COMPLEXITY AND DYNAMICS

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Settlement and landscape from the Bronze Age to the Renaissance in the Nordic Countries (1700 BC–AD 1600)

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Settlement organization in Iron Age Scandinavia and beyond: Traditions, terminologies, regionalities and methodologies

Marie Ødegaard and Ingrid Ystgaard

Abstract

The nature of settlement organization is a core question in archaeological excavations and research. In some respects, settlement archaeological research in Scandinavia is characterized by variances notably in research traditions and terminology. These are largely the product of differences between national institutions and languages. However, contrasts in prehistoric and historic settlement organization appear between regions and periods rather than between the (later) national borders. Methodological advances are opening up a broadening range of opportunities in the years to come. By reviewing the topics of research traditions, terminology, regional and temporal variations, and developing methodologies, we here introduce the general topic of this book as well as the individual contributions.

Keywords: Settlement organization, research traditions, terminologies, regionalities, methodologies

Introduction

How did people organize their settlements in prehistory? This question is at the core of a large number of archaeological excavations throughout Scandinavia and beyond, and has remained so during the past three to four centuries. A few decades after the introduction and implementation of settlement archaeological excavations based on top-soil mechanical stripping, the influential book "Settlement and Landscape" was published (Fabech and Ringtved 1999). This book aimed to compare results and establish a new way forward for understanding settlement archaeology and landscape organization in northern Europe from the Stone Age to the medieval period. While the discussions on differences in research traditions and terminologies between the Nordic countries are still valid, new excavations and methodological developments that have taken place during the past two decades have made it necessary to discuss settlement organization again, in a broader comparative perspective. The aim of this book, therefore, is to present new research based on new excavations and/or material, which employ up-to-date methodologies. In doing so, we hope to contribute to a greater understanding of the complexity and dynamics of settlement and landscape organization in Scandinavia and beyond, from the Late Bronze Age to the Renaissance.

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Figure 1. Settlement traces and their spatial distribution at Dilling, Moss, Southeast Norway. Illustration: Jan Kristian Hellan; Museum of Cultural History, University of Oslo.

At the outset, we highlight four aspects which characterize settlement archaeological research in Scandinavia today. First, differences in research traditions have contributed to notions of differing developments in settlement organizations within the Scandinavian countries. Second, differences in terminology between languages regarding settlement organization, particularly the words in Scandinavian languages for single farms and villages, contribute to different interpretations between national research traditions. Third, settlement organization differs between regions and periods rather than between the later national borders. Lastly, methodological developments contribute to increasingly rapid developments in results and interpretations, and open for a broadening range of opportunities in the years to come. The discussion of these four aspects, which forms the first part of this introduction, prepares the ground for our presentations of the contributions to the volume.

Continuous excavations, in addition to new interpretations of older finds, generate a research literature which is growing fast. In what follows, we will discuss the developments in settlement organization from a Scandinavian point of view, including, however, insights from beyond this geographical area. Furthermore, we will focus on Iron Age settlement organization, but also consider earlier settlement studies as far back as the Bronze Age, as well as later studies including the Middle Ages and the Renaissance. Our reflections on terminology and methodology are also valid for sites dating beyond this time span.

Research traditions

The question *what constitutes a village* has been widely discussed within different disciplines, such as geography, history, archaeology and anthropology. In archaeology, the *spatial* properties of settlements are best preserved for analysis, and therefore frequently discussed. Definitions are, as we will see, often related to the numbers of farms, numbers of buildings and spatial properties of farmsteads.

Settlement organization has been regarded as developing differently in the Nordic countries. Single farms were considered the dominant settlement type in Bronze and Iron Age Norway and parts of Sweden and Finland (Widgren 1997; Lillehammer 1999). In Denmark, the general impression is that single farms dominated during the Bronze Age. The earliest villages emerged in northwest Jutland in the Pre-Roman Iron Age and first in the Mid-Roman Period in southern Jutland (Ethelberg 2000:192; Nielsen 2020: 895–914, Haue this volume). Differences within each nation were, however, recognized, and often understood as related to topographical and geographical preconditions (e.g., Lillehammer 1999; Mikkelsen 1999). In line with this, some

scholars considered single farms as characteristic of the Scandinavian periphery with marginal agrarian land (Kaldal Mikkelsen 1999:189; Myhre 1999). However, clustered settlements (*klyngetun*) are not uncommon in western Norway in historical times, demonstrating that single farms and clustered settlements can be found within the same landscapes (Salvesen 1996; Langnes 2016; Røyrane 2018), and that topography in itself cannot explain differences in settlement types (e.g., Kaldal Mikkelsen 1999).

