, focuses on the genre of travelogue, a popular feature of newspapers in the 1850s–1860s and the turn of the century. A thorough application of discourse analysis allows the author to point out that this form creates its own master narrative of Majorna as a distinct and mostly negative other, as an anachronistic place characterized by poverty and neglect. Operating with well-understood symbols and vocabulary, travelogues create Majorna as a coherent world and more than any other journalistic form, they have an impact on the public image of the suburb.

There is no doubt that *Afloat and Aflame* is an important contribution to the development of methods in historical archaeology as well as to the studies of discourses and processes of urban marginalization. The recent mass digitalization of newspapers opens new avenues for research in historical archaeology. The material allows for asking new types of questions about narratives and counternarratives and for uncovering perceptions, vocabularies and voices that are less visible in other types of sources. Hjertman's dissertation is very successful in illustrating these new opportunities. It demonstrates convincingly the value of newspapers for understanding spatial, physical and cultural realities in the past and as a unique source

for identifying common representations of places and social conditions as well as finding individual voices of those historically considered as 'voiceless'. The author stops short of a critical reflection whether and how this new source challenges the notion of poor as 'of little note' (defined, following Elizabeth M. Scott (1994:3) as '… those considered of little importance, not worthy of "notice", by the dominant social, political, and economic group in a past society. … those considered not worth "noting" or writing about, those who therefore are not as visible to us in the written records we study. … those written about less frequently, or little "noted" by historical archaeologists'. My takeaway is that both the dissertation and newspapers as a source provide a stimulating invitation to question the common disciplinary perception of working-class poor and other marginalized individuals as ahistorical 'voiceless' or 'of little note', or at least to reformulate the meaning of those concepts.

The author succeeds in demonstrating that newspaper content is a viable and rich source for helping to answer archaeological questions about, for example, organization of landscape and domestic space, material practices and culture of working-class suburbanites, although her reflection on this subject is only superficial. For the most part, the author skillfully maneuvers through the different journalistic genres recognizing their specific forms, contexts and aims, and proficiently operates with the critical discourse analysis. By doing so, and by paying attention to temporal changes in the prevailing discourses, she is able to highlight the role of newspapers as worldmakers, this is to say, their role in influencing and shaping public debates and views of the suburb. Surprisingly, however, there is no critical consideration of the agendas of newspaper owners and editors and how their socio-political views and economic interests might have influenced the content and narrative they chose to promote. Such a consideration would have further contextualized the creation and promotion of specific narratives of Majorna and added a nuance to the understanding of the processes of worldmaking the newspapers were involved in. There is also no discussion about any possible difference between narratives of Majorna in the suburb's newspaper *Forposten* and the newspapers published in inner Gothenburg. Being such an original study introducing new sources and ways of approaching the subject of marginalization, it is also unfortunate that the author does not present and discuss the practical methodological steps of selecting and processing newspaper content.

These shortcomings notwithstanding, the thesis is a valuable addition to the historical archaeological scholarship, a step towards exploring poverty and working-class urban neighborhoods in Sweden, Scandinavia and beyond. It is an exciting exploration of newspaper archaeology and successful exposition of newspapers as a unique and fascinatingly rich source of

information. The term of 'text-cavation' for conducting critical discourse analysis works well as a metaphor here, and if newspaper archaeology emerges as a subfield, there is a potential to develop the term to encompass a distinctively archaeological method of reading and analyzing texts, which is implied by the author. Since the move towards digitalization of newspapers (and other sources) is global, the study has a potential to inspire a wider international group of scholars to tap into them, to text-cavate and uncover new voices from and meanings of the past.

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Pia Nilsson, Martin Hansson & Eva Svensson

De obesuttnas arkeologi: Människor, metoder och möjligheter (Eng. *The Archaeology of the Dispossessed*)

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Review by Jonas Monié Nordin

In 2014, the Swedish cultural heritage legislation concerning ancient monuments (Kulturminneslagen §2, SFS 1988:950) was changed. The old law, which in principal constituted protection for all permanently abandoned physical remains of human activity, was changed, and an age-limitation was established. In the new law, physical remains post-dating 1850 are no longer automatically protected. The background to the changes in legislation was the liberal governments' (2010–2018) wish to support land owners' claims for expanded control over the lands (cf. RAÄ 2018:7).

Remains connected to the forest industry (charcoal- and tar burning), industrialisation, the agricultural revolution (crofters' dwellings) were, in practice, seldom documented and rarely protected by the old system, meaning that they rarely were examined with archaeological methods, or that the existence of these monuments had any influence over infra-structural development. The change in legislation paradoxically led to a drastic change in antiquarian praxis, contrary to the legislators' aims and wishes. During the

Stockholm University
jonas.monie.nordin@ark.su.se

last eight to ten years, Swedish archaeological concern with remains from the early modern period has grown considerably, and historical archaeology (the medieval and post-medieval periods) is probably the dominant field in the cultural heritage management and the antiquarian system; a situation which is not mirrored in education and research in archaeology at the Swedish universities.

As a result of these drastic changes – the introduction of an age limit for protection of monuments – the research project, *The archaeology and cultural heritage of the dispossessed* (funded by the National Heritage Board 2017–2019), set out to provide new knowledge about of the poor and marginalized of the early modern and modern societies. That is, about the ones that archaeology has found so hard to locate and study in meaningful ways, and a group whose cultural heritage now was considered a heritage to be protected. How had Swedish archaeology dealt with the early modern poor, with what methods, and what practices? The project collected data, and methods related to historical archaeologies of this non-homogenous group, with a focus on the national antiquarian system and its implementation. The project published several papers in both English and Swedish, they organized seminars, and they also published this highly accessible and important book.

