



# Crossing the Maelstrom: New Departures in Viking Archaeology

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Accepted: 1 April 2021  
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## Abstract

This paper reviews the achievements and challenges of archaeological research on Viking Age northern Europe and explores potential avenues for future research. We identify the reemergence of comparative and cross-cultural perspectives along with a turn toward studying mobility and maritime expansion, fueled by the introduction of biomolecular and isotopic data. The study of identity has seen a shift from a focus on collective beliefs and ritual to issues of personal identity and presentation, with a corresponding shift in attention to individual burials and the “animated objects.” Network ontologies have brought new perspectives on the emergence of sea trade and urban nodes and to the significance of outfield production and resources. Field archaeology has seen an emphasis on elite manors, feasting halls, and monuments, as well as military sites and *thing* assembly places, using new data from remote sensing, geophysical surveys, geoarchaeology, and metal detectors. Concerns over current climate change have placed the study of environment as a key priority, in particular in the ecologically vulnerable North Atlantic settlements. Discussing future directions, we call for alignment between societal/economic and individual/cultural perspectives, and for more ethically grounded research. We point to diaspora theory and intersectionality as frameworks with the potential to integrate genomics, identity, and society, and to ecology as a framework for integrating landscape, mobility, and political power.

**Keywords** Viking Age · Mobility · Identity · Power · Environment · Interdisciplinarity

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## Introduction

Whether we think in terms of exchange and mobility, gender, violence, migration, political evolution, ethnicity, or cosmology, the Viking Age is a focus of recent debates in archaeology. Today, studies of this period are equally invigorated by a range of new conceptual explorations as well as scientific approaches. Viking Age research also attracts attention as a globally known topic in popular history and is claimed as a historical heritage by diverse groups—from nationalists to internationalists, capitalists to environmentalists, atheists to neo-pagans. Yet, this reception serves as much to distort recognition of a period that holds genuine importance as a transformative historical trajectory.

The cultural and political transformation of northern Iron Age societies in the centuries following the dissolution of the Roman Empire along with the consequences of maritime expansion following the widespread adoption of sailing vessels make the Viking Age a lynchpin of developments across much of northern Europe. From the first documented maritime raids and explorations in the North Sea and on the Baltic shores shortly before AD 800, seafaring Scandinavian armies were a prime political concern in western Europe by the mid-ninth century. The following century saw Scandinavian communities settle and maintain trading networks that stretched from England, Ireland, and Atlantic Scotland to Normandy and European Russia, along with settlements in Atlantic Scotland, Iceland, and the Faroe Islands. This process culminated in the establishment of colonies in Greenland and ventures into Newfoundland shortly before AD 1000. Meanwhile, societies in Scandinavia experienced profound changes, including the creation of larger and more powerful kingdoms and the adoption of Christianity, especially from the mid-10th century onward. While the military and political roles of Scandinavians waned after the mid-11th century, Scandinavian (or Norse) diasporas maintained a strong cultural presence in coastal areas into the high Middle Ages, and the Viking Age remained a cultural memory expressed by sources such as the Icelandic sagas and Skaldic poetry.

This paper explores changes during the last decade in the archaeological analyses of Scandinavia and the wider Viking world during the Viking Age (c. AD 750/800–1050). Our aim is to review trends and tendencies, not to make an exhaustive list of research on the period. Viking Age archaeology refers to Scandinavia, parts of northern Germany, and the North Atlantic islands, including Iceland and Greenland, as well as to diasporas in western Europe, Ireland, the British Isles, and even as far west as Newfoundland. Furthermore, the activities of settlers, traders, and travelers of Scandinavian origin have been studied in Polish, Finnish, Baltic, and Russian areas as part of Viking Age archaeology (Fig. 1). In this paper, we emphasize developments and challenges in Scandinavia, with the ambition to also cover the main achievements relating to diasporas in the west and east. While the study of the Viking world is a highly interdisciplinary field, the main focus here is on archaeology. Achievements within philology (i.e., Old Norse studies), place name studies, history, and history of religion—subjects that mainly refer to written sources—thus mostly remain beyond the scope of the present paper.



**Fig. 1** Map of the Viking world with sites discussed in the text. Map: Louise Hilmar

In research on the Viking Age, as in popular perception of the period, one can identify two competing views as to what defines the subject of interest. One may see the Viking Age as a pattern of trade, diaspora, and raiding—activities in which society engaged with the sea and the wider world in new, transformative ways. The other view identifies its focus as Old Norse culture, with pagan worldviews and mentality as the point of departure. While these two views are not mutually exclusive, they tend to divide research interests and communities with little cross-referencing. We argue that a lack of integration between these two largely tacit strains of research undermines the effort of the first to identify motivations and agency and limits the potential of the second to engage with social organization. We also notice that the transformation of interdisciplinarity inherent in these developments aligns archaeologists increasingly with biology, chemistry, or geology and decreases research integration with philology, history, and social sciences.

In the following, we examine some themes that have been explored within the last decade. In response, we call for changes toward more ethical research frameworks: first, focus on an alignment between societal/economic and individual/cultural perspectives, with diaspora theory, personhood, and other post-humanistic perspectives as frameworks with the potential to integrate genomics, identity, and society; and secondly, an environmental perspective that integrates landscape, mobility, and political power with a growing attention to ecology, environmental change, and societal resilience.

## What Caused the Viking Age?

Mobility and interaction are integral to the concept of the Viking Age. Several developments work together to highlight these issues in recent research. Contemporary society's confrontation with economic globalization and its consequences, from increased wealth and resource pressure to migration and conflicts, has directed focus to corresponding themes in global history. At the same time, the recent maturing of a range of isotopic and biomolecular methods for provenancing materials has greatly augmented our ability to trace mobility and exchange in the past.

An issue where this interdisciplinary dialog works productively is in the search of causes for the "beginning of the Viking Age." At stake here is the trajectory of and dynamics behind the early raids by Scandinavians, recorded from the late eighth century onward in the British Isles and continental Europe, and the concomitant expansion of maritime contacts marked by archaeological finds in Scandinavia. The response of modern scholars is outlined in an important review by Barrett (2008, 2010) in terms of various determinants: technological, environmental, demographic, economic, political, and ideological.

Barrett rejects monocausal models and takes care to dismiss the commerce associated with the emergence of trade in the eighth century as a cause for the raids. He observes that the earliest recorded Viking raids appear to have taken place between western Norway and northern Britain, regions, he maintains, that had little involvement in the emerging trading emporia (Barrett 2010, p. 293). Instead, he proposes that the escalation in maritime activity was caused by a combination of new economic incentives combined with a "bulge" (Barrett 2010, p. 293) of young men competing over a short supply of farmland, status roles, and marriage partners (see critique in Jesch 2015, p. 107).

Barrett's perceptive review has triggered a series of responses calling to attention the importance of urban networks (Sindbæk 2011), ideologies (Carver 2015), personal reputation (Ashby 2015), and the availability of sex partners (Raffield et al. 2017; Wicker 2012; for critiques see Moen 2019, pp. 258–260, 2020). In most cases, these models are either too generic to engage with the chronology (i.e., why the favored dynamic should set off maritime expansion at a particular point in time) or they do not agree on essential points of time and trajectory. On this crucial question, Viking Age archaeology remains split between the traditional "big bang" theory of a rapid transformation emerging in the late eighth century and various models claiming a protracted "long dawn" of processes unfolding over the course of the eighth century or earlier still.

Among the proponents of the latter, Price suggests that the patterns of maritime raiding that define the "Viking phenomenon" may be found earlier than commonly thought and outside the North Sea; he argues that such finds as the Salme ship burials (Fig. 2) from c. 750 imply "that the origins of raiding might well lie within the Baltic sphere, with a focus on the east" (N. Price 2018b, p. 13). The Salme ships and their crew were found buried in Estonia, but isotopic signatures trace their origin to Middle Sweden (Price et al. 2016). To claim Salme as the



**Fig. 2** The Salme II ship burial from c. 750, uncovered in 2010 on the Island of Saaremaa, Estonia. The ship contained the remains of over 40 males, many displaying physical trauma from battle, together with numerous weapons and other artifacts. Isotopic analyses and artifacts suggest that the group originated in central Sweden. After T. Price et al. 2016

beginning of a new pattern is refreshing, but it may essentially be as arbitrary as the plunder of the monastery at Lindisfarne in 793, which traditionally has been used by historians as a mark of the beginning of the Viking Age.

Where the period around 800 clearly *does* mark a new pattern is in the arrival of continental and insular metal artifacts in western Scandinavia. A series of recent studies survey new finds, many produced by private metal detecting in Denmark (Baastrup 2014) and Norway (Aannestad 2018; Heen-Pettersen 2014, 2019; Heen-Pettersen and Murray 2018). Sweden does not have a comparable record, in part due to restrictive legislation on metal detecting (Dobat 2013a) and also to real differences in distribution (Heen-Pettersen 2019). The new finds leave established chronology and geographical trends largely intact: few, if any, overseas imports can be shown to have arrived before c. 800, whereas they proliferated in the ninth century in coastal regions of western Norway and in maritime “gateway” regions in Denmark. This temporal and geographical distribution remains a fact to explain, regardless of recent suggestions to rethink the Norwegian involvement in early Viking Age raids (Griffiths 2019).

The ostentatious acquisition, display, exchange, and deposition of foreign objects seen in this period is still best explained as relating to the emergence of overseas raids around 800. The emergence of monumental ship graves in the same decades may similarly point to a new ideological emphasis on navigation (Bill 2020). If so, this puts the date of the most ostensible archaeological markers for the beginning of the Viking Age in line with the traditional date based on evidence from written sources.

New research lines, including biomolecular studies, have contributed decisively to the issue and provide templates for further research. Using molecular species identification on antler combs from Orkney, von Holstein et al. (2014) thus reject previous claims to the use of reindeer antler in pre-Viking contexts. Their results neutralize a key line of evidence claimed to support the existence of longstanding peaceful interaction between Norway and the Northern Isles prior to late eighth-century raids.

This shifts the balance of evidence for a “long dawn” for North Sea navigation. In another study, Ashby et al. (2015) apply the same method to comb-making workshops in the emporium Ribe, Denmark, and demonstrate that the arrival of reindeer antler as a raw material in this site *did* indeed predate the beginning of North Sea raids. As reindeer must have been sourced from the Scandinavian Peninsula, this provides the missing link between Norway and North Sea emporia, which Barrett (2010) called for. A recent study by Rosvold et al. (2019) pursues this line of research further by applying DNA analysis to archaeological antler, demonstrating links to geographically specific reindeer populations.

Another key contribution is provided by Baug et al. (2019) through petrographic and geochemical studies of whetstones found in Ribe, Denmark. The authors show that the majority of whetstones from contexts from c. AD 760 onward probably originated from quarries in Eidsborg, Telemarken, and Mostadmarka near Trondheim, Norway. While speculating rather freely on the particular historical context of this import, the study provides the clearest evidence yet that the Viking Age raids were preceded by an extended period of long-distance voyages that linked emporia trade in the southern North Sea to central Scandinavia.

From Salme to Ribe to Mostadmarka, detailed biomolecular and geochemical studies thus provide valuable new pointers to the emergence of long-distance maritime connectivity at the beginning of the Viking Age. This debate and the discovery process are likely to continue in the coming years as new challenges arise and further data and methods are integrated.

## The Viking Diaspora

A benchmark of Viking studies in the 2010s is Jesch, a philologist who calls us to study the Viking Age as the creation of a cultural diaspora (Jesch 2015). Jesch draws on contemporary cultural theory, in particular on Cohen (2008), a sociologist who studies globalization and migration, to suggest how the ambiguous identities, collective myths and memories, and the troubled intergroup interactions created by movement and resettlement are central to the study of the Viking Age. Her perspective has reinvigorated Viking studies by turning issues often seen as problems of definition into key interest points.