The differences in interpretations of settlement organization between the Scandinavian countries, therefore, stem in part from divergent research traditions rather than from divergences in empirical data (Widgren 1997; Lillehammer 1999; Skre 1999; cf. also Wickham 1992). The so-called retrospective or retrogressive method in history and to some extent in archaeology has been more strongly represented in Norway than in Sweden and Denmark. This has contributed to interpretations that emphasize structural continuity in settlements from prehistoric to historic periods (eg., Sandnes and Salvesen 1978; Österberg 1981; Pilø 2005, Amundsen and Fredriksen 2014; Gjerpe 2017; Grønnesby 2019). The method was considered valid because of the strength of the idea that Norwegian farmers had more personal freedom and thus more settlement stability than farmers elsewhere in the Nordic region, where tenant farms under larger estates were seen as being more common (Øye 2000; cf. Wickham 1992).

While the discussion of spatial properties related to the number or farms and their composition is still valid, other archaeologists focus more on aspects of interaction and cohesion between units in a farming society when discussing differences of settlements. Different weighting of social and economic criteria has led to variant conclusions and definitions of what constitutes a village, a hamlet, and a single farm. Formal institutions, for instance ritual activities, churches, or schools, are of consequence for the organization of local communities and often seen as crucial for what constitutes a village (e.g., Widgren 1997; Rindel 1999; Øye 2000; Myhre 2016). Differences in judicial and social rights in questions of land ownership, land tenure, and land use are seen as being of great importance as factors determining the type of settlement organization (e.g., Pedersen and Widgren 1998:421; Myhre 2002:135; Wembley 2008; Herschend 2009; Ødegaard *et al.* this volume). Interdependency between farmsteads, such as common work in the harvesting season and a common organization of specialization and surplus production, are equally important (e.g., Fallgren 1993:73–75; Herschend 2009:322–325; Frölund 2019:148; Gjerpe 2019, this volume; Rødsrud and Fredriksen this volume; Frölund this volume; Ystgaard this volume).

Figure 2. Documentation of houses before and now. A) Lars Pilø drawing building plans at Forsandmoen, Western Norway. Photo: Sf29846 ©CC BY-NC-NC, Digitaltmuseum.no B) Sunshine presents challenges for Guro Skogvold gathering documentation on an iPad at Dilling, Moss, Southeast Norway. Photo: Museum of Cultural History, University of Oslo.

Terminology: Villages, hamlets, and farms

Differences in interpretations between the Nordic countries also stem from differences in terminology (Erixon 1960; Lillehammer 1999). The words village, hamlet and farm are commonly used to describe settlements throughout the world, but they are extraordinarily difficult to define with precision (Roberts 1996). The content of these concepts varies considerably, according to which geographic area, period, or discipline is the starting point (Øye 2000:14). Within disciplines, there are also differences of opinion (see e.g., Roberts 1996; Langnes 2016; Myhre 2016; Gjerpe 2019).

English *village* corresponds to modern Danish *landsby* and modern Swedish *by*. In Norwegian, however, the term *landsby* is much less used, and often interpreted within a strict historical meaning in which the settlement must include a church if it is to be called a village (Widgren 1997:41; Lillehammer 1999; Øye 2000). Hence, there has been a reluctance to accept the presence of villages in Norwegian prehistory (Øye 2009).

The word for *farm* in Old Norse was *bær*/*býr* or *garðr*. The latter denoted settled and arable land enclosed by a fence, etymologically identical with the English *yard*. Both terms can denote 1) a single farm, 2) a clustered, agglomerated farm, or 3) a tax object – a land assessed farm (Bjørkvik 1981:625). Norwegian *gård*, therefore, does not translate directly to English *farm*. Instead, it can denominate a variation of settlement organizations, including *mangebølt gård* which can consist of several farmsteads (Norw. *tun* or *bruk*) with bordering fields, meadows, and enclosures and with a common name (Rønneseth 2001[1974]:50). In some instances, Norwegian *gård* thus corresponds to Danish *landsby* and Swedish *by* (Widgren 1997; Lillehammer 1999; Øye 2009). Accordingly, there are not necessarily any structural differences between the Norwegian farms with several holdings (*mangebølt tun*), Swedish *byar*, and Danish *landsbyer* (Widgren 1997; Pilø 2005).

In addition, the Nordic languages lack a distinction made in international terminology between the German *Dorf* and *Weiler*, and between the English *village* and *hamlet*, and French *village* og *hameau* (Widgren 1997:41). The Scandinavian terms *by*/*landsby* thereby also cover the English hamlet. Thus, villages can be very small (down to two-three farmsteads) to rather large (more than 50 farmsteads) (Riddersporre 1999). European and Scandinavian historical research has accepted that having 10–15 farmsteads is the lowest criterion that must be met for a settlement to be deemed a village (Widgren 1997:41). However, in archaeological research the minimum size is often set to three farmsteads (Becker 1983:6; Mikkelsen 1999:178; Hansen 2017:10; Gjerpe 2019) or even two (Erixon 1960; Sporrong 1985:196; Sabo and Söderberg 2018:12). In sum, the terminology regarding farms, hamlets, and villages between the Scandinavian languages, and between the Scandinavian and other European languages, is vague and fluid, and often eludes definitions (Øye 2009).