The Archaeology of the Dispossessed is divided into six chapters and is provided with two appendices. Chapter 1: The dispossessed and historical archaeology, discusses concepts and perspectives: who were the poor, what is/was poverty, how should we describe them, and how can we trace that through archaeology (a scientific discipline historically driven by search for objects and valuables)? The chapter includes a discussion on Swedish historical archaeology of the early modern and modern periods and its relation to international research. Here the authors introduce issues on power and materiality as discussed by the Annapolis school of historical archaeology, the wider debate on historical archaeology of dispossession in historical archaeology, and that of the archaeology of the institution of slavery. It is striking how limited Swedish archaeology of poverty and class has been in an international perspective. A comparison to industrial archaeology confirms that (pp. 122–134). Despite its long and ample industrial history, Swedish archaeology has not yet developed a more specialized industrial archaeology.

Chapters 2 and 3 present the antiquarian practice: what has been done, and where do we find the results? These chapters are most welcome not only for civil servants in the cultural heritage management system, but also for students at all levels, seeking sources and perspectives for essays and further studies. In chapter 4 the authors delve deeper into important aspects of the cultural heritage and the history of the dispossessed: the biologi-

cal heritage (plants, flora, trees), the rural slum, the aristocracy's crofters, the urban poor. Chapter 5 provides a summary and discussion. Here the authors return to three important results that sprung from earlier chapters: firstly, the complex and inconsistent bureaucratic aspects of the antiquarian system; secondly, the high potential of historical archaeology through the method of triangulation that provides with new and pertinent knowledge concerning the substantial, yet heterogenous group of dispossessed of the early modern and modern societies, in the towns, in the industries, and in the rural settings. Thirdly, and finally, they conclude that poverty and dispossession is not an easy thing to define, understand, and to work with – but of the utmost importance for a more democratic and more representative study of the more recent past.

One of the many strengths of this book is the presentation and critique of the antiquarian practice concerning the material heritage of the poor. Too often sites with material remains of the dispossessed have been neglected by the antiquarian system, both on an administrative level and on the practitioner's level (the rescue archaeology firms). This is apparent in local lack of interest, systemic unawareness of historical archaeological methods, and structural neglect of the heritage of the dispossessed. The authors point to worldly aspects, such as the use, and non-use of headlines and keywords in reports and how that limits accessibility. A typical large-scale rescue archaeological excavation in Sweden often include remains from several time periods. Prehistoric sites may be in focus for the archaeologists, and the results from the concurrent excavation of a croft or a saw mill, may in the technical report be played down in favour of the prehistoric sites' (pp. 53–57). More telling and discouraging are examples of the cultural heritage management system's neglect of the physical remains of society's poor – but the book also presents several good and important examples. Four cases, both successful and not so successful, are presented in the appendices, together with a very valuable 'handbook' of best practice. The latter will be of great importance for the local, regional and national heritage management, and for students, and also in teaching.

The Archaeology of the Dispossessed provides an important contribution to Scandinavian archaeology and cultural heritage management. It is a handbook to be used in the day to day task of historical archaeology. It is thorough, well-written, well-illustrated, and thought-provoking despite its humble tone. Praise aside, there are two aspects that could have been addressed. The book is featured by a landscape perspective of archaeological remains. Several good examples (and some not so good) are presented at length. The use and construction of space on both micro and macro levels are presented with several well-chosen examples, from, for instance, crofts and remains of rural slum. But what about the role of material cul-

ture? What can the material finds, the material culture, or the lack of finds say about poverty? Examples are given, but one would have wanted more. How can assemblages of ceramics and other indications of consumer culture be understood in terms of class, culture and degrees of poverty? And, how can the material culture be understood in relation to written and depictive sources?

Another point is the lack of multicultural perspectives. The authors state that the Sámi past is too complex to be addressed in this context (p. 7), and that many results were not accessible at the time of print (2020), which is understandable, yet regrettable. But what about the Roma historic experience? It is exemplified by the Snarsmon-project in Bohuslän (Andersson 2008), important and relevant studies, but it could have been given more room. Historical archaeology not only gives us tools for a deeper understanding of the more recent past, it gives us tools to understand its complexity. It is often the written record and the oral traditions that provide sources to identify the physical remains of the Roma camp, the Sámi dwelling or the Dutch industrial workers cabin – but we need archaeology to unfold a deeper understanding of past lifeways and social and cultural practices – and the multi-cultural aspects of the past, and present.

These critical points are however marginal. *De obesuttnas arkeologi* is an important contribution to the swiftly expanding field of historical archaeology, and a very accessible introduction, a handbook, and a tangible companion to Swedish cultural heritage management. Read it and use it!

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Vivian Smits

Kulturarvsparadoxen: Om uppdragsarkeologin och kulturarvets användning i samtiden

(Eng. *The Cultural Heritage Paradox*)

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Review by Fredrik Svanberg

Kulturarvsparadoxen (Eng. *The Cultural Heritage Paradox*) is an Archaeology dissertation that examines how Swedish contract archaeology creates knowledge of significance for society. This is one of the systemic goals of contract archaeology as defined in legislation, and therefore something which should theoretically be followed by regional county administrative boards when setting the aims for specific projects. Though written in Swedish, the dissertation invites an international audience to its content with a generous seven-page English summary.

The purpose of the thesis is to investigate the meaning and relevance of archaeological heritage in relation to the different target groups of Swedish contract archaeology: researchers, government agencies and the general public. Three research questions are formulated: (1) How does cultural her-

Nordiska museet
fredrik.svanberg@nordiskamuseet.se

itage, which originates from contract archaeology and end up in museum collections, function in Swedish society? (2) Why is knowledge produced within contract archaeology often limited to knowledge of the past rather than knowledge for contemporary society? And, (3) To what extent can cultural heritage produced by contract archaeology be more relevant to society?

The book follows a classic scientific structure starting with purpose and questions, followed by limitations, method and material, eight investigative chapters and finally a concluding chapter where the study is summarized and questions answered. Methods applied are studies of literature, case-studies of limited archaeological projects and analyses of questionnaires to selected groups of archaeology and museum actors. This works in relation to the questions asked, though perhaps the detailed study of one specific site (see below) could instead have been exchanged for more general studies of a number of contexts, since archaeological cases tend to differ.