Jesch’s framework typifies a field that has witnessed a reemergence of cross-cultural and deliberately comparative perspectives. Following the culmination in the 2000s of a long-term trend toward interpretive foci aiming to unlock the culturally unique, researchers have in recent years explored psychology (Raffield et al. 2016), economic theory (Svendsen and Svendsen 2016; Svendsen 2019), or resurrected ethnographic analogy (Downham 2015; Melheim et al. 2016; N. Price 2018a), in search for general themes and processes.

While themes of migration, diaspora, and transnational communities have readily engaged historians and philologists of the Viking Age, archaeologists have also attempted to pursue them. Some trace the movement of objects and materials or apply social network protocols to distribution studies (Sindbæk 2013a). Others focus on the active use and manipulation of nonlocal objects and styles (e.g., Aannestad

2015; Burström 2014; Glørstad 2014; U. Pedersen 2015, 2016a, b; H. Williams 2014b).

Meanwhile, studies focusing on the period's signature technology of mobility—boats and ships—have been scarce. The last decade has seen the completion of important maritime research efforts begun decades ago (Crumlin-Pedersen 2010; Englert 2015) but less in the way of new departures for studies of ship technology. The most notable efforts have been made in the harbor of Birka, Sweden, where long-term marine archaeological investigations have led to an improved understanding of the harbor facilities of the site, albeit not to major new ship finds (Olsson 2017; Hansson et al. 2018). Instead, scholars have brought the ritual use of boats and ships in burials to the fore (Bill 2016, 2017, 2020; Bill and Daly 2012; Bonde and Stylegar 2016). While attention has thus been directed to older finds, this situation may be due to change, as two new finds of ship burials were recently reported from geophysical surveys of Gjellestad in southeastern Norway and Edøy in northern Norway. Both finds are as yet unpublished, except for news reports, but they promise a much-needed reinvigoration of ship archaeology.

For wider, comparative explorations of Viking diaspora, the archaeological record proves disturbingly erratic. In the North Atlantic islands, including Greenland, Iceland, and the Faroe Islands, where Scandinavian immigrants constituted the main human presence during the Viking Age, archaeologists can summon data to pursue broad themes like settlement history and colonization processes (Schmid et al. 2017; Vésteinnsson and McGovern 2012) and cultural adaptation (Dugmore et al. 2012). In the southern North Sea, by contrast, researchers are confined to isolated detector finds or hoards (Ijssennagger 2013, 2015) and attempts to place these in wider patterns of cultural interaction (Croix and Ijssennagger-Van Der Pluijm 2019; Hines and Ijssennagger 2017).

In the Irish Sea region and Atlantic Scotland, apart from towns and military camps (see below), traces of the Viking diaspora are largely restricted to occasional graves, as at Cnoc nan Gall in the Inner Hebrides, Swordle Bay in western Scotland, or Cumwitton in Cumbria (Becket et al. 2013; Halstad-McGuire 2010; Harris et al. 2017; Harrison 2015; Paterson et al. 2014). Here, publication of the corpus of Viking graves and grave goods in Ireland is an outstanding achievement of the decade (Harrison and Ó Floinn 2014). Other studies emphasize the diasporic elements in settlement structures (Glørstad 2012, 2014). The Isle of Man remains an exception, showing a more varied record, which invites synthetic studies (Steinforth 2015a, b, c; Wilson 2018). Few major excavations have taken place, and these have been largely in rescue contexts, yet a group of recently published settlements provide a much-needed baseline: Cille Pheadair and Bornais in the Hebrides (Pearson et al. 2018; Sharples and Best 2020), and sites at Bay of Skail, Orkney, and Unst, Shetland (Griffiths et al. 2019; Turner et al. 2013).

In Poland, the last two decades have seen steeply increased interest in Scandinavian contacts, although research remains hampered by the language barrier (Gardeła 2015). The publication of excavations from 1990–2002 in the Ogrody district of Wolin, as well as two remarkable volumes of synthesis on previous excavations, is a ground-breaking contribution to Viking Age studies in Poland (Rębkowski 2019a, b; Stanisławski and Filipowiak 2013, 2014). These and other results have been used

to bolster the case for Wolin as the site of the fabled Jomsborg of saga fame, as well as to argue for a key role of Scandinavians in the early Polish state (Stanisławski 2013). The theory has sparked widespread debate among Polish researchers, as have the interpretation of the burials often previously discussed as Scandinavian chamber graves in Poland. New analyses, including isotopic and aDNA studies, point against the idea that these elite burials were typically for people of Scandinavian origin (Błaszczuk 2017; Błaszczuk and Stępniewska 2016; Janowski 2015). These debates have framed the emergence of a more balanced assessment of what is arguably a real but limited presence of Scandinavian influence in Poland (Gardęła 2015; Moździoch et al. 2013).

A potential for a more diverse view of the Viking Age can be gleaned in the Baltic Sea area, albeit recent research has seen only occasional efforts to bring mainland Finland (Ahola and Tolley 2014) and the Åland Islands (Frog et al. 2014) into the dialog. Attempts to bring the eastern Baltic into a similar dialogue remain on even fewer hands (Mägi 2011, 2015, 2018, 2019), though with notable efforts directed to Linkuhnen, Wiskiauten, and other sites in the Kaliningrad region (Goßler and Jahn 2018; Ibsen and Frenzel 2010).

Meanwhile, Scandinavian exploration in Russia and eastern Europe continues to attract active interest, characteristically in the form of conference proceedings reviewing work originally published in many different languages (Androshchuk et al. 2016; Bauduin and Musin 2014; Bjerg et al. 2013; Callmer et al. 2017). Within Russian archaeology and historiography, questions concerning Scandinavian contacts and their role in the early Rus' state continue to stir debates (Jackson 2019) and discussions of the archaeological sites where evidence of such contacts is focused, including Kiev, Novgorod and Staraya Ladoga, Izborsk, and Pskov (Makarov 2017). Research at these hotspots is complemented by artifact studies (Androshchuk 2013, 2014; Androshchuk and Zotsenko 2012) and studies of graves and burial custom (Mikhaylov 2016). Yet, despite the fact that the past decade has also seen notable fieldwork and research on key trading sites, including Gnezdovo on the upper Dnepr (Puškina et al. 2017), Shestovitsa in the Ukraine (Kovalenko 2013; Skorokhod and Błaszczuk 2020), and Staraya Ladoga in northwestern Russia (Kirpichnikov 2018; Nosov 2018), the results are virtually not discussed outside Russia.

Some of the most transformative results in the search for Viking diaspora concern the Danelaw in northern England. They result above all from the rich evidence of private metal-detected finds and its systematic recording and research (Richards and Naylor 2012). This has allowed the identification of sites such as the AD 872–873 winter camp of the Viking Great Army in Torksey, Lincolnshire (Fig. 3), and, more generally, a reevaluation of the scale and impact of Viking settlement (Hadley and Richards 2018; Raffield 2016; Richards and Haldenby 2018; G. Williams 2015). In particular, the program of surveys and excavations at Torksey have contributed to characterize the archaeological signature of a Viking army camp site (Hadley and Richards 2016). Also connected with this work are studies of army provisioning, including large-scale pottery production (Perry 2016, 2019).

The most extensive exploration of the metal-detected evidence is Kershaw's (2013) monograph on Scandinavian-type objects in England. Her study assembles long-missing archaeological material and matches it to the onomastic and linguistic





**Fig. 3** A selection of metal-detected finds from the AD 872–873 winter camp of the Viking Great Army in Torksey, Lincolnshire. The finds include numerous lead gaming pieces together with weight coins, hack-silver, and ornaments, including types more commonly found in Scandinavia. Photograph: © Fitzwilliam Museum, Cambridge

evidence of mass settlement of Scandinavians. Kershaw notes a striking number of female ornaments among Scandinavian-style objects and suggests this to be evidence that the settlers included numerous Scandinavian women (e.g., McLeod 2011). Other researchers note adaptations to the design of many Scandinavian-type brooches, which may indicate that some were produced by Anglo-Saxon metalworkers, perhaps as likely to be worn by Anglo-Saxon as by Scandinavian women (Rogers 2020, p. 268).

Debate on the Danelaw diaspora is also raised in the context of the study on the modern genetic structure of the British population, which claimed to show that the number of Scandinavian Viking Age migrants to England had been negligible (Leslie et al. 2015). In response, Kershaw and Røyrvik (2016) point out how the results are biased by a sampling strategy that was insufficiently informed by archaeological and historical knowledge and did not permit a distinction between the Migration-period Anglo-Saxon genetic component (argued to be substantial) and the Viking Age Scandinavian one.

The Viking diaspora is thus a difficult matter to pursue in archaeological research (Norstein 2020). Many studies still struggle with the task of even attesting the presence of Scandinavian populations and producing a timeline and scale to their occurrence. They rarely manage to proceed to in-depth examination of the nature of interactions. The sheer scale of activity revealed by metal detecting is changing

perceptions, despite struggles to contextualize the material. The same goes for the detailed studies on burials, monuments, and material culture, which have more to reveal on attitudes and agency. Yet for a real understanding of movement and interactions, this material needs to be linked more specifically to the origin and displacement of individuals. This is what evidence emerging in the study of biological signatures now increasingly adds.

## A Scientific Approach to Mobility

Isotopic signatures in human skeletal remains have engendered a major thrust of research in the Viking world. While isotopic studies a decade ago would typically concentrate on a single element (strontium being all the rage for archaeologists in the early 2010s), research is currently moving to consider the combination of multiple isotopic signals. The natural extension to this trend is the addition of aDNA and proteomics.

Many pioneering studies in this field have been essentially concerned with learning to interpret the evidence in geological and climatic settings as diverse as Denmark (Knudson et al. 2012; T. Price et al. 2011, 2012), the North Atlantic (Montgomery et al. 2014; Price and Naumann 2014), and Middle Sweden (Hedenstierna-Jonson 2015). Some early studies, as yet with slim baseline data, were marked by a somewhat unbalanced synergy of scientists and archaeologists. Thus, the inference that warriors interred at the late 10th-century Trelleborg fortress in Denmark were largely recruited from outside Denmark (T. Price et al. 2011) was based on a stipulated local range that was more restricted than the variation subsequently seen in faunal samples from the same site (Frei and Price 2012). This raises questions as to how far signatures may vary within a region.

Even elements, which have long been studied, continue to reveal noteworthy results. By this means it has been possible to solve an enigma long surrounding the famous mass burial in Repton in the East Midlands, UK. Since its discovery in the 1970s, the site has been suspected to relate to the wintering of the Great Heathen Army that invaded England in 865–874. Longstanding dispute was raised by radiocarbon dates, which appeared to indicate a long period of use beginning before the Viking Age. New analysis has finally clarified the issue thanks to a full study of the isotopic signal, which revealed that the initial results had failed to consider the marine reservoir effect caused by a fish-rich diet (Jarman et al. 2018). Once recalibrated, the dates are consistent with the Great Army activities.

Strontium and light stable isotopes also suggest a Scandinavian origin of at least some of the c. 37 individuals, mostly young adult males, found in a mass burial at the grounds of St. John's College, Oxford (Pollard et al. 2012). It has been suggested that the deceased represent an unsuccessful raiding party or possibly victims of the AD 1002 St. Brice Day's massacre. A similar origin is suggested by oxygen and strontium signatures seen for some of the individuals from a burial pit discovered on Ridgeway Hill, Dorset (Fig. 4), containing an assemblage of at least 51 adult males, some arguably of Scandinavian and others of Baltic origin (Chenery et al. 2014; Loe



**Fig. 4** A burial pit discovered on Ridgeway Hill, Dorset, containing an assemblage of at least 51 decapitated adult males, buried in the 10th century. Several individuals show isotopic signatures that suggest a Scandinavian origin, and the burial is thought to represent an unsuccessful Viking raiding party. Photo: Oxford Archaeology

et al. 2014). These studies showcase the power of isotopic analysis to turn otherwise enigmatic bioarchaeological finds into contextual evidence.