When these topics have been treated in national frameworks, differences in research traditions and terminology between the Scandinavian and Nordic countries have reinforced differences in interpretations of settlement organizational principles. Today it is clear that settlement patterns in the Nordic countries demonstrate regional rather than national differences, and that they were more dynamic than previously thought. Villages, nucleated settlements, and single farms co-existed in the Iron Age and medieval times, and single farms could also develop into subdivided multiple farms (Øye 2000:18).

Spatial organization: Regional and temporal variations

The spatial organization from the Bronze Age towards modern times in the Scandinavian countries shares many similarities, but when it comes to details, regional and temporal differences appear. Many scholars have discussed variations in building traditions between the Scandinavian countries, with particular attention to architecture (e.g., Skov 1994; Artursson 2006; Carlie and Artursson 2006; Martens 2010). There is a growing understanding of variations between and within regions, for instance regarding the degree of nucleation of settlements, the architecture of buildings, building sizes, and the occurrence of fences (e.g., Ethelberg 2003:165; Martens 2010). Different topography, geography and contact networks create different conditions for agriculture and way of life. This may explain some of the differences — not, however, all of them (e.g., Mikkelsen 1999; Rindel 1999; Øye 2000). While the traditional accounts of regional differences between and within the countries of Scandinavia can still be accepted as valid, the picture is being constantly deepened with new excavations and studies. Let us look at an example. Although the three-aisled longhouse with a barn is an architectural concept of *longue durée*, originating in the Early Bronze Age and lasting until the end of the Late Iron Age, new features were introduced over time, all with different intensity and regional distribution, adding increasing complexity to settlement forms and functions (Göthberg 2000; Oma 2016; Eriksen 2019; Nielsen 2020). Some building types only existed for a couple of hundred years, while others were in use for 500–600 years (e.g., Løken 2020). Trade networks, cultural contacts, and different social, political, and economic developments can influence the choices made by a community when it comes to the layout of buildings and settlements (Riddersporre 1999; Artursson 2005:148; Runge 2018; Martens 2020).

In southwest Scandinavia, northwest Germany and the Netherlands, the Early Iron Age houses were relatively short, consisting of four to six trestles (Ethelberg 2003:139f: Artursson 2005:88; Herschend 2009; Løken 2020). This geographical area is also where large prehistoric villages occur. Villages and nucleated settlements are rarely found east and north of this area (Sabo and Söderberg 2018:37), and in the rare cases they exist at all, they first occur from the time of the Common Era (Martens 2010). However, this picture continuously changes with new excavation results. Nucleated settlements with larger and more complex buildings have recently been found outside of the "traditional area" and are older than previously thought (e.g., Grønnesby 2005; Fransson 2019:155; Løken 2020; Diinhoff 2021; Gjerpe in prep; Haue this volume; Meling this volume; Ødegaard *et al*. this volume).

Throughout northwestern Europe, it has been recognized as a common feature that houses of the Late Bronze Age and Pre-Roman Iron Age lasted one generation before a new house was built a short distance away, so-called "wandering" farms or villages (Gerritsen 1999; Rindel 1999; Webley 2008; Herschend 2009; Martens 2010; Holst 2014). The period around AD 200 saw, in general terms, a change towards longer-lasting houses following each other in the same plot for several generations (Gerritsen 1999; Myhre 2002:107–108; Webley 2008:34–36, 149; Herschend 2009:140–141; Holst 2010:158; cf. Ethelberg 2003:278ff.). The process did not occur everywhere in the Nordic region, nor did it occur everywhere at the same time – not, for instance, in southern Jutland where houses were inhabited for one or two generations throughout the Roman and Migration periods before they were moved (Ethelberg 2003). The Iron Age societies of the Roman and Early Germanic Iron Ages were not static units, site-bound for many hundreds of years.

An overall picture of this Roman Iron Age trend can still be supported by new excavations (Løken 2020; Dahl this volume, Frölund this volume, Hjulström and Lindeberg this volume, Lindell this volume, Ystgaard this volume). However, new excavations and methods, such as statistical modelling of radiocarbon dates, challenge the notion of contemporaneity in this transitory process between and within regions (e.g., Haue this volume; Meling this volume; Ødegaard *et al.* this volume). This overall increasing stability of settlements nevertheless indicates large-scale social and economic developments, likely connected to changing agricultural practices, and changing notions of land holding and inheritance (Pedersen and Widgren 1998:421; Myhre 2002:108 with references; Webley 2008; Herschend 2009). Asymmetrical, stratified power relationships became increasingly visible and institutionalized, expressed through architecture, for example in larger houses and farmsteads, secondary residential rooms, perhaps for families of a lower social order, and other material expressions of social relations, such as marked grave mounds (Norr 1996; Karlenby 2007:135–136). This is also discernible in the invention of the hall and hall room, appearing around the beginning of the Common Era (Herschend 1997; Løken 2001) or even earlier (Ødegaard *et al*. this volume). Specialization in craft- and agricultural production was an essential part of this picture (Frölund this volume, Rødsrud and Fredriksen this volume, Ystgaard this volume).