Smits clarifies her position from the outset, in the introduction, saying that she perceives a paradoxical relationship between what contract archaeology produces – knowledge about the past – and the expected contemporary relevance of this as significant knowledge for the future. The paradox (or rather discrepancy) is the difference between what the political, legislative level wants and prescribes for contract archaeology to produce, and the actual product. The formulation of this paradox is, in itself, a useful contribution to the scientific discussion.

Smits positions her study at the intersection between archaeology and critical heritage studies. She adopts a critical approach towards the dominant preservation discourse, discussed by Laurajane Smith as the Authorized Heritage Discourse. Smits also applies the perspective of organizational theory comprising the impact assessment of political goals, regulations and other instruments as well as their application to the process of making heritage.

The main investigation is presented in seven chapters. The first three are basically a review of literature analysing the relationships between politics, society and heritage focusing on the period after the important cultural heritage proposition of 1974 in Sweden. The proposition is regarded as the starting point for the modern field of Swedish cultural politics, and laid the foundation for much of today's system. Smits presents a thorough walk-through of all major policy developments, debates and relevant literature. In general, while the meaning of cultural heritage has changed for society at the cultural policy level – from a marker of national identity to a utility for personal cultivation, identity building, sustainability and regional growth – the outlook of the state on authorized heritage has not changed. It supports the same dominant actors as before, such as major museums and archaeological actors (chapter 4). Smits also describes the profession-

alization process of archaeology, its different processors and actors and their respective missions and goals (chapter 5). Interestingly, she finds a further paradox here. The current market-orientated system of contract archaeology, combined with the decentralization of cultural politics and new public management, has fragmented the process and, crucially, cut the bonds between contract archaeology and museums – the main institutions working publicly and with the aim of making knowledge of the past significant. The main value embraced today in policy-making is sustainability, which contrasts with a lingering antiquarian focus of the actors in contract archaeology.

Then follows a case study of collection databases, and object lists from excavations at the medieval town of Nya Lödöse, combined with a survey study including interviews with sixteen contract archaeologists (Chapter 7). The study looks at what was excavated and the processes of sorting of the finds and selection. Not surprisingly, it turns out that selection has changed over time. The most interesting result is that current goals for the work formulated in tenders and excavation plans completely lacks reference to any contemporary developments of society. The relevance is solely motivated in relation to antiquarian knowledge of the past. The results are enriched by interviews with 32 museum employees. They say, most importantly, that perspectives of museums regarding, for example, what sort of material might complement collections or which would be valuable in audience-related work, are currently not implemented in contract archaeology, and that they see the relevance of archaeological collections for contemporary society as poor.

After these empirical chapters follows a lengthy discussion of findings where Smits deepens various aspects of the paradoxical relationships found, and finally suggests a new model for the production of archaeological heritage. These discussions are generally thorough, though a link to the general context of public archaeology appears to be missing. This research field has, after all, wrestled with questions of relevance and audience interaction in depth and produced a significant body of knowledge about these things (e.g. Merriman 2004; Skeates et al. 2012; the journal *Public Archaeology*). Incorporating knowledge from this field could have deepened reflections and significantly helped in the design of the suggested new model.

The most important conclusion of the dissertation is that 'the relation between cultural politics, Contract Archaeology and the museum, affects the production of archaeological heritage to a degree that it cannot be considered viable as a Heritage product with relevance for the general public as it is intended' (p. 255). Smits identifies this as due to a number of shortcomings of the current heritage production process. In order for cultural heritage produced by contract archaeology to gain significance for soci-

ety, the paradox described by Smits needs to be resolved. To do so, Smits has several suggestions. Among the most important is the need to involve museums in the process and a strengthening of the coordinating role of the county boards. Moreover, there is need for a wider understanding of the contents, methods and useability of the contract archaeology process and its use for other disciplines, as well as its meaning in aspects other than the purely scientific and the development of a critical perspective on the preservation discourses currently focused.

The practical suggestions identified by Smits may be difficult, at least in part, to put into practice, and do not necessarily lead towards higher contemporary relevance. I am not sure, for instance, that it really is in the detailed selection of finds that higher significance may be sought. Rather it may be in the selection of what type of sites to dig in the first place, and in how finds are actually used in museums.

Kulturarvsparadoxen is a highly relevant and readable work, presenting an astute analysis of the Swedish contract archaeology system in relation to cultural politics and society. The paradox identified is an accurate observation, studied in depth, which in my opinion is the most important result. It reveals a lot about the Swedish system. The method of comparing intended outcomes on a political/legislative level with actual outputs and studying the roles and practices of different actors in the system could probably be applied with equally interesting results to other countries/systems. Smits goes after the grail of how to produce knowledge of relevance for society, and though she may not have gone the whole distance, she certainly highlights and pushes the question in important ways, opening it up for discussion and for future research to build upon. I would have wished for the addition of the body of knowledge stemming from public archaeology, and the suggestions formulated within this field, but overall, *Kulturarvsparadoxen* is an excellent work. It is much needed, and should be taken as a serious starting point for discussions of how to develop Swedish contract archaeology.

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New Research Project: Uppåkra – The Hall on the Height: Investigating a Long-Term Iron Age Residence

Torbjörn Ahlström[1], Håkan Aspeborg[2] & Mats Roslund[3]

Background

Iron Age 'central places' were important power nodes in pre-state Scandinavian societies. They comprised large halls, sometimes ritual buildings, workshops, signs of trade and exchange, and numerous exclusive and precious metal objects. To date, some 25 'central places' have been identified in southern Scandinavia, among them can be mentioned Erritzø, Gudme, Tissø, Lejre, Sorte Muld in Denmark, Uppåkra, Ravlunda, Järrestad, Västra Vång, Slöinge, Old Uppsala in Sweden, as well as Aker and Karmøy in Norway. They have been interpreted as large manors controlled by shifting elite groups, which were able to gather people at public rituals, legal assemblies, seasonal markets, and summons of warriors (Näsman 1991; Brink 1996; Callmer 1997; Fabech 1997, 1998; Hedeager 2001; Jørgensen 2009; Høilund Nielsen 2014; Skre 2020). These places can deliver vital information for our understanding of the proto-historical period when Scandinavian chiefdoms took their first steps towards Medieval realms.