As more studies become available for comparison, researchers are increasingly able to assess the resulting patterns. It is now possible to compare the proportion of people of local versus nonlocal origin buried at the trading site Ridanäs, Gotland (Peschel et al. 2017), with the Viking Age towns Birka (T. Price et al. 2018) and Sigtuna (Krzewińska et al. 2018). The results point to a progressive biographical diversity, which in the urban sites is high even by comparison with modern-day data. This contributes real evidence to feed into the debate as to whether early towns in the Viking world were international “circulation societies” or more grounded in regional communities.

With an increasing use of multi-isotopic approaches, isotopic studies have begun to offer results of more historical and archaeological consequence. Among the high-profile results is the isotopic provenancing of individuals interred in the two ship burials at Salme, Estonia, as being almost certainly a party from Middle Sweden (T. Price et al. 2016, 2020). With a date in the mid-eighth century, this attribution has made the Salme burials a focal point in debates on the beginning of the Viking Age (see above).

Ancient DNA studies, meanwhile, have as yet made only isolated contributions, despite great expectations (Buckberry et al. 2014; Pollard et al. 2012). The conclusions of the first few Viking Age aDNA studies are inevitably as cautious as the first flush of isotope studies (Krzewińska et al. 2015, 2018). The study of mobility

in the Viking Age is set for a paradigmatic shift with the arrival of population-level genomic studies currently in preparation. This may leave isotopic studies with a more limited but important role as a tool supplementing the far more information-packed aDNA in sourcing immigrants and their offspring.

In coming years, isotopic and biomolecular techniques will almost certainly continue to add new data to the study of the Viking Age. Yet, their potential to fuel historical research needs to be put in perspective. The incorporation of natural sciences into the Viking Age archaeology of the past decade has brought back streaks of an unhealthy positivism and a return to the concept of bounded cultural units that has long been explored and criticized in other contexts (see Furholt 2018 for a similar critique of the use of natural sciences in research on the Neolithic in Europe).

For these new data to become of more than passing interest in the study of the human past, they must be integrated with the causative and resulting cultural dynamics. Furthermore, they must be combined with theoretical models that build on a nuanced perspective on mobility and the constructions of social groups and social identities. While biologists, geologists, and chemists have entered the interdisciplinary dialogue for good, the eventual success of this line of research will depend on the character of the collaboration of philologists, historians, and archaeologists, who continue to hold key evidence for and, more importantly, insights into what remains interesting about the Viking Age.

## Individuals and Multiple Identities

Social practice, communities, rituals, and aristocracies were major foci of Viking archaeology during the late 1990s and 2000s, followed by interests in cultural norms and change and in worldviews and religion. The work that has unfolded in the 2010s reflects a profoundly different generational experience. While a focus on structures, actors, and identity was previously framed by practice theory and post-structuralism, one may observe a shift in interest from large social groups toward a stronger focus on individuals, their appearance, and specificities. The change of emphasis may be linked to the experience of individuals in our contemporary world, as social media has become a fact of life. Accordingly, the previous interest in collective beliefs and action has seen declining attention, while work has turned to issues of personal identity and presentation, with an inclination toward nonnormative social roles and statements. If the quintessential attraction of the Viking archaeology of the 2000s was a ritual site or deposit (e.g., Dobat 2006; Jørgensen 2009; Larsson 2007; Lund 2008; N. Price 2002; Zachrisson 2004a, b), that of the 2010s could be a grave with unique personal features and ritual objects (e.g., Gardela 2013a; Harris et al. 2017; Hedenstierna-Jonson et al. 2017; Ulriksen 2018).

Societal context affects many aspects of research on the Viking period. “Viking” is used as a positive term in contemporary identity discourse; at the same time, it is presented as a primitive, aggressive, prestate construction (Croix 2016; Halewood and Hannam 2001; Sindbæk 2013b; Svanberg 2003a). Even within research, reflections of a nationalistic mindset can be identified, for example, by analyzing how scholars have used the pronouns “we” and “us” as terminology for describing people

in Viking Age societies, in contrast to the use of “they” in descriptions of people in Sámi societies in the same time and regions (Jahnsen 2016).

Recent studies of social identities have focused principally, and often separately, on aspects of ethnicity and gender. Within Swedish and Norwegian archaeology, the former includes an interest in the interrelationships between Old Norse and Sámi societies, while the significant cultural other for archaeology in Denmark are the Slavs of the southern Baltic Sea. In areas of Viking settlement outside Scandinavia, questions of ethnic identity are brought to the fore in relation to interactions with previously settled populations (Hayeur Smith et al. 2018; Sutherland 2009).

Using anthropologists Barth (1969) and Eriksen (1994) as a foundation and approaching ethnic identity with a strong aspect of situationalism, scholars have identified social groups that may have possessed an in-between or creolized position between Old Norse and Sámi identities. Others, building on the scholarship of Said (1978) and Bhabha (1994) and in particular the work of archaeologist Siân Jones (e.g., Jones 1997), have approached this theme that emphasizes hybridity as a way of avoiding the latent essentialism suggested by creolization as a mixture of two entities (Amundsen 2017; Bergstøl 2004, 2008; Mulk and Bayliss-Smith 2007; Nielsen and Wickler 2011; Spangen 2009). Similarly, cultural memory related to migration from Slavic areas into Scandinavia and the social setting of these groups within Scandinavian societies have been explored in relation to early urban as well as rural contexts. This field has also questioned the role of gender, including hybrid positions, in the creation of social identities (Gardeła 2018; Hillerdal 2009a, b; Moen 2011, 2019; Naum 2007, 2008; Roslund 2007).

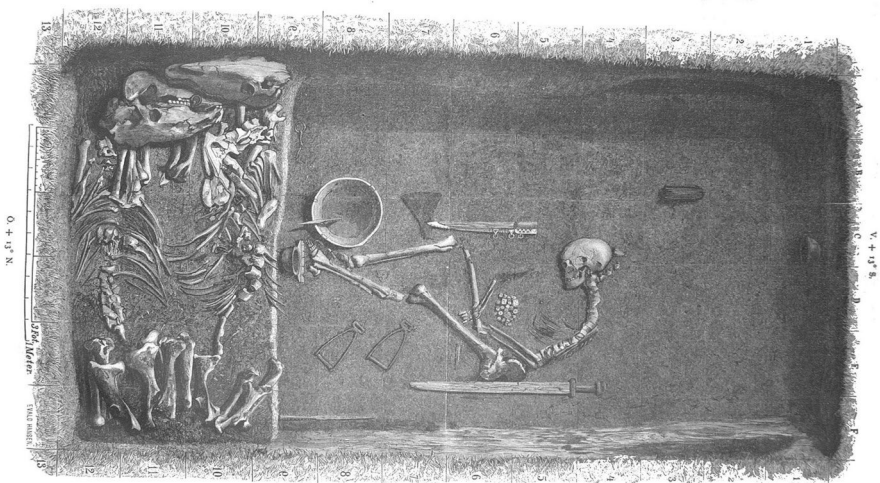
Studies of gender have mainly issued from interpreting burials (e.g., Arwill-Nordbladh 2008; Gardeła 2013a; Hillerdal 2009a; Moen 2011, 2019), but even the use of space within the household and its relations to gender have been explored (Croix 2012; Eriksen 2019). Other aspects of identity are highlighted by individual studies. Hedenstierna-Jonson (2006) has explored warrior identities through grave finds and settlements. Raffield et al. (2018) have suggested the dominance of men over women through institutions of polygamy and concubinage, albeit based on a limited range of sources. Raffield (2019a) and Ravn (2012) have separately examined childhood and the formation of hegemonic ideals, though also exclusively with a male focus. Furthermore, Eriksen (2017) has explored the ontological status of infants in the Viking Age in relation to objecthood. Other specific social roles that have been studied include thieves (Kalmring 2010a), slaves (Naumann et al. 2014; Raffield 2019b; Roslund 2013), disability (Arwill-Nordbladh 2012), ritual specialists (Karg et al. 2009), and smiths (Barndon 2005; Hed Jakobsson 2003; Hedeager 2011; Lund 2010; U. Pedersen 2009). These perspectives often imply the assumption that the grave goods were the possessions of the deceased, a position that has been justly questioned in other areas of archaeology (e.g., Odebäck 2018).

Compared to previous mortuary studies, which tended to focus on collective rituals (e.g., Svanberg 2003b), increasing attention is now brought to the individual, to unique features, or to the specifics and variations within the burial rites. The research project focused on the “Birka girl” stands out as an example. Through a combination of isotope analyses and analyses of grave goods and burial custom, one infant grave from Birka is utilized to discuss mobility and social dynamics (Hedenstierna-Jonson

2015). The “Birka girl” study pioneers an attempt to combine biomolecular data and contextual archaeology, although it is inevitably limited by the lack of comparative context.

As part of the focus on individuals, variations, and diversity, burial studies have highlighted “deviant” burials (Gardela 2013a; Toplak 2015, 2016). Some of these burials have been interpreted in light of gender theory, in particular with a foundation in Judith Butler’s work, and interpreted as the burials of persons with a queer or transgendered identity (Gardela 2014; Kastholm Hansen 2016; N. Price 2002; Ulriksen 2018). Considering that it may often be hard to determine in any region what a “typical” burial was (Lund 2013; N. Price 2008b), it has turned out to be equally challenging to determine which burials differ so strongly as to be termed deviant. However, Gardela (2013a), in particular, demonstrates how the identification of burials in which the buried were treated differently than the majority may also give insights into ideas of the afterlife and the relationship between the living and the deceased. This also raises the question of how liminal some of these so-called deviantly buried individuals may have been within the Viking society, while they were at the same time provided with burials that could indicate that they were considered to be part of a social elite.

From this perspective, it is instructive to follow the reactions to the recent identification by aDNA of one warrior burial in Birka chamber grave Bj.581 (Fig. 5) as female and thus, potentially, a female military leader (Hedenstierna-Jonson et al. 2017; N. Price et al. 2019). This discovery gave rise to strong reactions from other scholars, in part, at least, because it did not match existing preconceptions of what a warrior was in term of gender (Androshchuk 2018; Edberg 2019; a volume of response was also expressed in media). While the authors acknowledge



**Fig. 5** Plan of Birka chamber grave Bj.581, a warrior grave excavated by H. Stolpe in 1878. The skeleton was confirmed as female by aDNA in 2017. The discovery demonstrates the impact biomolecular research now has on social archaeology. Drawing by H. Stolpe in 1889

the complexities of funerary transformations, they find “better contextual evidence for the more literal and traditional interpretation” that Bj.581 was “the grave of a woman who lived as a professional warrior and was buried in a martial environment as an individual of rank” (N. Price et al. 2019, p. 192). This pragmatic stance stands somewhat in contrast to what made Bj 581 an extraordinary discovery in the first place, that the biological sexing of the deceased crossed lines among what is otherwise a markedly gender-binary distribution of funerary objects in Birka’s mortuary traditions. As such, the find inevitably challenges wider preconceptions of the Viking Age.

Lately, instead of the identification of gender being framed by binary oppositions, an intersectional perspective has been advocated in which the co-existence of several vectors is seen to intersect in creating self-identity (Arwill-Nordbladh 2013b; Lund and Moen 2019). The time is ripe to use these results further in more nuanced studies of how individuals were part of more than one social group in terms of kinship, gender, occupation, and lifestyle.