It has been assumed that Iron Age buildings became larger over time and that farm sizes increased (e.g., Hansen et al. 1991; Webley 2008:51, 151; Diinhoff 2010:84), with buildings generally becoming increasingly complex with several rooms and entrances, longer life spans, and several phases (Pedersen and Widgren 1998: 421; Artursson 2005: 90, 92; Norr 2006; Martens 2010). While this is true to some extent, it is also clear that there were periods when farm sizes decreased. Such events were also subject to local and regional variations (see e.g., Artursson 2005:113; Martens 2010; Ødegaard and Winther *in prep*.). This is most clearly seen in the last part of the Late Iron Age: houses, on average, became shorter, while farm sizes generally increased. Activities previously carried out within one, multi-functional longhouse, were moved to an increasing number of smaller, complementary buildings (Øye 2002:276; Ethelberg 2003:130, 318; Sørensen 2003:437, 448). Employment of radiocarbon dating and statistical modelling in comparison with analysis of typological features increases our understanding of when different types of buildings, tied to different functions, were constructed within the settlements (Løken 2020; Iversen and Laursen 2021; Ødegaard and Winther *in prep*.). Large aristocratic farms with specialized crafts and cult practice, such as Tissø on Zealand (Jørgensen 2008) and Järrestad in southeastern Scania (Söderberg 2003), were still unusual in the Late Iron Age. However, metal detector finds, geophysical prospections and new excavations continuously add nuance to this picture (e.g., Gustavsen et al. 2020; Grundvad 2021; Hjulström and Lindeberg this volume).

In the period between the 6th and 9th centuries, there is a marked decrease in the number of known settlements (e.g., Göthberg 1995:98–99; Ethelberg 2003:317; Diinhoff 2009; Sabo and Söderberg 2018; Hansen 2019; Iversen and Laursen 2020; Oinonen *et al*. 2020; Mjærum *et al. in prep*.). Settlement sites often demonstrate discontinuity from the Early to the Late Iron Age (e.g., Göthberg 1995; Löwenborg 2010; Gjerpe 2017; Hansen 2019; Lindell this volume). The complexity behind the dramatic events both in the short term and the long term in northern Europe in Late Antiquity has been unfolded in an increasing corpus of studies presented from the turn of the century onwards. Natural historians, archaeologists, historians and historians of religion have presented different angles on

the events of this period, but they have a common feature – they have been circling around the climatic incident following a series of volcanic eruptions in the Northern and Southern hemispheres between AD 536 and 540, and a following outbreak of plague across the European continent (e.g., Axboe 2001; D'Arrigo *et al.* 2001; Löwenborg 2012; Gräslund and Price 2012; Sigl *et al.* 2015; Büntgen *et al.* 2016; Keller *et al.* 2019; van Dijk *et al. in press*). Discussions regarding trajectories, causes, and effects of the Late Antique disruptions cover such fields as the centralization of political power within the Nordic region and the introduction of new notions of inheritance and reorganization of agricultural strategies and settlements, in addition to climatic events and plague (Myhre 2002; Iversen 2017; Hansen 2019). It should be pointed out that settlement decrease and a re-structuring of society were also discussed in pre-1999 research (e.g., Gräslund 1973; Myhre 1985; Näsman and Lund 1988; Pedersen and Widgren 1998:303–305). New research also supports earlier suggestions that potential settlement decreased and that a re-organization in Scandinavia had already started in the centuries leading up to the 6th century, indicating long-term societal changes following the fall of the Western Roman Empire (e.g., Gundersen 2019; Ystgaard 2019). Furthermore, regional differences between and within the Scandinavian countries characterize both the impact of the climatic events, as well as patterns of re-organization of settlement and the centralization of political power (e.g., Solheim and Iversen 2019; Hansen 2019; Lindell this volume; Loftsgarden and Solheim this volume).

From c. AD 900, there were major changes in the building tradition, with the occurrence of one-aisled constructions with or without earth-dug wall posts (Skov 1994; Artursson 2005). In Germany and the Netherlands, one-aisled constructions are already known from the 7th century; however, in the northern Schleswig area they are mainly known from the medieval period (Sørensen 2003:438 with references). At some sites, like Østergård in southern Jutland, Denmark, the ground area of the houses increased (Sørensen 2011). In other regions, building of smaller houses for special functions intensified (Göthberg 1995:98; Øye 2002:277). Barns were moved out of the dwellings, indicating a new life form with greater distance to the animals (Øye 2002:283; Oma 2016). Post-built constructions were previously thought to disappear at least by AD 1000 (see Øye 2002:281 with references). However, buildings with earth-dug posts from the (late) medieval period are now known from a number of sites in Scandinavia (e.g., Øye 2002:279; Diinhoff 2009:160; Søvsø 2009; Søndergård this volume). Medieval buildings and settlements are more thinly represented than buildings and settlements from earlier periods. This is a paradox, especially in view of the generally accepted belief that there was a population increase, at least from the Viking Age, in Scandinavia (Øye 2002:246; Ethelberg 2003:372; Sabo and Söndergård 2018). In Norway, the missing settlements are believed to be hidden under the historic farms, indicating that the present farm structure might date to as early as the 7th century (Grønnesby 2019). In Funen, Denmark, the settlement organization in the 7th and 8th century changes significantly, reflected by farms moving together within fixed geographical structures that correspond to resource areas known from historical cadastral maps (Hansen 2019:327; see also Sørensen 2003:457). This suggest that the known settlement structures were established in the decades around 600 AD. This contrasts with the previously dominant labile and farm-based settlement structure and, at the same time, gives possibilities of increased administrative control (Hansen 2019:327).