Uppåkra is one of the most prominent of these centres, situated four kilometres south of Lund in Scania, southernmost Sweden. Large-scale metal detecting and several minor excavations since 1996 have confirmed the unique and complex character of Uppåkra (Stjernquist 1995; Larsson 2003; Hårdh 2002, 2010; Larsson 2019). The settlement covers an area of *c.*40 hectares, a size comparable to a large medieval town. It existed for

Lund University
1 torbjorn.ahlstrom@ark.lu.se
2 hakan.aspeborg@ark.lu.se
3 mats.roslund@ark.lu.se

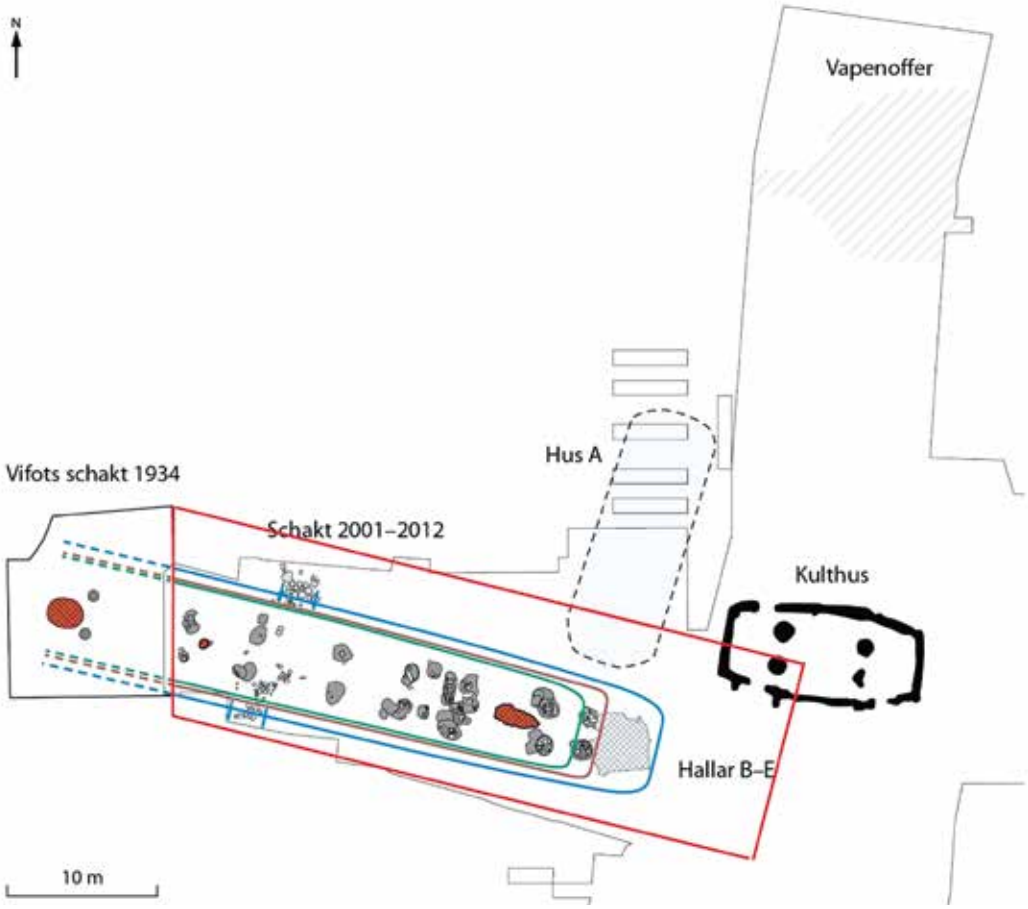

Figure 1. Extent of the investigated surface. The hall building and the cult-house. Based on Larsson & Söderberg 2013.

more than a millennium as a central site from 100 BCE to 1000 CE. Undisturbed cultural deposits are mainly preserved from 100 BCE to 550 CE, whereas most deposits from later periods have been impacted upon by modern agriculture. This means that the period from about 550 CE to 1000 CE can be reached mainly through study of artefacts found in the plough soil (Hårdh 2010). The most spectacular discovery is a cult house, built and rebuilt on the same spot from the third to the tenth centuries CE. Ordinary farms, areas for the sacrifice of animals, weapon deposits, workshop areas and about 12,000 objects of bronze, silver and gold have been recorded. Amongst the locally produced artefacts are many foreign exotica. The quantity and quality of the immense data set makes it possible to study both the resilient infrastructure of the site, as well as social and economic internal change. The political elite probably lost their power to the

Jelling dynasty in the late tenth century CE. As a pagan place of worship, and compromised by the former rulers, it was abandoned in favour of the new king's royal estate in Lund. However, it still played an important role as the 'granary' for the king.

New research project

During the years 2022 to 2026 the project 'The Hall on the Height', with a budget of 50 000 000 SEK, will be implemented by the Department of Archaeology and Ancient History at Lund University. Several private and corporate donors have contributed to the project; the Tetra Laval Group, the Crafoord foundation, the LMK foundation, the Thora Ohlsson foundation, Sparbanksstiftelsen Finn, Länsförsäkringar Skåne, the Kronqvist family, Lund University and several anonymous donors. Eleven archaeologists and specialists are engaged in the project, all with several years of experience from contract archaeology. The aim is set on investigating the core of the Uppåkra manor, the hall building with adjacent cult-house down to the natural ground. It will also be possible to include the important area between the two buildings, with remains from ritual behaviours. Together with the cult-house, the hall created a physical and spiritual centre of the comprehensive landed estate, with control over resources and influence on world views.