Simultaneously, we find increasing interest in what an individual *is* in terms of the study of personhood: what constituted being considered a person and what it meant to be a person in Viking Age Scandinavia. This has been explored in burials (Fahlander 2016, 2018; Lund 2013, 2017) and, with a focus on the relationship between personhood and objecthood, in hoards (Lund 2015, 2017; Myrberg 2009a, b). The perspective of personhood holds the potential to challenge the preconception of grave goods as being directly and intimately linked with the deceased individual in the grave as the possessions of the deceased.

As instruments in the transformation of the deceased from biological to social dead and in the incorporation of the bereaved into society, the grave objects also reflect these actions. For instance, in several graves at the burial field Bikjholberget at the early urban site or emporium of Kaupang, Norway, the final ritual action of the burial consisted of chopping grave goods to pieces and leaving the axe stuck in the ground (Lia 2004; Lund 2013). Similarly, N. Price (2002) and Wickholm (2006) have demonstrated how spears were sometimes thrown into a grave as part of the burial. In some instances, these objects were antiquities removed or robbed from older graves (Wickholm 2006). Thus, in future studies of graves, we need to be open to the complexity of creating identity, while understanding the burials as potentially part of personhood transformation and thus not identifying all grave goods as the possessions of the deceased.

To fully grasp the complexity of identities as well as rituals, we may call for future analyses that further explore the relationship between objects that represent the identity of the deceased and artifacts related to the bereaved and to the performative burial rites. Furthermore, there is potential to utilize insights into the performance of ritual aspects of the burials in order to grasp the complexities of how identities were created, maintained, and transformed in Viking Age societies. The aDNA of Bj. 581 has been valuable in putting gender back on center stage in Viking Age archaeology. Hopefully, future mortuary archaeology will further emphasize the complexity of the relationship between the deceased, grave goods, identity, and personhood.

## From Cult and Belief to Worldviews, Viking Ways, and Ontologies

Through the 2000s, Viking Age archaeology moved from studying Old Norse paganism exclusively as a religion to examining it as worldviews, minds, and aspects of the cognitive landscape, thus including and incorporating social and cultural perspectives and consequences (e.g., Andrén et al. 2006; Hedeager 2011), or what Price (2002) has termed “the Viking way.” Following this line of thought, new studies have broadened these issues into a study of Viking Age *ontology* (Back Danielsson 2007, 2016; Eriksen 2019; Fahlander 2018; Lund 2013, 2017).

As Andrén (2013a) points out, a characteristic feature of Viking Age rituals is that they took place at many different locations in the landscape. In addition to the depositions in relation to magnate’s halls, a number of studies have explored the ritual actions of depositions that took place in wetlands (Androshchuk 2010; Gotfredsen et al. 2014; Hedeager 2003; Lund 2008, 2010; Zachrisson 2004b) and others the ritual actions at trees and groves (Andersson 2004; Magnell and Iregren 2010). The similarities between ritual activities within an Old Norse ontological framework and those of the Sámi ritual places have also been highlighted (Lund 2015; N. Price 2000; Spangen 2009).

Studies of the Scandinavian conversions to Christianity, a focus of research in the 1980s and 1990s, have been fewer in the last decade (but see, e.g., Andrén 2013a; Kristjánsdóttir 2015; Lund 2013; Vésteinsson 2016). In the early 2000s, a group of studies pioneered new ways of incorporating written sources and archaeology in studies of pre-Christian or Old Norse worldviews. Most significant were the studies by Hedeager (2003, 2004), Solli (2002), and N. Price (2002). They shared a renewed trust in evidence from the Old Norse written sources and used these to challenge and deepen the understanding of the Viking Age way of life, rituals, cognition, and belief system. These studies did not abandon source criticism but sought to identify analogies between phenomena expressed in material culture and those preserved in texts, including material metaphors as analogies to the *kenninger* from the written (though originally oral tradition of) Old Norse poetry (Andrén 2000; Domeij Lundborg 2006). Rereadings of Old Norse sources have now been combined with advances in ritual studies to highlight the performative elements of rituals and of ritualization as actions (Eriksen 2016; Gardeła 2008; Lund 2013; N. Price 2005, 2008a, 2010, 2014). Additionally, mortuary studies have highlighted the memorial actions of the burial rites and the relationship between the bereaved and the deceased (Back Danielsson 2016; Bill 2016; Lund 2013; Nordeide 2016; A. Pedersen 2014; H. Williams 2016).

In the 2000s, the focus in studies of rituals in the Viking Age was on the cognitive landscape and the spatial aspects of rituals in particular (Andrén 2002; Hedeager 2003; Ljungkvist 2006; Lund 2005, 2006, 2010; N. Price 2002, 2005; Raffield 2014; Söderberg 2005; Zachrisson 2004a, 2014). The starting point for examinations of spatiality was the archaeological material, mainly acts of deposition, and from there finding counterparts, similarities, and differences in Old Norse written sources—an interdisciplinary approach combining archaeology with toponyms, in particular sacral place names, philology (not always without



interdisciplinary frictions), history of religion, and cognitive research. Acts of depositions within the settlement were also in focus, in particular in relation to the magnate halls (Lucas and McGovern 2007) and later in more regular buildings (Eriksen 2017).

In the last five years, attention has shifted from the landscape to artifacts through an exploration of what Lund has termed “the animated objects of the Viking Age” (Aannestad 2018; Burström 2015; Eriksen 2017; Lund 2015, 2017). The renewed focus on artifacts has also gained impetus from new analytical capacities such as material analysis or the use of 3D scanning (Åhfeldt 2013; Neiß et al. 2016; Oehrl 2017, 2019; Wärmländer et al. 2015).

A case in point are pendants and other ornamental metalwork, the number of which has increased significantly, mainly due to metal detecting. Many of these finds are categorized as amulets for personal protection or as part of ritual actions (Graham-Campbell 2013; Gräslund 2007; Jensen 2010; A. Pedersen 2009; Zachrisson 2018). Methodologically, the finds at the core of the debate on what characterizes the Viking Age mentality are thus mainly stray finds. To a noticeable extent, the interpretations of the amulet finds have been worked to fit into the existing discourse on Old Norse religion, rituals, and the Viking way, as laid out in archaeology in the early 2000s.

Pendants with potential mythological connotations, such as those interpreted as valkyries, have thus received generous attention (Gardeła 2013b, 2018; Gardeła and Odebäck 2018; Helmbrecht 2011; see also Domeij Lundborg et al. 2012 for a discussion of the use of Old Norse sources in interpretations of metalwork). In addition to these and other objects interpreted as depicting artifacts associated with potential Old Norse pagan rituals, such as staffs, chair pendants, Thor’s hammers, and miniature weapons, a group of objects potentially show Christian references, such as the so-called “bag” pendants interpreted as miniature books, the 11<sup>th</sup>-century Agnus Dei amulets, or the so-called Hiddensee crosses (Armbruster and Eilbracht 2010; A. Pedersen 2009).

A notable element is the intense discussion on the gender of some of the anthropomorphic amulets, such as the “Óðinn” figurine from Lejre (Christensen 2013). Scholars have strived to determine whether this small, exquisitely detailed silver figurine, found in 2009, is a configuration of the god Óðinn or, for example, the goddess Freya (Fig. 6). However, just as belief systems may have been ambiguous in the late Viking Age, with pagan and Christian elements being partly interwoven, it may be relevant to search for deliberate ambiguity in terms of gender (Arwill-Nordbladh 2013b; Mannering 2013), especially considering the openness to associations and metaphoric expressions argued to be essential to Viking Age mentality (Andrén et al. 2006; Domeij Lundborg 2006).

A biographical study of objects marks a new approach to material culture as an active force in social relations. Furthermore, a focus on the *chaînes opératoires* of the period has been reinforced in the studies of production, inspired by theoretical formulations such as actor–network theory. These methods form a welcome addition to traditional typological studies, much as these remain useful (e.g., Androshchuk 2014). Weapons, in particular swords and pieces of jewelry, including penannular brooches, as well as imported and transformed objects such as trefoil brooches

**Fig. 6** Silver figurine found at Lejre, Denmark, in 2009. The figure is identified by some as the god Óðinn, enthroned and with two ravens, but the clear attributes of female dress raise questions. This and other new finds of figurative pendants and amulets throw new light and questions on Viking Age cult and iconography. Photo: Ole Malling and Roskilde Museum



and pendants produced from artifacts with completely different social spheres, have been studied with an emphasis on the changing social connections and links to production, trade or gift giving, potential heirlooms, and finally the deposition of the artifact that took them out of circulation (Aannestad 2015; Ashby 2014; Burström 2014; Glørstad 2012; Lund 2008, 2009, 2015; Myrberg 2009a, b).

The growing focus on personhood has also affected the study of beliefs and worldviews, such as in the exploration of human–animal relationships (Hedeager 2010; Jennbert 2015; Pluskowski 2010). A focus on ontology has also pointed Viking Age research in this direction. These perspectives have been influential, particularly in the studies of animal style on artifacts, where human beings and other beings are expressed as entangled. Methodologically, these studies have benefited from and built upon an exploration of the material culture juxtaposed with the Old Norse written (though originally oral) sources (Domeij Lundborg 2006; Hedeager 2004, 2010; Pluskowski 2010).

## The Use of the Past in the Viking Age

A new attention is devoted to the role, use, and effects of cultural memory and the creation of links to the past in the Viking Age. The focus here is on collective identities and the multiple temporalities of burial sites, memorial aspects in runestone inscriptions, or the use of antiques, possibly heirlooms, as a means of creating links to pasts, whether real or constructed (in particular André 2013b; see also Arтелиус 2004, 2013; Arтелиус and Lindqvist 2005, 2007, Arwill-Nordbladh 1998, 2007, 2008, 2013a; Glørstad and Røstad 2015; Hållans Stenholm 2012; Leonard 2011; Lund 2020; Lund and Arwill-Nordbladh 2016; Naum 2008; A. Pedersen 2006, 2014; Thäte 2007; G. Williams 2014).

Pre-Viking Age disc-on-bow brooches found in a number of female graves from the Viking Age may indeed be examples of such heirlooms. Judging from their cloisonné work, they must have had an ancient appearance in the Viking Age, and, as pointed out by Glørstad and Røstad (2015), they may have functioned as memory props, linking people to the past and to ancestors. Strikingly, the Aska grave explored by Arwill-Nordbladh contained reinvented berlock pendants—elsewhere only known from 700-year-old Roman-period graves. In the same grave, a small figurine pendant wearing such a disc-on-bow brooch displays references to different pasts and temporalities (Arwill-Nordbladh 2008, 2013a). These links to the past thus appear to work on material (antiquities) as well as on a referential (typological) level (Lund and Arwill-Nordbladh 2016). Furthermore, these various types of reuse are not shared by all within society but are articulated differently materially within different social groups, as these disc-on-bow brooches are only found in specific graves of females of the social elite.

Memory clearly played a role in Viking Age society, as also expressed in the raising of rune stones (Andrén 2013b; Staecker 2004; see also Imer 2014). Cultural memory has also been enhanced in relation to migration (Naum 2008; Roslund 2007). These perspectives have potential beyond the use of memory in relation to the deceased. How, for instance, is a form or a typology kept and maintained? These issues have been central in research on coins (Burstrom 2014) as well as on pendants, where some object forms reappear and make reference to object types that are 600 years older (Arwill-Nordbladh 2008).