Viking Age buildings are seldom recognized, which may be due to the introduction of new building techniques: the use of sill plates as base (e.g., Sørheim 2009; Kristiansen 2014; see also Hansen 2019) or log constructions (e.g., Berg 1989: 16; Weber 2002; Øye 2002:283 with references; Olsen 2009). These construction techniques leave few preserved traces of the buildings underneath the topsoil. However, other building constructions such as walls and fireplaces can be preserved, and such building traits help us to detect the establishment of, for example, Late Iron Age settlement in southern Finland (Heinonen this volume). It is widely recognised that our understanding of settlements and their structures from the medieval and early modern periods is sketchy, but as yet there are still comparably few excavations of sites from this time span due to, among other things, methods, research traditions and legislation (Martens 2009, Kristiansen 2014, 2019). In light of this, an analysis indicating that buildings with earth-dug, roof-carrying posts did not disappear completely, but occurred in Denmark in the Renaissance, is of importance for the understanding of medieval settlements (Søndergaard this volume).

New methods and data collections – towards increasing complexity and dynamics

While previous research to a greater extent relied on architecture and constructional elements of buildings as the most important form of data for the study of spatial and social organization, recent research has had an increasing range of opportunities for analysis thanks to new theoretical and especially methodological innovations and increased quantities of data.

Development and refinement of the methodological toolbox of settlement archaeology during the past decades has contributed to a range of new possibilities and results. An increasing understanding of settlement dynamics and complexity, leading to new strategies for excavations where top-soil stripping is used to uncover larger areas,

Figure 3. Top-soil stripping before and now: Same method, different attire. A) Trønd Løken following the excavator at Forsandmoen, Western Norway in the 1980s. Photo ©CC BY-NC-NC, Digitaltmuseum.no. B) Tharald Bull Strømnes, Ingvild Grønbeck and Eystein Østmoe following the excavator at Ørland, Central Norway in 2015. Photo: Åge Hojem, NTNU University Museum.

enables archaeologists to assess the spatial organization of settlements in wider contexts, beyond the buildings themselves (see e.g., Heidemann *et al.* 2012; Ystgaard 2019).

Developments in statistical treatment of radiocarbon dates allow for more detailed phasing of the sites. Bayesian modelling of radiocarbon dates can provide more accurate calculations of the life duration of separate houses, which in turn gives more nuanced insight into building sequences as well as into the spatial and temporal lay-out of a site. New statistical methods which provide higher accuracy of ^{14}C-dates can thereby lead to changes in (older) typological assumptions (e.g., Sørensen 2011; Hansen 2017:54–59; Herschend 2017; Laursen and Holst 2017; Ethelberg 2018; Iversen and Laursen 2020; Villumsen *et al.* 2021). Included in wider analyses, radiocarbon dating from sites can be the starting point for new questions related to biographies of settlements, as demonstrated by several of the contributions to this volume.

There is an ever-increasing amount of archaeological data. There are many factors accounting for this, among them the Malta Convention in 1992 (see Løvschal 2016), the new museum law of 2002 in Denmark increasing possibilities for economic finances for sampling (Villumsen 2012), and an increasing number of excavations conducted prior to large infrastructure projects. Such data includes excavation data, natural historical data, digitized museum collections and digitized historical maps. This

Figure 4. A variety of field methods employed in settlement archaeology. A) Tore Gjeset Schjølberg taking measurements with a GPS instrument. B) Synne Rostad metal detecting. C) Kari Loe Hjelle, Syver Smukkestad and Ulf Fransson extracting a turf column for pollen samples. D) Philip Wood, Richard Macphail and Kari Loe Hjelle discussing sampling for micromorphology and pollen. E) Ulf Fransson with macrofossil samples. F) Ingvild Grønbeck sieving finds. G) Ellen Wijgård Randerz excavating animal bones. H) Synne Rostad sieving finds. I) Frode Iversen drawing. Photos: A, B, H, I: Åge Hojem. C, F: Ingrid Ystgaard. G: Marte Mokkelbost. D, E and collage: Magnar Mojaren Gran, all at NTNU University museum.

has created a new basis for analysis which is reflected in archaeological research. Big data has gained ground as an increasingly important element in historical, scientific, and contemporary research (Løvschal 2016). Big data provides opportunities for revealing patterns which would not be recognisable in smaller data sets. An increased volume of data, combined with methods and subjected to proper source criticism, generates higher statistical relevance. This can be seen in the use of radiocarbon data, where low precision data can be combined with high precision data in analyses directed towards discerning general patterns, for instance in demographic variations and developments (see below). Big data sets can be used to test hypotheses put forward in earlier research, and in turn open new possibilities of discovering patterns across time and place. Advanced GIS applications and mapping tools, combined with increasingly developed computer and statistical programs, provide new opportunities for analysis of large data sets (e.g., Ore and Uleberg 2019; Matsumoto and Uleberg 2021). Documentation of the excavations in Geographical Information Systems (GIS) increasingly contribute to the potential of complex analysis of the data from each site, also demonstrated in several of the contributions to this volume. There is one challenge that remains — to address the analytical potential that lies in the collection of GIS information from excavations within regions, and perhaps nations, into larger datasets (Matsumoto and Uleberg 2021).