Uppåkra is the only central site to contain artefacts and ecofacts from throughout the Iron Age. This provides us with an incomparable opportunity to grasp 1000 years of processes of creating a resilient society. Within the carefully selected volume of 800 m^3 of cultural deposits lie the shifts of the periods we wish to explore.

Our aims with 'The Hall on the Height' are several, some are presented here (for further information follow the project at www.uppakra.lu.se). Primarily, we will document and analyse the spatial use of the hall building and actions performed through time. To achieve this, micro level analyses of the deposits will expose spatial divisions, household activities and ritual behaviour. We collaborate within Lund University with the high energy light source facility MAX IV and other laboratories where synchrotron light and x-rays reveal materials and elements at electron level. Analyses of bones, plant residues, pollen and microscopic remains of objects down to DNA level uncover patterns in animal breeding, agriculture and the division of space in the hall. The distribution of artefacts and ecofacts will give us a unique opportunity to study the duality of sacral and political power. Our project will present an outstanding example for the study of social resistance and resilience.

Figure 2. The upper deposits in the trench investigated March 2023 by Fredrik Lundgren and Elin Säll. Photo: Håkan Aspeborg.

On a second level, we will be able to ask questions about the site's agrarian economy and ecological resistance and resilience. Remains from climate fluctuations and responses to these are encapsuled in the deposits, making process directed research possible. The resources created a basis for non-agrarian activities, keeping of retinues and artisans, as well as political network building. This is relevant with respect to the *c*.540 CE horizon, with both volcanic driven climate perturbations and the possible outbreak of the Justinian plague.

Theoretical and methodological considerations are thus focused on ecological and social resistance and resilience, i.e. a society's ability to adjust to changing living conditions. Social changes were always negotiated within the community. The rulers were able to stay in power by expressing continuity through rituals and recurrent meetings with repercussions far away from the settlement. An important vehicle for a community is a coherent world view. At Uppåkra, the most obvious expression of this are the residence hall and the cult house. Together with assembly places in the landscape and the settlement itself, they represent monumental institutions with long-term use. Repeated rituals, both as feasts and political meetings, as well as seasonal religious celebrations and juridical negotiations, were

opportunities where those in power could confirm the order of the world, but also could be challenged. The institutions as physical monuments survived altered political content and stabilised the community.

'Central places' in southern Scandinavia represent regional expressions of a general development in society. Since their discovery, constant theoretical renewal and supplement of data have given new insights. There are strong proponents for the study of diversity among them to arrive at the shifting biographies of these places and their function as institutions in a defined settlement district. The use of social models about community building above the level of the individual village is essential. With this double background in empirical knowledge and theoretical approaches, it is possible to integrate the sites with the surrounding landscape, in which they were strongly embedded. With the project 'The Hall on the Height', Uppåkra will be consolidated as a vital exponent for a period when ruling by an elite preceded realms that covered larger territories.

The project results will be published as a primary technical report and a volume dedicated to further interpretations based on the results. In the extended volume, the project participants focus on the structures and artefacts on an intra-site and inter-site level. We also plan to publish articles in international journals as well as a popular book for the public. Welcome to follow the project at www.uppakra.lu.se.

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New Research Project: Sweden and Ukraine in the History of Museum Collections and Exhibition Narratives

Fedir Androshchuk

Background

The Russian invasion and occupation of Ukraine in February 2022 has raised public concern not only about the independency of Ukraine, but also about the stability and future of the democratic world order. Cultural heritage has been part of these concerns. The protection of heritage assets has become an issue of national and international security, and political uses of historical narratives and collections have led to a highly politicized conflict over cultural property. According to UNESCO's verification of 1 March 2023, 247 historical sites in Ukraine were damaged during the first year of the war, including 107 religious sites, 20 museums, 89 historical buildings, 19 monuments and 12 libraries (UNESCO 2023). In his essay 'On the Historical Unity of Russians and Ukrainians' from July 2021, Vladimir Putin claimed that Ukraine belongs to 'historically Russian lands' (The Ukrainian Research Institute [HURI] 2021). According to the current regime, all Ukrainian museums can potentially be considered as Russian cultural property, and therefore be targets for the transferral of collections to Russia. For instance, it was reported that on October 26, 2022, Russian forces transferred Grygory Potemkin's monument and his burial in Kherson across the border to Russia (Santora 2022). Looting of collections has also been reported from regional museums in Kherson, Melitopol and Mariupol (Human Rights Watch 2022).

Aside from immediate war time destruction and looting, long-term political strategies involving heritage can be identified. Since the 1990s, Rus-

National Museum of the History of Ukraine
aeifor@gmail.com

sian museum collections have become an important structural element in efforts to expand the influence of Russian culture on the international arena (e.g. Plets & van der Pol 2022). A major exhibition, 'Holy Russia – Russian Art from the Beginning to Peter the Great', opened in 2010 in the Louvre, France (Pyatnitsky 2012). This was two years after the so-called Russo-Georgian war and became a manifestation of the influence of Russia's 'soft power' in the Western world. In the exhibition, 'the long history of Christian Russia' is counted from Prince Volodymyr and the Christianization of Kyiv. Many objects in the exhibition have been found in Ukraine but ended up in Russian museums in Moscow and St. Petersburg. Another example at the national level is the exhibition 'Ordinary Nazism', which opened in Moscow on April 19, 2022, and highlights Russia's offensive in Ukraine against 'Ukrainian nationalism'. The exhibition supports and explains to the public reasons for the country's invasion of Ukraine.

Today, when Russian museums are used as an important instrument of offensive state propaganda, it is extremely important to examine the role of museums in the shaping of local, regional and national identities, and to study the multicultural contexts in which they are defined and negotiated.