So far, the use of the past in the Viking Age has mainly been interpreted from a power perspective, in which authority over the past is seen as a means of social control (e.g., A. Pedersen 2006). However, as with studies of social identities, the use of the past in Viking Age society may also be utilized to explore how pasts play a role in people's self-perception, not only in how they navigated in terms of power. The perception of time and temporality plays a role in any society's worldview, and therefore a deeper insight into how pasts were actively used in the Viking Age will provide us with an increased knowledge of Viking Age ontology.

## Global Villages: The Urban Nodes

As well as displaying cultural, religious, and political changes, the Viking Age marks an economic transformation in the growth of an incipient urban and commercial network of exchange. The starting point of this trajectory is generally taken to be the emergence in the eighth century of emporia—maritime nodes of exchange and crafts production. By the 11th century, the familiar trappings of medieval trade were fully established: market towns, trade law, regulated coinage, slow bulk-carrying cargo ships, and exchange in high-bulk, low-value staples such as dried fish, cured meat, timber, or grain (Englert 2015; Sindbæk 2017).

Excavations in emporia and towns are a longstanding research focus of Viking Age archaeology. The past decade has seen the publication of long-term excavation projects at Kaupang (U. Pedersen 2016a; Skre 2011c), Wolin (Stanisławski and Filipowiak 2013, 2014), York (Hall et al. 2014), and Dublin (Wallace 2016). On

the southern Baltic coasts, the trading sites Truso and Gross Strömkendorf—practically unknown until the 1990s—are now firmly recognized as key localities (Bogucki and Jagodziński 2012; Brather and Jagodziński 2013; Gerds and Wolf 2015; Jagodziński 2014; Tummuscheit 2011), while additional sites along the Baltic and North Sea have received attention (e.g., Kleingärtner 2013; Majchczack et al. 2018). This intense research focus has transformed our understanding of some nodes, and a wider range of activities is now acknowledged prior to what was previously seen as a concerted foundation by Viking armies in York (in the 860s) or Dublin (in the 900s). Conversely, Skre's (2011b) reassessment of the rise of Kaupang has substituted what tended to be viewed as a regional “start-up” beach market in Vestfold for a concerted Danish political initiative, staged in a bid for control of the emerging Irish Sea route around 800.

Hedeby, the key trading hub of the Viking Age Baltic Sea has seen a concerted publication effort, with monographs on the settlement structures (Schultze 2008), harbor facilities (Kalmring 2010b), cemeteries (Arents and Eisenschmidt 2010), and a much-needed overview (Schietzel 2014). Expansive 3D GIS archives have caught up with a century of large research excavations. Together with pioneering geophysical surveys in the early 2000s, this has paved the way for new explorations, now set to test and detail Hedeby's townscape and settlement history through detector surveys and targeted excavations (Hilberg 2016, 2018). More than ever, this impressive baseline now calls for contextual studies of Hedeby's society and its way of life as a priority for future research (von Carnap-Bornheim et al. 2014).

More detailed research and excavation strategies are beginning to emerge as a means of exploring living spaces and exploiting the potential for chronology on a finer scale. The latter is needed for results to become pertinent to debates where detailed time scales are increasingly critical to historical interpretation (Croix et al. 2019a). A growing interest in global history raises questions that call for a close correlation of activities in the emporia with long-distance economic events and processes. Meanwhile, analytical techniques increasingly allow such questions to be addressed through “high-definition” protocols of excavation and sampling (Raja and Sindbæk 2018). The issues once raised by diffusionist researchers as to how Viking trade may have responded to changes in the Carolingian world, or even the Mediterranean or the Middle Eastern, have thus found new pertinence in the age of networks and globalization (e.g., Hodges 2012).

What a contextual approach to Viking Age towns may look like can be gleaned from recent research in Kaupang and Ribe. The Kaupang excavation project introduced a household-level focus, combining open-area excavation with consistent stratigraphic excavation and microsieving. The resulting group portrait of the town's inhabitants was a pioneering effort (Skre 2011a, b). Geoarchaeological analyses have demonstrated the potential of micromorphology to add decisive data (and controversy) regarding activities and the use of space (Wouters et al. 2016). Excavations in Ribe also pioneered high-definition strategies in the 1990s, albeit constrained to small surfaces, which proved difficult to interpret (Croix 2015; Feveile 2012). The recent excavations of the Northern Emporium project (Fig. 7) have provided an opportunity to pursue a contextual excavation of an eighth- and ninth-century streetscape with articulated building remains (Croix



**Fig. 7** Excavating a workshop floor with metalworking debris from the ninth-century emporium Ribe, Denmark. The Northern Emporium project has explored high-definition field methods including geomorphology and 3D laser scanning. Photo: S. M. Sindbæk and Museum of Southwest Jutland

et al. 2019a; Sindbæk 2018). Alongside active research on Ribe’s Viking Age cemeteries (Croix 2020; Søvstø 2014), the results hold the potential to shed light onto the community and networks of a Viking Age town at a smaller scale.

At Birka strong research, efforts have been directed in the past decade at cemeteries and at the harbor area (see above). Meanwhile, notable achievements of research on the town’s famous “Black Earth” settlement area are the publication of parts of the 1990s excavations (Ambrosiani 2013) and, after a 140-year scramble, the finds from Stolpe’s 1870s excavations in the same area (Gräslund et al. 2018). A series of conference volumes chart the course to define and orchestrate the next phase of investigation (Hedenstierna-Jonson 2012; Holmquist et al. 2016; Kalmring 2012). Several test excavations have been undertaken, but only few results are yet published (Andersson et al. 2016; Kalmring and Holmquist 2018). As at Hedeby, geophysical prospection offers important new starting points (Trinks et al. 2014), but they have yet to be followed up by detailed analysis and excavations.

Part of Birka’s predicament is the ambiguous legacy left by the 1990–1995 “Black Earth” excavations. These produced striking results relating to nonferrous metal workshops and living quarters (Ambrosiani 2013; Ambrosiani and Gustin 2015). Subsequent analysis has suggested links with named dynasties and missionaries and proposed a remarkably detailed chronology that claims to backdate Birka’s foundation and to tie it to events in the town’s principal written source, the *Life of Anskar*. This is a lot to ask from an excavation with few absolute dates and for which the excavation matrix required extensive post-excavation rationalization

(Ambrosiani 2013, pp. 205–207). New research will be needed to either vindicate or critically assess these results.

In many respects, research in Viking Age towns reflects similar priorities as those seen in other fields. In economic perspectives, there is a deliberate shift away from the focus on political organization and social evolution toward an exploration of wider social communities and their networks (Hillerdal 2010; Kalmring 2010a; Kalmring et al. 2016; Sindbæk 2007a, b; Skre 2008). At the same time, the focus on urbanity as an expression of social choice is concerned with individuals, agency, and lifestyle choices, as well as social identity more generally (Boyd 2013; Hadley and ten Harkel 2013; Skre 2011a, b).

The focus on mobility and interaction has contributed a willingness to see people other than kings and magnates as active in urban centers. Yet, despite the recognition of a wider range of social dynamics, groups, and agents, the construction of traders, travelers, craftspeople, and consumers often remains stereotypical and detached from the diversity of biographies and incentives that would have made for real-life dynamics in Viking Age towns. A better understanding of these will come from analyses that integrate urban centers with the movements, displacements, and transfers of knowledge that created them—in short, their networks—as well as by exploring the meetings and ways of interlinking social identities within the Viking Age towns.

## A Maritime Network Economy

Well into the 2000s, Viking Age trade continued to be widely dismissed as little but a manifestation of a politically controlled distribution of prestige goods without scope for economic agency, diversification, or regional impact (e.g., Wickham 2005, pp. 818f). Since then, a series of analyses have brought out new evidence bearing on the scale and impact of exchange and the way in which maritime communication made an impact on large numbers of individuals across regions. “Trade” is recognized, in this light, not merely as an instrument of political elites but as a dynamic issuing from and transforming the pursuits of wider communities (Skre 2017a).

The motivation for trade and exchange could be as simple as the wish to impress peers with dress and ornaments (Aannestad 2018; Glørstad 2012; Øye 2014; Vedeler 2014), or to treat guests to new tastes such as hoppy beer and leavened bread or rarities such as grapes and raisins (Henriksen et al. 2017; Rohde Sloth et al. 2012; Zachrisson 2014). Exotic raw material or the knowledge and know-how of craftspeople from other regions might hold value in their association with distant places (Ashby 2015). One particular commodity, slaves, were certainly indispensable in Viking Age exchange. Their importance as valuable objects of long-distance exchange cycles probably only increased over time (Fontaine 2017; Raffield 2019b; Zachrisson 2014).

What marks out Viking Age trade in particular, however, is increasing cycles of maritime exchange, which afforded long-distance movement of bulk materials, and the reliance of rural populations on distantly sourced products to maintain their way of life (e.g., Hilberg and Kalmring 2014). A factor that has inadvertently

contributed to highlighting these patterns is the expansion of private metal detecting, which has increased the number and knowledge of late Iron Age sites in particular, including the Viking Age (see Borake 2018; Christiansen 2019). This activity has caused both academic interest (Dobat 2013a) and criticism among heritage management and museums (Rasmussen 2014). Through their mere numbers and distribution, however, these finds have changed perceptions of centers and peripheries. Artifact types that were once believed to be rare, imported luxuries have been found in numbers that imply widespread use among rural populations (Christiansen 2019; Feveile 2011, 2017; Kershaw 2013). This recognition challenges notions of trade as a prerogative of the elite.

The study of silver as a key commodity and means of exchange in the Viking world benefited greatly from concerted rapprochements in the 2000s between numismatists, archaeologists, and archaeometallurgists. As a distinctive subfield, it is unified by the focus on hoard finds, which often provide a great diversity of material culture, and by contextual associations (e.g., Graham-Campbell and Ager 2011; Gruszczyński 2018; Ingvarðson 2012). It presents a model of well-integrated interdisciplinary research, bridging archaeological studies (e.g., Hårdh 2016; Jankowiak 2018; Roslund 2015), numismatics (e.g., Moesgaard 2015; Myrberg 2009a; G. Williams 2014), and economic history (Gullbekk 2011; Skre 2017a) within a joint research discourse (e.g., Graham-Campbell et al. 2011; Kershaw et al. 2019).

New results also issue from advances in biomolecular and isotopic approaches. Scientific methods of material analysis have started to reveal a scale and chronology of exchange that link trading centers more directly to a distributed network of production than was imagined ten years ago. Lead-isotope analysis has proven to be for metal circulation what strontium is for human movement. This is witnessed by studies on lead (U. Pedersen et al. 2016) and silver (Merkel 2016), with the further analytical projects now in progress (Hrnjic 2018; Kershaw et al. 2019).

Several isotopic systems, including lead, sulfur, carbon, nitrogen, oxygen, and hydrogen, may also characterize the provenance of key animal products such as deer antler (Becker and Grupe 2012) or wool (von Holstein and Makarewicz 2016). While much baseline data and studies into trophic webs and metabolic and taphonomic processes remain to be completed, multi-isotope analysis—sometimes in combination with proteomics and aDNA—has demonstrated the potential to trace the movement of previously undetectable movables including cod (Star et al. 2017) or, indeed, possible slaves (Naumann et al. 2014).

New analyses combining archaeological and scientific approaches are beginning to detail the procurement of resources such as beeswax (Gustafsson 2016), quernstones (Baug 2015), fur (Lindholm and Ljungkvist 2016), soapstone vessels (Baug 2017; Forster and Turner 2009; Hansen and Storemyr 2017), iron (Loftsgarden 2019; Rundberget 2017; Tveiten and Loftsgarden 2017), tar (Hennius 2018), and whale bone (Hennius et al. 2018). These explorations have gone together with a broadening appreciation of the outfield economy—hunting, fishing, or the collection or extraction of animal and mineral products (Øye 2013). Complex chains of extraction, manufacture, and transport were required to produce these and other everyday objects and materials (Ashby and Sindbæk 2019; Mehler et al. 2015).