The last few decades have also seen an increase in the private use of metal detectors. Amateur enthusiasts are providing large amounts of new data, although differences in legislation between the Scandinavian countries have an effect on how this new data develops (e.g., Fredriksen 2019). The emerging metal detector-driven data sets also contain new challenges for interpretations (e.g., Trier Christiansen 2017; Dahle *et al.* 2019; Sand-Eriksen *et al.* 2021).

Another reason for the increased amount of data is that museum collections are being digitized, and the data they contain is becoming much more available. There is also a growing interest in the digitization of older historical maps and historical texts, which together with the application of geophysical prospection, LiDAR and aerial photo-archeology, contribute to an ever-increasing digitization of text and map material (Løvschal 2016). New databases are constantly being set up that collect various archaeological, botanical and historical data, in ever larger and more comparable databases (e.g., Ore and Uleberg 2019; Abraham *et al.* 2021; Filzwieser and Eichert 2021; Bird *et al.* 2022; Kjesrud *et al.* this volume, see also sead.se/).

The use of non-invasive methods is increasingly important for understanding archaeological features, sites, and their larger contexts. Technological advances and an improved understanding of different landscape and soil characteristics continuously lead to a more precise application of methods used (Kristiansen *et al.* 2022; Stamnes *et al. in press*). While small archaeological features such as postholes are often elusive, even with high-resolution methods, features such as cooking pits and fireplaces have a relatively high detection rate (e.g., Gustavsen *et al.* 2020). Several Scandinavian examples indicate the location of Iron Age long houses and settlement structures (Smekalova *et al.* 2008; Trinks *et al.* 2010; Christiansen *et al.* 2016; Filzwieser *et al.* 2017; Tonning *et al.* 2020; Stamnes and Kiersnowski 2021), demonstrating a potential for identification and understanding of the prehistoric landscape.

Scientific data is increasingly used in archaeological studies to understand macro scale changes not easily detectable with traditional methods. This has been termed the 'third science revolution' in archaeology (Kristiansen 2014). New data is also emerging through increased use of scientific analyses in archaeology, such as isotope analysis for studying diet, settlement, and animal husbandry (e.g., Larsson *et al.* 2020; van der Sluis *et al.* 2020; Groot *et al.* 2021), genetics and aDNA (e.g., Margaryan *et al.* 2020). Radiocarbon dating has long been used as a proxy (indirect evidence) for human activity in Stone Age studies (e.g., Shennan *et al.* 2013; Timpson *et al.* 2014; Bird *et al.* 2020; Jørgensen 2020), but in recent years it has become more common in Bronze and Iron Age studies as well (e.g., Hamilton *et al.* 2015; Stockhammer *et al.* 2015; Solheim and Iversen 2019; Brunner *et al.* 2020; Hennius 2020). Several of the articles in this book use ^{14}C material and botanical analysis as big data to shed light on past settlement development and plant and landscape use (Meling this volume; Loftsgarden and Solheim this volume; Kjesrud *et al.* this volume). Other archaeometric methods increasingly used include portable X-Ray Fluorescence (pXRF) on pottery (Rødsrud and Fredriksen this volume), organic residue analysis/lipid analysis of such items as potsherds and iron production to examine the materials, their origin and manufacture (e.g., Rundberget *et al.* 2018; Holmqvist *et al.* 2019; Solvold 2019).

Developments in vegetation history move in a similar direction, where large data sets and new modeling tools enable the development of increasingly sophisticated models of functional divisions of houses, previous agricultural activities, land use and vegetational developments (e.g., Grabowski 2014; Mehl and Hjelle 2016; Mjærum 2020; Mortensen *et al.* 2021; Solheim 2021; Mjærum *et al.* 2022). Pollen analysis is used to study landscape use (e.g., Hjelle *et al.* 2016; Prøsch-Danielsen *et al.* 2020; Abraham *et al.* 2021; Mortensen 2021) and economic history (e.g., Izdebski *et al.* 2016) in larger regions and in long-term perspectives. There is also a growing interest in plant use beyond arable agriculture within

archaeobotany (e.g., Mooney and Martín-Seijo 2021 with references; Kjesrud *et al.* this volume). Analysis of large charcoal assemblages from archaeological sites gives new insights into fuel acquisition strategies and woodland exploitation (e.g., Ballantyne *et al.* 2018; Mooney and Fyllingen 2020). Dendrochronological felling dates from historical construction timber in Europe has recently been analyzed as a geographical proxy to illuminate economic, demographic, and social conditions in early historic and medieval Europe (e.g., Ljungqvist *et al.* 2022). There is also an increased use of non-pollen palynomorphs (NPPs), which include fragments, diaspores, or whole organisms of very different taxonomical units such as fungi, algae, insects, and mosses. Use of NPPs is becoming an integral part of studies of land use and anthropogenic impact in Europe (e.g., Enevold *et al.* 2019 with references).