New research project

A new project, called 'Sweden and Ukraine in the history of museum collections and exhibition narratives', funded by Torsten Söderberg's foundation, will explore the ideas behind the collecting and exhibition of Ukrainian objects in Sweden and Swedish objects in Ukraine, and their roles in shaping national identities in both countries. The project's overall purpose is to deliver new knowledge on the history of the establishment of museum collections in Sweden and in Ukraine. A number of Swedish museums and archives have a selection of archaeological and historical objects and documents that have been brought from Ukraine (for instance in the Antiquarian Topographical Archive and the Swedish National Archives), such as visual art and maps, war banners, and archaeological finds. Some of the items came to Sweden during the Viking Age, others during the early Middle Ages or early Modern time. Together they constitute material evidence of the contacts between both countries during these periods.

The project's main focus is history of collections with a starting point in Ukrainian objects in Swedish museums and Swedish (or broader Scandinavian) objects in Ukrainian museum collections. How and why were they brought to museum? What place do they take in historical narratives of these countries? The aim is to highlight this material and examine how knowledge about the memorabilia can influence national narratives

in both countries. Another task is to develop theoretical and methodological points that can help Swedish and Ukrainian museums identify influence campaigns. This project aims to overcome traditional national narratives of Swedish and Ukrainian historical museums, and provide ground for a common transnational history. By highlighting the history of Ukrainian museum collections it will be possible to understand their roles in the shaping of national identity, and equally the importance of a collective responsibility to protect cultural heritage in the current Russian-Ukrainian war.

The project runs for 2 years. It started in 2023, and its results will be presented in the form of a book in Swedish, and a book chapter in Ukrainian.

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Conference: Advances in Sámi Archaeology – 'Things Should Never Rest – Something Must Always Be Happening'

Markus Fjellström

From 31 August to 2 September 2022, about 50 archaeologists, mostly from Norway, Sweden and Finland, specialized in Sámi archaeology, gathered at Silvermuseet/INSARC in Árjepluovve (Sw. *Arjeplog*) for the three-day conference entitled 'Advances in Sámi Archaeology' (ASA). The ASA conference of 2022 was held in the spirit Dr Einar Wallquist, who founded Silvermuseet in 1965, and whose motto was 'Things should never rest – something must always be happening' (author's translation from Swedish: Det får aldrig stå stilla, det måste alltid hända någonting). The idea behind the conference was first and foremost to create a platform for archaeologists and researchers to discuss Sámi archaeology. This was the second time that the conference was held, and with the great interest shown, there is an obvious need for archaeologists specialized in Sámi archaeology to gather on a regular basis to share thoughts and knowledge on new research projects or finds to develop the field.

The conference in Árjepluovve was organized by the founder of the research center INSARC (Institute for Arctic Landscape Research) and previous museum director of Silvermuseet, Assoc. Prof. Ingela Bergman, the museum director Dr Malin Brännström and Dr Markus Fjellström. Two keynotes, held by Dr Tiina Äikäs at Oulu University in Finland and Prof. Nancy Turner at the University of Victoria, British Columbia, Canada, introduced the themes of the conference. Among other things, the impor-

Lund University
markus.fjellstrom@ark.lu.se

Figure 1. *Åskåta* at Lampárguolbban. Photo: Gry H. Sivertsen, Silvermuseet.

tance of interdisciplinary research, ethical considerations and its implications on research were stressed, as was the importance of close collaboration with indigenous people.

The scientific presentations were varied, interesting and provided an opportunity for lively discussions. The first theme focusing on *Sámi archaeology* covered presentations such as Sámi offering sites and rituals, Central and South Sámi archaeology in the early modern period, the Black Death, bear graves in Norway and glacial archaeology. Researchers questioned the borders of Sámi living areas in the past, but also raised awareness of unknown sicknesses, new bear burials and the endangered cultural heritage emerging from melting glaciers and snow patches in the wake of climate change. The second theme, *Ethnobiology and landscape analysis*, covered presentations such as barrier fence construction, zoological and ethnoarchaeological perspectives on working reindeer and pitfalls in the world heritage site Laponia. Here, insights from osteology, paleoecology, forest history and archaeology demonstrated the importance to interdisciplinarity research in understanding Sámi pasts. The last theme on *Indigenous methodologies* concentrated on presentations such as contract archaeology in Swedish Sápmi cultural landscape and politics in Lule Sámi lands, the need for widening our horizon limits and children's cultural monuments, and ancient and recent perceptions of sacred mountains and watercourses. An important aspect here, that is already to some extent implemented, is the collaboration and inclusion of the Sámi people and the local population into the archaeological work. These collaborations need to be developed and

can, for instance, be realised through community archaeology, engaging the indigenous and local population into the discussions and interpretation of the archaeology, informing about ongoing and future projects, and so forth.

Sámi archaeology covers a wide spectrum of research questions and interests relating to all different kinds of aspects concerning Sámi past in Norway, Sweden, Finland as well as Russia. There is thus also an important aspect of transgressing the borders regarding internationalization and to permit international and intra-, as well as trans-disciplinary research projects. An important part of Sápmi is on the Kola peninsula in Russia, and only time will tell how the connections and collaboration with Russian and indigenous researchers in Russia will be in the future.

On the third day of the conference the participants attended an excursion along the Pite River in Árjepluovve and visited a number of heritage sites in the surroundings. One focus of the visits was to raise awareness of the protection of cultural heritage sites against landscape changes inflicted by human exploitation of natural resources and climate change. One of the sites that we passed was Máttávrre, which has, to their constructions, placement and number, unique hearths from different periods. One area had hearths built in a pebble stone field that had been the object of exploitation due to gravel pit extractions, damaging a unique cultural heritage site. A nearby hearth-row system, enclosed into a reindeer corral used for herding, also raised questions regarding the protection of similar sites. At Lampárguolbban we visited an *åskåta* (Sw.) (figure 1), used during the nineteenth to the twentieth century CE. This typical hut construction is characteristic for Árjepluovve and adjacent areas. It is especially interesting due to its construction, and has received attention from the discipline of Historic Preservation. The next Advances in Sámi Archaeology conference will be held at Árran – Julevsáme guovdásj in Drag in Nordland, Norway 18–20th September 2024.