Instead of indicating a lingering primitive subsistence strategy in Viking Age economy, the provision of these and other products presented economic opportunities for (and the drive to) colonizing new landscape niches, or altogether new landscapes. Thus, the hunt for Arctic products, including walrus ivory, may thus have contributed to the exploration and initial settlement in Iceland and Greenland (Frei et al. 2015). Insights into the extraction of diverse products enable a new appreciation of the links between different economies and of what it meant to be an inhabitant of a farm in forest or mountain areas, where shielings, iron production, or hunting may have been as important as farming (see Svensson et al. 2009; Svensson 2018). This may move focus to the way of life and economy, in ways that may, among other things, liberate a somewhat fixed view of identifying actors either as Norse, Sámi, or creolized.

With these new insights into production, lifeways, and their links to trade and consumption, we also see the emergence of a more nuanced understanding of economy, a change in regional perspectives from consumers to producers, and an appreciation of the connections between producers across regions. This opens up questions concerning the social organization of production and motivates an interpretational framework in which not only kings and magnates take the spotlight. The obtainment of, for instance, reindeer antlers in the mountainous parts of present-day Norway or the production of tar deep in the forest of present-day Sweden must have been performed by inhabitants of the region who may not have been directly connected with the craftspeople using the products or the consumers obtaining them. The growing energy expended by rural communities in activities such as fishing, drying cod, extracting iron blooms, producing tar, or manufacturing soapstone vessels or molds correlates with the growing capacity to transport and exchange such products over long distances by sea. Charting the chronological and geographical development of outfield exploitation may therefore provide an opportunity for future research to follow the detailed impact of the Viking Age maritime expansion.

An even closer affinity between outfield resources and urban networks is revealed by the conjunction of materials, skills, and demands in craft production in towns. A number of recent studies into Viking Age crafts, many inspired by actor-network theory, resume interest in technology as an aspect of social relations. Studies have charted how the practice of nonferrous metalworking required access to multiple materials from different sources, including a range of alloys and specific clays for crucibles and molds, and involved long-term collaboration of masters and apprentices (Gustafsson 2011; U. Pedersen 2015, 2016a, b, 2017). The activities of craftworkers in towns were thus linked across long distances to rural populations, who were not only customers but also suppliers of essential materials.

The focus on networks of materials and people holds promising new perspectives for the study of relations within towns. A recent study highlights how the seemingly unassuming task of making a chest might involve a combination of advanced blacksmith skills to produce a lock and equally advanced nonferrous metalworking skills to produce a key, in addition to skillful carpentry, which again relied on tools provided and maintained by a blacksmith (Croix et al. 2019b). If pursued at any significant scale, such a production—or equally those of horse harnesses, ornaments, and weapon sets—would have demanded continuous cross-craft collaborations,



which might have provided an important stimulus for craftspeople to convene and thus contribute to the rise of early towns as nodes of special importance (Ashby and Sindbæk 2019).

Viking Age trade and urbanism appear increasingly distributed in ways that defy the once-accepted models of a “great transformation,” per Polanyi’s once overwhelmingly influential scheme (see Skre 2008). Although research continues to draw a line between Viking Age emporia like Ribe or Birka as economic centers and earlier Iron Age sites such as Sorte Muld, Helgö, and Uppåkra (Clarke and Lamm 2017; Fischer and Victor 2011; Hårdh 2010; Stidsing et al. 2014) as ritual and political ones, the validity of this distinction may increasingly be questioned. New research is needed to compare the long-term trajectory of what became the urban networks of the Viking Age in a way less bound by evolutionary assumptions. The same need for comparison exists between Viking Age and medieval towns. From the 11th century on, secular and ecclesiastic land owning increasingly influenced the course of urbanism in Scandinavia; however, the change is incoherently charted and conceptualized (Andersson et al. 2008).

Exchange networks and craft production relate to cultural preferences and inform on their operations as much as they tell about economic agency and power. While burials, hoards, ornaments, and even settlements are habitually analyzed in term of cultural meaning, the perceptions and preferences invested in exchange remain inadequately explored, often lost from sight when approached as economic practices and concerns. The permeable boundary between culture and economy is in need of intellectual trespassing from the point of view of the latter as much as the former.

## Settlement and Social Power

While many discoveries in the past decade have emerged in laboratories or among museum collections, fieldwork remains a prime vehicle for research for a wide range of settlement studies and questions focused on power relations. Comparatively little attention has been paid to the highly varied rural settlement of Viking Age Scandinavia (Fallgren 2008). The presumption that ownership and inheritance of land was already established in the late Roman period in Jutland (Holst 2010) has had consequences for the interpretation of inheritance. The right to inherited land was a turning point in Viking Age Scandinavia in particular, as also expressed in a number of rune stones (Zachrisson 2017). A break with the interpretation scheme of settlement is found in Norwegian archaeology, where the idea that Norwegian material followed the Jutlandic pattern has been challenged by new explorations of the eastern Norwegian settlement material that, in many instances, show a lack of continuity from the previous periods in the Viking Age settlement (Gjerpe 2017). Methodologically, this breaks with the Norwegian preconception of the *Urgården* (Pilø 2005), and it follows the rejection of the retrogressive method in Norwegian archaeology in recent years (Fredriksen and Amundsen 2014).

Beach sites and ship-handling sites, another group of locations of seminal importance in a maritime society, have similarly attracted few bodies of dedicated work (Madsen et al. 2010; Ulriksen 2019). Fortified ship encampments, or

longphorts, one of the major discoveries of Irish archaeology in the 2000s, have seen continuing attention (Kelly 2015), in particular with the impressive publication of the Viking river camp Woodstown in County Waterford (Russel and Hurley 2014). Metal detecting has brought archaeological substance to army camps and wintering sites in England (Hadley and Richards 2016; G. Williams 2020). As yet, neither army camps nor longphorts have any clear Scandinavian counterparts, although naval activity and military campaigns must have occurred here as well. Tracing lesser-known site types and activities such as these should be a future priority.

A key focus of research in the past decade are assembly sites and, more specifically, sites for *thing* moots (Sanmark and Semple 2008; Sanmark et al. 2013, Semple and Sanmark 2013). Scholars have identified circular courtyard sites in northern Norway as potential assembly sites (Brink et al. 2011; Iversen 2015; Storli 2010). The examinations of the assembly sites have profited methodologically from the juxtaposition of material and written sources (Sanmark 2017; Sanmark and Semple 2008). In Sweden, runestone inscriptions have been correlated to the physical structures in the surroundings. The construction of new mounds and the establishment of assembly sites in relation to older mounds has been proposed as a means of giving credibility and creating an atmosphere of belonging while simultaneously negotiating power relations by linking the assembly site to the past (Sanmark and Semple 2008; Semple and Sanmark 2013). These analyses demonstrate that assembly sites may be an umbrella for a multitude of types of places. Variation also clearly characterizes the material. Just as in the discussions of central places and metal-detector sites, the reassessment of assembly sites has shown that a strict and formalized one-fits-all model is a poor match for these locations.

The outstanding focus of settlement research, however, has been on high-status sites and monuments, a clear contrast to previous efforts to trace the life and settlements of “ordinary people.” This emphasis has arisen in part because high-status sites lend themselves well to popular narratives and to a new pattern of funding structure. Scandinavian archaeology today is increasingly sponsored by public or private bodies through competitive, project-based donations. Meanwhile, developer-led archaeology often remains unpublished and thus detached from further research (though not always; e.g., the Norwegian report series *Varia* such as Gjerpe 2008). The project-based funding structure invites a focus on recognized sites and safe returns. While high-profile research excavations in the 1980s and 1990s often turned to sites and phenomena that had not figured strongly in previous research, revealing what has now become well-known locations such as the power centers and/or market sites in Tissø, Sebbesund, Borg, Åhus, Fröjel, and Uppåkra, part of the focus has now returned to famous locations.

Projects anchored in well-known sites, typically places known through written sources, entail a risk of embracing existing narratives rather than challenging the equilibrium of research. This tendency is exacerbated by the perennial temptation for archaeologists (Danish ones openly, Norwegian and Swedish researchers often with more caution) to conflate modern states with the namesake medieval kingdoms and to link finds with kings and kingdoms. Thus, the fame of sites such as Jelling, Borre, and Gamla Uppsala, and the research conducted in these places, tend to

easily reinforce inherited images in the public domain, a tendency that sometimes reflect back on research priorities.

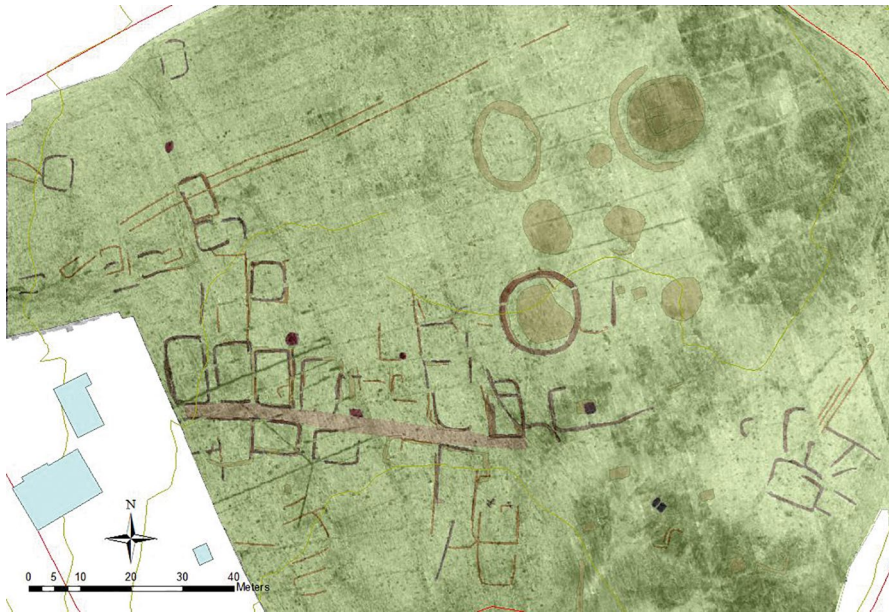
Big projects tend to involve a long fermentation period. Thus, two of the major monographs of the decade, on the well-known centers Borre in Norway and Lejre in Denmark, report on projects essentially conducted in the 1980s and 1990s (Christensen 2015; Myhre 2015). This is even more true for the famous Danish ring fortress and settlement site Aggersborg, excavated in the 1940s–1950s but not published until recently (Roesdahl et al. 2014). Similarly resurrected by publication is the Swedish Valsgårde cemetery, mainly excavated in the 1920s and 1930s (Nordahl 2018). While it is positive to find engagement with old excavations and to see the materials made available, the long delay to publication remains an impediment for research. Some of the projects that drew attention during the 2000s, such as Tissø, have yet to be published beyond outlines (Jørgensen 2010).

Meanwhile, new excavations and surveys at Gamla Uppsala in Sweden have situated the three monumental mounds and a previously excavated hall building into a wider landscape of burial grounds and settlements, including what is believed to be a giant ritual palisade or rows of raised timber pillars along the road leading into the center (Beronius Jörpeland et al. 2018; Eriksson 2018; Ljungkvist and Frölund 2015; Ljungkvist et al. 2011). More recently, small-scale excavations have revealed a complex stratigraphy with several phases of hall buildings and fire events, handing enticing points for a future biography of the place (Ljungkvist 2018).