In recent decades, scientific analyses have become increasingly important in studies of demographic dynamics and the timing of societal crises. Pollen analysis (Lagerås *et al.* 2016) and dendrochronology (Büntgen *et al.* 2006; Thun and Svarva 2018) have been used to explore patterns of settlement expansion and abandonment. Widespread contamination of food and fodder by poisonous ergot (*Claviceps purpurea*) (e.g., Alm and Elvevåg 2013; Grzybowski *et al.* 2021) compounded by climatic cooling is proposed to have led to epidemic ergotism in the Migration period (Bondeson and Bondesson 2014). Geostatistical modelling is used to investigate the effect temperature changes may have had on cereal production and settlement pattern (Stamnes 2016). Sediment analyses, including geochemical and palynological analyses (e.g., ter Schure 2021; Bajard *et al.* 2022), and studies of insect outbreaks (e.g., Büntgen *et al.* 2009), are used to reconstruct past changes in temperature and agricultural practices.

While this volume maintains a focus on spatial and social organization of settlement sites in line with traditional research orientations, new research is broadening the scope of settlement studies by considering concepts of dwelling, biographies, and personhood (e.g., Beck 2017; Eriksen 2019; Dahl this volume). Synthesizing studies moving in these directions, however, also rely on additions of material and development and refinement of new and existing methods in field archaeology in general, and development-led archaeology in particular. Therefore, a continuous reflection on materials, methods and possibilities on all levels is necessary for the study of prehistoric settlement and landscape organization.

The contributions to this volume

A large portion of the papers in this volume present case studies, studying one or more aspects of settlement organization in farming societies. Many of the contributors represent regional museums, and this both reflects how cultural heritage management is organized in the Nordic countries and contributes to the regional perspectives that characterize this volume. Most papers are based on development-initiated heritage management excavation projects. These are the most common types of excavation in the Scandinavian countries, and they represent an important arena for the development and testing of many of the methods briefly discussed in this introduction.

The contributions to the volume are arranged according to chronology and geographical region. Chapters 2 – 8 discuss settlements in long-time perspectives and include case studies from the Early Iron Age from southeastern and eastern Norway and northern Jutland. Chapters 9 – 15 focus on social dynamics and relations between people, landscape, and settlements from the later parts of the Early Iron Age, through the Late Iron Age and the Middle Ages to the Renaissance, and include case studies from southern and central Norway, central Sweden as well as Finland and Denmark.

Niels Haue presents settlement sites from the Pre-Roman and Early Roman Iron Age in the Aalborg area in northern Jutland, Denmark, which is one of the most intensely excavated areas in southern Scandinavia. Haue's interpretation signifies that nucleated settlements and villages emerged on the transition from the Late Bronze Age to the Early Iron Age, and that they subsequently did not wander, but stayed in the same site for several generations, forming regular settlement mounds. The formation of villages correlated with a stricter regulation of land-use rights, and an increase in population. This contradicts earlier interpretations based on evolutionary principles and over-regional frameworks. ***Trond Meling*** presents a compilation of settlement and radiocarbon data from the last millennium BC in the fertile landscapes of southwestern Norway. An increase in settlement and population led to houses succeeding each other in stable farmsteads, in the most favorable areas as early as the Late Bronze Age. Rights to the use of meadows, pastures, and outfield areas were negotiated, in different points in the landscape, indicated by cooking pits, rock shelters and bog deposits. ***Satu Lindell***'s study is based on the settlement site of Madla in southwestern Norway, in one of the most favorable agricultural and most densely settled areas of Norway. She discusses the organization and re-organization of this settlement which demonstrates long continuity, although there was a decline in activity in the 6th century. ***Marie Ødegaard***, ***Lars Erik Gjerpe*** and ***Linnea Syversætre Johannessen*** compile the comprehensive results from one of Norway's hitherto largest excavated settlement sites from the Early Iron Age, at Dilling, southeastern Norway, mainly dating from c. 200 BC to AD 200. They argue that the settlement was organized in larger residential areas divided by "empty" areas without building remains. Furthermore, there was more than one individual farmstead within

each residential area. A change in spatial organization around BC 200–150 is argued to relate to a shift in regulations of rights of possession of land – at the same time as a larger farm with a hall room appears.

The four first chapters, therefore, question the notion of the wandering settlements as a standard settlement pattern in southern Scandinavia in the last millennium BC, and bring nuance to this view through in-depth regional studies.