New Research Programme: Crisis, Conflict and Climate: Societal Change in Scandinavia 300–700 CE

Kerstin Lidén[1], Gunilla Eriksson[2], Sven Isaksson[3], Sven Kalmring[4], Ludvig Papmehl-Dufay[5] & Helena Victor[6]

Although archaeology during the past decade has increasingly focussed on the effects of climate change on prehistoric populations, there are few studies, if any, that have offered a high enough resolution in time and space to actually allow discussion of its societal effects. The main purpose of the 'Crisis, Conflict and Climate' programme is to provide this, by investigating a period of climate change, conflict and crisis in Scandinavia, 300–700 CE.

With this programme, there will for the first time be a coherent investigation of demographics, disease, climate and environment, politics and social change in one, very well-defined, geographical region in northern Europe, the island of Öland situated off the southeast Swedish coast, in the Baltic Sea. We will study one of the more prominent features of the Ölandic societies during this time, the ringforts, producing high-resolution dates of their different utilization phases and clarifying their function and societal role. This eight-year programme (2023–2030), which is generously funded (43 million SEK) by The Bank of Sweden Tercentenary Foundation (Sw. *Riksbankens Jubileumsfond*), is a collaboration between Stockholm University, Linnaeus University and Kalmar County Museum, with professor Kerstin Lidén at Stockholm University as Principal Investigator.

1 Stockholm University
kerstin.liden@arklab.su.se
2, 3 Stockholm University
4 National Historical Museums
5 Linnaeus University
6 Swedish National Heritage Board & Kalmar County Museum

Figure 1. Öland with the ringforts marked on the map. Source: Lidén 2022.

The archaeological record from the Roman Iron Age and Migration Period on Öland is extremely rich, including more than 1000 visible stone house foundations, innumerable accompanying stone fences, thousands of cemeteries and graves and at least 15 ringforts (Stenberger 1933; Fallgren 2006, 2008). To this should be added numerous prestigious and unique items, including bronze statuettes, glass beakers and gold coins of Roman origin. At least 370 *solidi* are known from the island – more than from any other region in Scandinavia (Fagerlie 1967; Herschend 1980; Fischer et al. 2011). The main influx of gold coins occurred in the 5th century and decreased dramatically after 476 CE, that is the fall of the Western Roman Empire (Fagerlie 1967; Fischer et al. 2011). The strong influence from the Roman Empire is just as evident on Öland as in all of southern Scandinavia during this time, with evidence of hierarchical societies, long distance

Figure 2. The Ölandic fort Ismantorp with well-preserved Iron Age building foundations. Photo: J. Norrman (1997), ©RAÄ.

travel and large networks (Näsman 1984; Lund Hansen 1987; Herschend 1991; Jørgensen 2003, 2011; Fischer 2005; Hedeager 2011; Andrén 2014).

We know that there have been at least 18 ringforts on Öland, of which 15 are still visible (figure 1). Most of the ringforts are round or oval in shape, but there are exceptions such as Bårby borg, which is a semi-circle located at a steep limestone cliff, and Treby, which consists of three small circles joined together. They often enclose an area of a dense stone house settlement. Their sizes differ considerably, the largest being Gråborg, almost 210 m across. The number of gates in the ring wall is normally three, but also in this instance there are exceptions, as is the case with Ismantorp, with nine gates. Unlike their contemporaneous counterparts, the hillforts on the Swedish mainland, they are situated on flat areas – most of them close to wetlands but with some distance from the coast (e.g. Wegraeus 1976; Olausson 1995). Only one of the ringforts have been excavated to any large extent, Eketorp, whereas only small excavations have been performed in eight other forts and none in the rest. When it comes to their topographical settings and their immediate hinterlands, even less is known in terms of possible connected open settlements or directly related burial grounds. Some forts have provided evidence of multiple occupation phases, e.g. Eketorp, Gråborg, Bårby borg and Triberga, whereas others so far only have provided evidence of a single phase. The ringfort of Ismantorp on the central part of the island is an illustrative example of a ringfort, with

a ring wall 5–6 m wide, up to some 3.5 m in height and with a diameter of *c.*140 m, with the remains of *c.*95 buildings still visible (figure 2). Eketorp had a similar construction, but is smaller and where the second occupation, dated to *c.*fifth–seventh century CE, covered an area of *c.*80 m in diameter, with remains of 53 stone-built houses (Borg et al. 1976). At least 12 of the ringforts are thought to have been constructed in the fourth or fifth century CE, and of these at least 10 contain stone-built houses similar to those at Ismantorp and Eketorp (Wegraeus 1976; Fallgren 2008). Several of the ringforts seem to share a common layout, where for example Sandby borg and the second occupation phase in Eketorp feature the exact same number of houses (e.g. Victor 2015).

The location of ringforts in close association with wetlands has led to the suggestion that their function was ritual rather than military defensive, and that they were never permanently occupied (Fallgren 2008; Fallgren & Ljungqvist 2016). The violent attack on Sandby borg, however, indicates alternative functions, as excavations revealed a brutal attack where people were slain and left unburied in the fort (Alfsdotter et al. 2018). The timing of this attack is close to the volcanic winter of 536, and raises questions concerning the reason for the violence. Was this a singular event? Is it a mere coincidence that it concurs with a major climatic event, as well as with a large pandemic? We know that human remains have also been found in some of the other Ölandic ringforts dating to the same time interval and we know that some of the forts were re-utilized later, but not all of them. This makes them a great case study to address questions of crisis and resilience.