Other new fieldwork projects increasingly involve remote sensing and geophysics: at Borre in Norway, ground penetrating radar (GPR) and LiDAR surveys have revealed the shoreline and jetties (Draganits et al. 2015), as well as the outline of several large hall buildings (Tonning et al. 2020). At nearby Gokstad, GPR and LiDAR mapping were similarly used to reveal traces of settlement once connected with the famous ship grave (Bill and Rødsrud 2017) and its landscape context (Schneidhofer et al. 2017). Heimdalsjordet, the newly found production and trading site at Gokstad, has sparked discussion, suggesting to some a smaller version of emporia sites like Kaupang or Ribe (Bill and Rødsrud 2017) (Fig. 8).

The Avaldsnes project in western Norway has taken a different approach, in part because the complex medieval history of the site did not allow large-scale excavations. Instead, the project has aimed to reconstruct the long-term settlement history of a site believed to have been a key residence of early Norwegian kings (Skre 2017b, 2019). The project owes more than any other recent project in Scandinavia to the tradition of landscape archaeology, with excavations and surveys flanked on one side by onomastics, written sources, and retrospective map studies, and on the other side by environmental archaeology. It bears conceptual kinship to the Mosfell archaeological project in Iceland, which centered on the Hrisbrú farm, the supposed home of the skald Egill Skallagrímsson (Zori and Byock 2014), and the Quooygrew project in Orkney, although the latter is deliberately focused on commoners' production and identity rather than aristocracy (Barrett 2012).

As in Sweden and Norway, the most sustained fieldwork efforts in Denmark and northern Germany have been directed at supposedly royal monuments. At Danevirke, a multiyear excavation targeted the only gate known in the ~10-km-long main rampart, almost certainly the guarded entry mentioned in a ninth-century peace



**Fig. 8** Plan of settlement traces discovered by ground penetrating radar surveys at Heimdalsjordet, Norway, close to the famous Gokstad ship burial. The row of building foundations resembles settlements at emporia such as Hedeby or Dublin. After Bill and Rødsrud (2017)

treaty (Tummuscheit and Witte 2019). The excavations have added to the complexity of the monument, detailing constructions over several centuries and pushing the date of its earliest phase further back, possibly into the fifth or sixth century AD, although the publications remain cautious about these dates.

At the famous burial mounds and rune stones in Jelling, excavations have revealed an entirely new context (Holst et al. 2013) yet reinforced the impression of a short-lived site, its monumental investments all dating to the second half of the 10th century. This is a marked contrast to, for example, Avaldsnes or Gamla Uppsala. The findings include a huge wooden enclosure, which is dated to around 968, during the reign of King Harald Bluetooth and is laid out to a strict geometric plan (Jessen et al. 2014). This ties the monuments closely to the carefully planned architecture known from the contemporary Trelleborg-type ring fortresses, which are ascribed to the same ruler.

The latter fortresses have seen no shortage of attention. Major work has been undertaken to establish their landscape context (Dobat 2013b). In addition to the final publication of Aggersborg (Roesdahl et al. 2014), excavations at the least-studied site, Nonnebakken in Fyn, have revealed the first plausible traces of gateways and buildings (Runge and Henriksen 2018). Radiocarbon dates are argued to put an early phase of this ring fortress back into the eighth century, but whether these dates relate to the fortress itself or to earlier activity in the site remains to be proven.

A recent addition to this group of monuments was discovered at Borgring, south of Copenhagen, where an almost obliterated earthwork has now been confirmed as

the remains of a 10th-century ring fortress (Goodchild et al. 2017). Borgring is a rare example of a hitherto virtually unknown site becoming the target of a major research project (Christensen et al. 2018). Although the attention of the project has deliberately been aimed at questioning established narratives about the ring fortresses, many details of the findings—and certainly of their reception—have confirmed the image of concerted royal agency, thus inadvertently contributing further to the popular myth of Harald Bluetooth as a founding figure in Danish history.

Other notable projects have tended to reiterate the focus on high-status settlement (Dobat 2014; Jessen and Terkildsen 2016; Lemm 2014; A. Pedersen et al. 2019). In Aska, Östergötland, the outline of a 50-m-long hall building has been established by GPR and is now targeted for further investigation (Rundkvist and Viberg 2015). A similar hall building reported from Birka is less clearly indicated by the GPR data and awaits further confirmation (Kalmring et al. 2017). If nothing else, the resulting discoveries have shown that aristocratic settlements were frequent and present in all landscapes; they were not merely a regional characteristic (see also Holst 2014).

This continuing focus on aristocracy and lordship reflects widespread conceptions of social power, which have developed little since the 1980s (Poulsen and Sindbæk 2011). Major studies continue to be explicitly framed by evolutionary state-formation theory and hierarchical, top-down models of power (e.g., Christensen 2015, p. 257; Iversen 2013; Skre 2019). In a similar vein as settlement sites, elite graves have been studied as expressions of power strategies based on claiming ancestry (Bill and Daly 2012; Opedal 2010; A. Pedersen 2006; Thäte 2007). Rather than simply control and manipulation, the sites may give insight into the conceptualization of temporality, group identity, and self-perception (Beck 2017).

A more explorative use of the different types of data may be a first step toward different perspectives. For Borgring and Gokstad, the critical factor in pointing to unexpected spots for excavation were remote sensing and geophysical surveys, which helped bridge the gap between landscape studies and excavations. Artificial intelligence techniques such as automatic landscape classification and feature detection may further enhance the use of these data (Stott et al. 2019). In a similar way, geoarchaeology may refocus attention to hitherto neglected activities (Macphail et al. 2013; Milek 2012; Milek and Roberts 2013) and site history (Cannell et al. 2016; Devos et al. 2013; Macphail and Linderholm 2016; Wouters et al. 2016). Zooarchaeology equally has the potential to explore practices such as communal feasting (Mainland and Batey 2018; Zori et al. 2013).

On the whole, research excavations have been less successful in complementing the targeted focus on high-status settlements and monuments with characterizations of locations and activities on the landscape. A wider focus is needed to integrate settlement archaeology with the increasingly acknowledged network of outfield activities—shielings husbandry, hunting, quarrying, iron production, etc. It will also be key to address what will certainly be one of the priorities for the coming years: the study of environmental change.

New conceptual frames for the power base of high-status settlements are equally needed. As a theoretical framework, some scholars point to assemblage theory, arguing how approaching one village, house, or even one posthole as an assemblage enables a perspective in which this assemblage acts on humans (Beck 2018; Eriksen

2019). Anarchistic theory provides another possible alternative to narratives built on a traditional “top-down” power focus (Borake 2019). These new perspectives include alternative paths in settlement archaeology that move away from traditional power perspectives and center-periphery models.

## Environment and Climate: Vikings and the Anthropocene

Concerns over current climate change have placed the study of environmental change and its effects on human societies in the past as a key priority across historical sciences. Only 12 years ago, Barrett (2008, p. 673) could justly dismiss speculation on climatic determinants for the Viking Age settlement expansion with reference to an almost complete lack of adequate data. Since then, research on paleoclimate has advanced decisively by high-resolution studies (e.g., Anchukaitis et al. 2017; Helama et al. 2017). Archaeologists now call for a response to the condition of what is considered the Anthropocene era of significant human impact on Earth’s geology and ecosystems and for an exploration of the deep-time ramifications of this concept (Brewer and Riede 2018; Solli et al. 2011).

A reconstruction of annual summer temperatures through the past two millennia confirm a marked warming trend in the eighth and ninth centuries (Büntgen et al. 2016), which calls renewed attention to earlier suggestions that a climate amelioration was an incentive for the Viking Age expansion of maritime connectivity and of settlement (e.g., Dugmore et al. 2007). Another new set of data lends unexpected support for this suggestion. Over the past decade, global warming has led to significantly accelerated melting from high-altitude ice patches in the Scandinavian mountains (Fig. 9). Systematic fieldwork has revealed thousands of artifacts emerging from the retreating ice patches, including many related to the hunting and trapping



**Fig. 9** Viking Age finds from melting high-altitude ice patches in Scandinavia reveal intensive exploitation, including reindeer hunting. This and other outfield activities provided valuable resources for subsistence and exchange economies. Photo: Secrets of the Ice Project

of reindeer. The ice-patch finds are still in an early stage of exploration, and their evidence is currently hard to interpret due to complex cycles of warming (leading to ice-patch melting and possibly also increased activity) and cooling (leading to ice-patch growth, thus fossilization). Yet, so far, the chronology of dated artifacts suggests a marked peak in the abundance of hunting and all ice-patch activities in the eighth to 10th centuries (Pilø et al. 2018, 2020).

Hunting and other organized resource exploitation in wooded and mountainous outfield areas formed an essential part of the economy in premodern Scandinavia (Solli 2018; Stene and Wangen 2017). It remains to be determined to what extent the high-altitude hunting activities relate to a general demographic expansion and thus an increase in the human footprint on the landscape, or more specifically to expanding trade cycles, which caused rising demands for products such as reindeer antler (Ashby et al. 2015). To relate these and other patterns of exploitation in sensitive and sometimes highly volatile outfield environments to the networks of exchange presents a prime research challenge for the coming decade.

The impact of the debate on environmental change is also visible in research on Viking Age colonization in the North Atlantic. This has featured as a prominent example in international debates on climate and human-induced environmental change (Diamond 2005). Environmental studies in Iceland have shown that, despite the massive environmental impact, Norse settlers were well aware of the limitations of the landscape and took rational and largely successful measures to secure long-term sustainability for their society (Catlin 2016; Hartman et al. 2017; Vésteinsson et al. 2014). In Greenland, researchers have similarly stressed that Norse colonists managed to establish a sustainable presence for centuries in a fragile Arctic landscape until the balance was upset by rapid cooling in the late medieval Little Ice Age, together with the upheavals in European societies caused by the Black Death (Dugmore et al. 2007, 2012). Thus, the exploitation of marine resources in Greenland may also point to the ability of the Norse population to adjust to the environment (Arneborg et al. 2012; Keller and Perdikaris 2016).

These examples set a precedent for the ways in which attention to climate and environmental change may alter our understanding of the Viking Age and how archaeology may contribute to enhancing the historical framing of current debates. As it is increasingly recognized in contemporary discourse, climate will need to be approached as a vector in a broader environmental perspective. This is where archaeological research may find a new position of strength in years to come, in a paradigm with the potential to integrate scientific data and cultural interpretation with historical trajectories, landscape settings, and environmental interactions.

## Discussion

Research in the last decade has transformed Viking Age archaeology into a field where diaspora and other cross-cultural, comparative themes have gained prominence. A strong focus on mobility and interaction has grown in reflection of modern globalization and its consequences and through interdisciplinary dialogue with new archaeoscience. Isotopic signatures in human skeletal remains have begun to offer

results of real historical and archaeological consequence, while aDNA studies look poised to do the same in the next few years.

In the interpretive field, previous interests in collective beliefs and action have waned in favor of issues concerned with personal identity, personhood, and the non-normative, spurred by interests in ethnicity, gender, and intersectionality. This has created a new focus in mortuary archaeology, with strong attention to themes such as transgression and nonconformity, including of gender. Studies of cult and ritual have shifted away from landscapes to artifacts with a biographical approach and “animated objects” being explored, accompanied by new attention to the role, use, and effects of cultural memory and links to the past in artifacts and monuments.

Interests in urban communities and their networks have inspired more detailed, “high-definition” strategies in research and excavation, and geoarchaeology has emerged as a decisive toolbox within this program. Meanwhile, a new appreciation of the agency of wider communities, especially through the outfield economy, is prompted by studies issuing from isotopic analysis, which, together with a massive influx of materials recorded from private metal detecting, highlight the scale and impact of exchange.

Field archaeology has seen an emphasis on elite settlements and monuments and, to some extent, military sites and political assemblies. Paleoclimate research, such as ice-core studies and tree-ring chronologies, has produced high-resolution data that, along with concerns over present climate change, has begun to place environment and climate fluctuations more centrally in Viking research.