Lars Erik Gjerpe sets out to explore why the introduction of iron reaping tools was delayed until c. 200 BC in eastern Norway, despite iron technology being known in Scandinavia from c. 500 BC. While he argues that Pre-Roman Iron Age society was traditionalistic and reluctant to take advantage of new technology, he suggests that a potentially dramatic climatic event, believed to have taken place in 207 BC, could have spurred the choice of a new technological path and the use of iron reaping tools, to meet the challenges of climatic decline. ***Kjetil Loftsgarden*** and ***Steinar Solheim*** use radiocarbon dates as proxies for population dynamics by compiling and analyzing dates spanning from 1300 BC to AD 800 from a wide range of excavated sites in southeastern Norway. Their results indicate a long-lasting phase of population growth, beginning in the 5th century BC and lasting until the 5th century AD, followed by a decline in the 5th and 6th centuries. The study highlights and contextualises earlier developments indicated by local and regional case studies, including several studies presented in this volume. ***Karoline Kjesrud, Luka Natassja Olsen, Irene Teixidor-Toneu, Jade J. Sandstedt, Anneleen Kool and Linda Christiansen*** present an initial exploration of another large dataset currently under compilation: macrofossils from soil samples from decennia of development-led archaeological excavations in southeastern Norway. With a cross-disciplinary approach, they study plant use and human–nature interaction in the period c. 400 BC–AD 400. In their study of Augland, a pottery production site in southern Norway dating to AD 200–450/460, ***Christian Løchsen Rødsrud*** and ***Per Ditlef Fredriksen*** trace two different pottery craft traditions and explore how knowledge interaction enabled craftspeople to experiment with, learn and combine both traditions in one site and even in some vessels. Clay recipes of the two traditions, and especially the use of granite versus soapstone as tempering agents, prove to be crucial both for the understanding of the production technique, the function of the pots, the distribution networks of the raw material, and the knowledge networks.

These four papers employ varying methodological and theoretical insights to shed light not only on over-arching patterns of demography and human-nature interaction, but also on the social embeddedness of technological adaptation and innovation. Between them, they demonstrate the large knowledge potential that exists in a deeper examination of existing data from our museums' collections, and in learning from ensuing discussions and debate.

Ingrid Ystgaard analyzes activities and tasks performed in three neighboring Roman Iron Age farmsteads in Ørland, central Norway. Each farmstead provided their own subsistence production, while surplus production was coordinated between the farmsteads. Thus, they were parts of a larger community, even though their spatial organization indicates that they were independent units. ***Per Frölund***'s paper on the agrarian settlements at Bredåker and Berget near Old Uppsala, Sweden, explores how surplus products from agricultural settlements were paid to a central farm in a tributary system, as an acknowledgement of submission and a price for peace, security, and protection. In her paper, ***Barbro Dahl*** explores the relations between settlement and burials at Forsandmoen, a densely settled and well examined site in southwestern Norway. While the settlement was inhabited for more than 2000 years, the burials examined date between AD 150 and 550. Dahl finds that the relationship between the living and the dead was close in space during this period, and that a connection through time was established through the continuous re-use and maintenance of both the burial mounds and the buildings. In their paper on the recent excavations at an elite settlement at Ströja, Östergötland, Sweden, ***Björn Hjulström*** and ***Marta Lindeberg*** present an example of continuous settlement with central functions in the period c. AD 450–1000. The focus of the settlement remained a mead-hall, re-erected several times and functioning as a ritual center of a dispersed settlement, which saw a larger restructuring in c. AD 650, along with the introduction of a season-based marketplace.

Together, these four papers explore relations between the living, both in terms of symmetrical relations between neighboring farmsteads, and asymmetrical relations between farmsteads representing different levels on a social scale. The close spatial and temporal relations between the communities of the living and the dead add to our understanding of the social strategies of the living. Thus, social relations between communities on both sides of the division of death were of crucial importance to the spatial, economic, and social organization of settlements.

Tuuli Heinonen discusses village development in the Uusima region of southeastern Finland. This followed a different trajectory compared to the rest of southern Finland, where settlement development is more comparable to Swedish and Scandinavian developments. By interpreting placenames, Heinonen finds that settlement likely was initiated both by Swedish-speaking colonists and Finnish-speaking groups. Many settlements were initially established as single farms as early as in the Late Iron Age, and unified

into village-like settlements during the 15th and 16th centuries. ***Louise Sønderborg*** states that Renaissance settlement sites are less known from the archaeological material. In Denmark one has, therefore, assumed that wooden, roof-supporting posts dug into the ground went out of use with a royal ban from AD 1554. However, excavations at Anebjerg in Jutland revealed that this construction principle was still being used in the 17th century, and that local building traditions and access to suitable building material were more important when it came to the choice of construction method than central regulations.

The two last papers in this book point towards important directions for further research on prehistoric and historic settlement organization in the Nordic countries. First, our scope must widen further, and consider settlement patterns in communities neighboring and interacting with the coastal Scandinavian settlement sites, both to the east in today's Finland, and to the inner and northern regions of the Scandinavian peninsula, where societies based on hunting and foraging left traces of settlements of which we still have very little knowledge. Second, we need to aim at broadening our insight into architectural, spatial, and social organization of settlements from the medieval and early historic periods.

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