We will study the people and the societies that utilized the ringforts, and put the ringforts into an international context, addressing the following questions: What was the economy enabling the erection of forts and stone-wall-houses? Why were the forts and the stone-wall-houses abandoned? And why were some of the forts re-utilized? Were the people who built the forts and the stone-wall-houses local to Öland? Was it local people who eventually re-utilized them? What economic conditions enabled re-utilization of the forts? Were conflicts the reason for abandonment? If so, were the conflicts internal or external to Öland?

By answering these questions, we will be able to provide information on if and how societies, during major climatic events and pandemics, have dealt with conflicts and crises, and how this in turn might have affected their social cohesion, as expressed in their economy, cultural manifestations and religious beliefs. In this programme, we will be able to study if crises, caused by different external factors, are driving or retarding forces of societal development.

Based on the outcome of an initial survey, followed by geophysical and geochemical prospection, a number of ringforts will be targeted for excava-

tion. The excavations will be performed as seminar excavations for students from Stockholm and Linnaeus Universities, led by the project members. The artefacts, human and faunal skeletal remains, plant macrofossils and stratigraphical input will be used to generate new data through radiocarbon dating, stable isotope analysis, aDNA analysis, osteological and archaeobotanical analysis. We will naturally also bring together and make use of already existing data sources concerning the adjacent stone wall houses, skeletal material from cemeteries and settlements, pollen and macrofossil analyses, etc.

The project presents a unique opportunity to perform a high-resolution study of processes leading to, and societal responses to, crises caused by external factors such as climate change, contagious diseases, and warfare. These conditions are not very different from the ones that many countries in the world face today, in times of a warming climate, pandemic diseases and worldwide conflicts.

The programme started in January 2023, with initial geophysical prospecting and lidar drone surveys carried out during the spring, and the first excavations taking place in the Lenstad ringfort. The results will be communicated in peer review journals, edited books and in public-outreach channels, and the programme can be followed at our website, www.ringforts.com.

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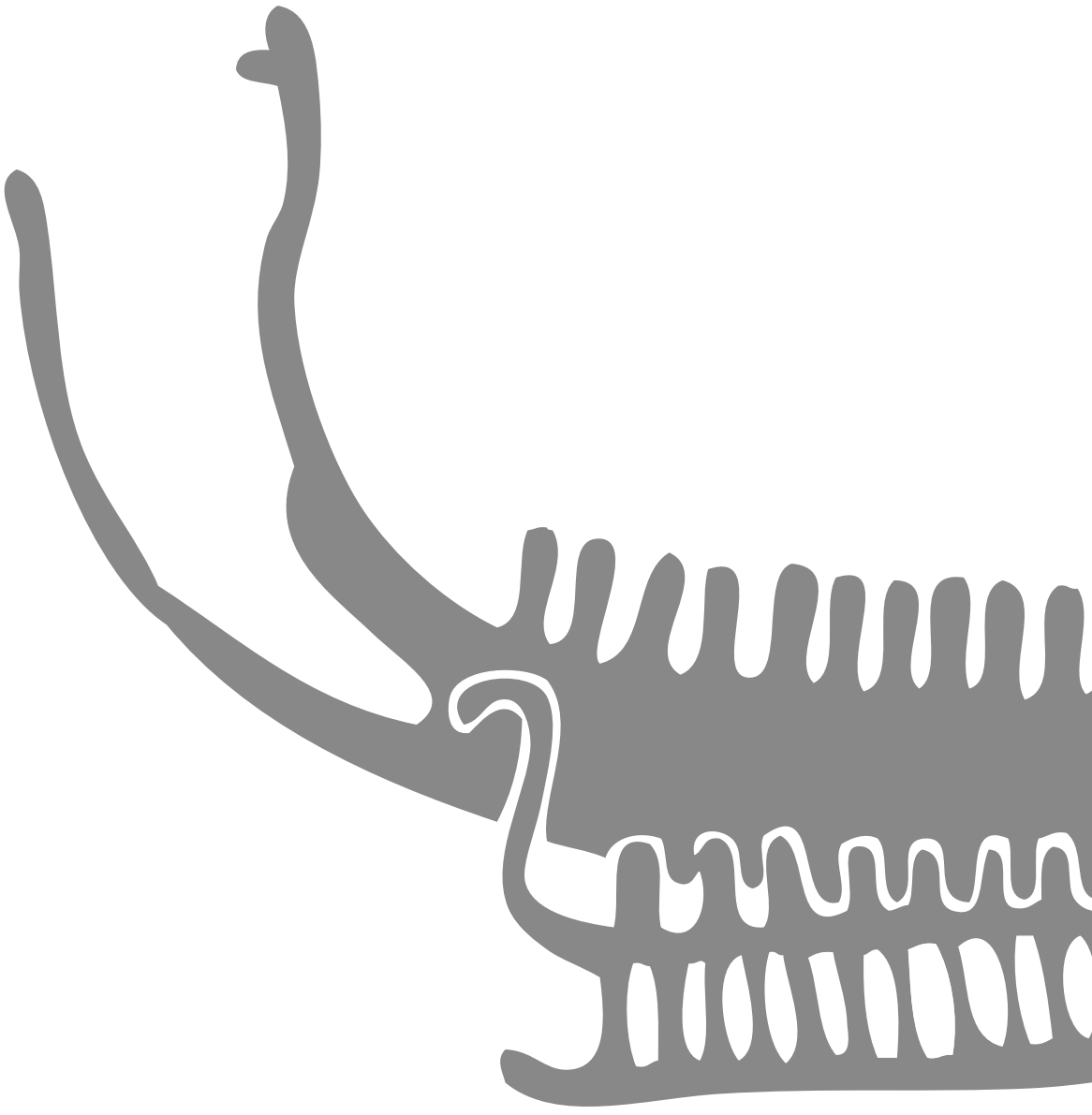

Contents

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