Many of these developments can be recognized across other fields of archaeology. Viking research has taken a lead on some, such as mobility and interaction, while being comparatively less engaged in others, such as environment and climate. The field remains a regional specialization with a notably international profile, bringing together researchers from across northern Europe, eastern Europe, and North America. Yet, it is also a field of many divides: Scandinavian researchers, influenced by a national self-perspective, continue to pursue themes of emerging kingdoms, social power, and cultural sophistication. To archaeologists in the English-speaking world, by contrast, the Vikings chiefly stand out as agents of change in studies of migration, identity, and interaction.

In particular, one may identify a persistent divide between two research tendencies (e.g., Lund and Arwill-Nordbladh 2016, pp. 415–416). The first approaches the Viking Age as a pattern of societal change, marked by transformative developments of military and political centralization, maritime trade, war, and piracy. For this paradigm, the past decade of research has been fueled by new methods for tracing the movement of humans and materials, framed by questions concerning globalization, social networks, and environmental change. This is typically framed by a social archaeology framework and assumes an economic, technological, or sociological focus. Within this strand of thinking, the prime movers are often perceived as political and military leaders—kings and magnates—and the focus of attention is predominantly male, as is the balance of the research community. In a related strain, the focus is on migrants, colonizers, or town dwellers—favorite protagonists, one might note, for middle-class academics.



The second perspective sees the period in terms of changes in culture, identities, and worldviews. This line of research has worked with biographical approaches to objects and assemblages and from theoretical frameworks grounded in social anthropological thinking and post-humanist theory, mostly aligned with historical archaeology or with interpretive and cognitive archaeologies. This type of scholarship displays a more balanced gender profile.

The authors of the present paper see their own research as being largely divided along these different strands. The persistence of two diverging research perspectives may be no particular problem in itself, but the continuing lack of mutual interest and cross-referencing is. Both perspectives have too much to offer the other in terms of calibration and expanded vision.

If we combine these perspectives in future archaeological research, we may enhance depths and nuances in our understanding of the Viking Age. If many factors caused the Viking Age, how do we understand and analytically approach the totality of constituent parts? We may use the concept of entanglement or meshwork to begin to grasp the social consequences of, say, launching just one ship. The sail for a large ship alone might consume the wool of 200 sheep and the equivalent of 10 years' work to process (Bender Jørgensen 2009). What was the environmental impact of those sheep? Who owned them? Who organized the cutting, spinning, and weaving of the wool? Who ordered the sail, and what was the power relation between the owner of all or some of the sheep and the producer of the sail? We may expand these perspectives to the shipbuilding and the farmers who produced a surplus of goods to bring as food supplies for the journey. Did the iron nails originate from iron production in the uplands of present-day Norway, even if the ship was built in present-day Denmark? We may examine the chaînes opératoires and know-how used for the production of ropes: who taught it, and who mastered it? Were the passengers only human, or were there animals onboard, and if so, were they separated or seated side by side? And if we include the insights gained from the studies of social identities and cognitive studies, we may ask who were the people onboard the ship, and to what degree was their identity fluid, hybrid, or fixed? Who raised, trained, and educated them? Did the sailors include more than one gender and more than one social role? How and by whom were decisions made, and how was leadership organized? To understand what got the ship across the sea, we must develop models that will enable us to grasp the power relations involved in the production of the ship, the launching, the sailing, the actions conducted by the sailors once ashore (be it trade or plundering), and the return to the homelands. Furthermore, these processes may integrate new models for understanding power, acceptance, and negotiations if they utilize the many new insights into social identities in the Viking Age. If warrior women existed (be they many or few); if ritual experts were not simply liminal but were potentially part of a high social strata and could be of male or female sex; and if the producers of craft were also entangled in long-distance trade network, then all decisions can hardly be reduced to the will of a king or magnate. In other words, what and who put the ship to sea? These are examples of questions that may be approached by further pursuing the theories and methodologies that have been included into Viking Age archaeology over the past decade.

## Conclusion: Aims, Goals, and Challenges of Viking Age Archaeology of the 2020s and Beyond

This overview allows us to identify at least some of the aims, goals, and challenges of Viking Age archaeology. Interpretations of the Viking Age are often marked by the preconceptions of the researchers. Present (and hopefully future) studies see an active effort to challenge such preconceptions. We call for a Viking Age archaeology that engages with critical heritage studies to explore how this time period may be studied today in ways that resist glorifying narratives, be they nationalistic, paganistic, or simply violent. In other words, we call for studies that take postcolonial and decolonizing perspectives seriously in order to counter the loaded cultural heritage of the Viking Age.

A call for an ethically founded Viking Age archaeology also includes challenges to the essentialistic notions of societies as closed units, toward an archaeology in which migration and diasporas are perceived as a typical rather than an atypical process in a human lifespan. These issues are even more strongly at stake as methods such as aDNA are brought to the fore. The introduction of aDNA into research on other parts of prehistory has been argued to cause a return to a concept of culture as a limited, bound unit (Frieman and Hofman 2019; Furholt 2019), reintroducing essentialist notions of “us” and “them.” In the highly contested field of Viking Age archaeology, we strongly hope for the incorporation of archaeosciences in a theoretically reflected and reflexive archaeology. Thus, we call for a Viking Age archaeology in which the humanistic approaches strike back. Through these approaches, we may arrive at studies of social identities that take into account the complexity and diversity of past societies more than they currently do.

As interpretations are used in the creation of identities and self-perceptions within contemporary society, we envisage an archaeology that is open to multiple social roles and identities of past societies and how they cooperated or conflicted in Viking Age Scandinavia. Simultaneously, there is a need to increase insight into the schemes within which identities were created, changed, or maintained in this period of the past. Approaches to identity need to be balanced with the study of personhood and post-humanistic theory. In addition, by exploring the active use of the past in Viking Age society, we may gain insight into not only who controlled or owned the past but how the past, time, and temporality were integrated into self-perception and Viking Age ontology and thereby expanded the understanding of identities to also explore how humans perceived the world in which they lived.

Similar considerations have consequences for how we approach and perceive power relations. There is a need to move from the static focus on elites to research that engages with the dynamics of agency and power toward a reconsideration of the complexity of entanglements of gender, identity, and status that took place in relation to the elite and other social groups. In spite of the abundance of new insights and the intersectional perspective that highlight the layeredness of social identities, we are still stuck with analyses of Viking Age society that reduce most

agency and power to kings and magnates. We call for a move beyond monuments and elite residences to a concern with the sites and landscapes where people interacted in other ways than the power affirmations and rituals of the hall. This will be a movement away from predisposed narratives that cannot be considered ethically sustainable. It includes a critical reconsideration of the terminology and understanding of relations and character of ownership in relation to enslavers and enslaved in Viking Age society. It feeds into a reengagement of Viking Age archaeology within critical cultural heritage research perspectives. We can therefore utilize critical and ethically reflective studies of Viking Age archaeology to address the misuse of archaeology within ethnic, nationalistic, or other politicized movements.

This also opens up conflicting interests even within a single individual. It may pave the way for studies that examine how diverging social groups, including slaves, were given and obtained social value. It includes a perspective for the lives of the socially deviant within a society; but more importantly, these new insights influence our comprehension of the ways in which power was constructed. We claim that this change of perspective is also an ethical obligation.

Thus, the nuances in the perceptions of social identities must have consequences for how we conduct research on social processes of change. These perspectives may provide us with a Viking Age archaeology that moves beyond the divide of focusing *either* on social organization *or* on social identity, personhood, and ontology. We believe that merging these two research strands can enrich the field. We foresee perspectives that incorporate social theory of other types of organization, moving beyond traditional, violence-based power notions.

In the past years, new ways of organizing and perceiving economy have grown out of changes in society today. The widespread adoption of “share economy” (to take one example) in present-day society has demonstrated how the social organizational aspect of economy may change rapidly in a society. This might also enable us to be perceptive to different aspects of Viking Age economy and how it is linked to social organization in ways different from those explored when focus was on globalization and new alignments between national states and larger economic units such as the European Union.

As current climate debates place the study of environmental change as a key priority for historical and archaeological study, a broader exploration of societal–environmental interaction is needed to bring Viking research into the Anthropocene. One way of moving ahead in combining social and cultural dimensions is to reengage a spatial framework and return to the landscape with new environmental perspectives. In this respect, we see a need for studies that more effectively integrate urban centers and exchange with movement and landscape.

We call for a Viking Age archaeology that challenges concepts such as hinterlands and outfields in order to grasp the complexity of codependency; an archaeology that moves beyond center-periphery models in order to understand dynamics between settlements or urban contexts and the so-called “outfields”—heathlands, mountains, and forests. The solution may not simply be to include the outfield but to integrate the diverse outfield studies into a common effort, rather than studying, for example, iron, stone products, and hunting separately, thereby working toward an

**Table 1** Aspiration for the future of Viking Age archaeology

We call for:

- An ethically sustainable Viking Age archaeology that engages with critical heritage studies
- An archaeology that is open to multiple social roles and identities in past societies and that challenges the notions of societies as closed units
- The incorporation of archaeosciences in a theoretically reflected and reflexive archaeology
- A move beyond monuments and elite residences to address the ways in which power was constructed
- To replace center-periphery models with dynamic connections between settlements or centers and the so-called “outfields”
- Engagement with archaeosciences in a new environmental humanities
- A Viking Age archaeology in which economy is approached as a way of life
- Merging the divide between social organization and identity, personhood, and ontology

understanding of these economies and the relationships between the various activities. We therefore call for spatial analyses that include all the resources moving from and to the “outfields,” linking them to the lives of humans in other regions and to other resources, all the way into the grave. In this sense, resources are also perceived as ecology. Thus, we challenge Viking Age archaeology to become a sustainable archaeology, ethically as well as in terms of exploring the dynamics between ecology, resources, and relationality in complex societies with long-distance trade. The study of production and exchange also needs to be more fully integrated with the social practices and cultural meaning that made particular activities, things, and achievements desirable and preferable.

We ask for a Viking Age archaeology in which economy is approached as a way of life and in which the connections between economy and ecology are examined in depth. Thus, we call for new landscape approaches built on the incorporation of geoarchaeology, biomolecular archaeology, and other archaeosciences to establish a Viking Age archaeology within environmental humanities.

The achievements of Viking Age archaeology in the 2020s will rest on its ability to align and combine what is currently too often approached separately as societal versus individual or economic versus cultural perspectives (Table 1). In this way, we may integrate the new frontiers of genomics, identity, and society into an ethical framework guided by critical humanistic perspectives. And we may unite concern for the environment and change with the human dynamics of mobility, with new models of the distribution of power in social networks, and with ecology and landscape as integrative frameworks.

**Acknowledgments** The authors would like to thank Steven P. Ashby, Unn Pedersen, Neil Price, the five anonymous peer reviewers, and Editor Gary Feinman and the editorial board for valuable comments on the draft manuscript. In addition to giving our manuscript important clarifications and additions, these comments made us wish to expand our paper far beyond what was feasible. Julie Lund’s contribution is supported by “Using the Past in the Past. Viking Age Scandinavia as a Renaissance,” financed by the Research Council of Norway, project no 250590. Søren M. Sindbæk’s contribution is supported by the Danish National Research Foundation under the grant DNR119 – Centre of Excellence for Urban Network Evolutions (UrbNet). Thanks to Jan Bill, Dawn Hadley, Jesper Langkilde, Jüri Peets, Lars Pilø, Julian D. Richards, and David Score for permission to reproduce images.

**Funding** Open access funding provided by University of Oslo (incl Oslo University Hospital).

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