SPRAWOZDANIA ARCHEOLOGICZNE 77/1, 2025
PL ISSN 0081-3834
DOI: 10.23858/SA/77.2025.1.4130

Robert Staniuk[1]

A THEORETICAL, INEQUALITY-BASED MODEL OF CULTURAL CHANGE CULMINATING IN THE EMERGENCE OF BISKUPIN-TYPE FORTIFIED SETTLEMENTS

ABSTRACT

Staniuk R. 2025. A theoretical, inequality-based model of cultural change culminating in the emergence of Biskupin-type fortified settlements. *Sprawozdania Archeologiczne* 77/1, 141-172.

Early Iron Age (EIA) Biskupin-type fortified settlements are viewed as unique examples of high-density urbanism (HDU) with limited (if any) evidence of social inequality. This argument is supported by two lines of evidence: uniform house sizes and small-scale differences in burial rites of the associated Early Iron Age Lusatian Urnfield culture. These two observations are rooted in rudimentary archaeological empiricism, highlighting the pitfalls of induction-based inference for identifying social phenomena and essentialist notions in studies of social inequality, thereby overlooking the dynamics of social processes. This paper will review the state of research on Biskupin-type fortified settlements to discuss how an inequality framework can help conceptualise their emergence, florescence, and decline. Finally, I apply this framework to develop a qualitative, theoretical model of the trajectory of social changes that results in the emergence of these sites.

Keywords: inequality; archaeological theory; culture-history; Early Iron Age; Biskupin-type fortified settlements

Received: 06.05.2025; Revised: 28.05.2025; Accepted: 23.09.2025

1 Faculty of Archaeology, Adam Mickiewicz University, ul. Uniwersytetu Poznańskiego 7/2.69, 61-614 Poznań, Poland; robert.staniuk@amu.edu.pl; ORCID: 0000-0002-9941-1875

INTRODUCTION

As global academic attention shifts towards understanding the impact of present-day inequalities on our future, archaeology is at the forefront of research into the historical relationship between inequality and human development (Mattison *et al.* 2016; Quinn and Beck 2016; Kohler and Smith 2018; Lalueza-Fox 2022; Bogaard *et al.* 2024; Feinman *et al.* 2025). Especially in recent years, inequality has become one of the leading 'buzzwords', spawning numerous investigations into virtually all contexts and materials to determine the presence of inequality and how it affected social organisation in the past (Przybyła 2013; Smith *et al.* 2014; Großmann 2021). In this context, the Early Iron Age is increasingly recognized as one of the defining periods in human history, coinciding with the rise of monotheistic religions as well as the establishment of states and monetary systems (Kristiansen 1998; Graeber 2011; Turchin 2015; Schumann and van der Vaart-Verschoof 2017; Scott 2017; Dunbar 2023; Gretzinger *et al.* 2024; Rönnlund 2024). These three aspects are interlinked by the notion of inequality, establishing a system where material (coinage), ideological (religion), and organisational (state) aspects have effectively formed the blueprint for the evolution of the present-day world (Wengrow 2010; Graeber 2011).

However, the evolutionary pathway we document retrospectively is hardly the one that developed through the ages (Turchin 2015; Graeber and Wengrow 2021). As the Early Iron Age was a moment where numerous societies practised different forms of social organisation, shaped by specific, broadly defined environments as well as historical trajectories (Haselgrove *et al.* 2023), it is worth considering how particular outcomes developed as a consequence of processes common to all human societies.

The Hallstatt C (820-580 cal. BCE, after Goslar 2019) Biskupin-type fortified settlements are part of this puzzle, although their emergence, florescence, and decline are consistently examined within the particular context of Lusatian culture (Niesiołowska-Wędzka 1974; 1991; Dzięgielewski 2017b; Nowakowski 2023). Considered as a unique discovery in the 1930s, the growing number of sites discovered since indicates a particular habitation form specific to present-day North-Central and Western Poland throughout the Early Iron Age (Szamałek 2009; Kaczmarek and Szczurek 2015). Their preserved wooden architecture, comprising ramparts, breakwater, foundation platforms, multiple house rows separated into individual house units, and pathway systems, drew immediate attention due to their excellent preservation, as well as the high degree of collective effort involved in their construction (Kostrzewski 1950; Durczewski 1970; Kaczmarek and Szczurek 2015). This High-Density Urbanism (HDU) appears to be a novel way of organising communal living in an environment previously characterised by a dense but dispersed network of small settlements (Ignaczak 2002; Kaczmarek 2002; Szamałek 2009). However, by adapting the culture-historical framework and relying on internal processes specific to the Lusatian culture, archaeologists have put themselves in a difficult position, as causes, drivers, and effects need to be examined from the perspective of a particular archaeological culture rather than

a historical or evolutionary process. As such, the goal of this paper is to outline how shifting the focus to an inequality framework can help us re-conceptualise the processes involved in the emergence, florescence, and decline of Biskupin-type fortified settlements. My argument will be based on a brief characterisation of the recent findings in inequality research, followed by a critical overview of existing concepts surrounding Biskupin-type fortified settlements. My analysis will be followed by an outline of the candidate processes taking place in the European Late Bronze Age. I will examine these candidate processes in the context of Biskupin-type fortified settlements by relating them to specific social processes occurring on these sites, thereby providing a tangible proposal for research on Early Iron Age inequality.

EVOLUTION OF INEQUALITY

In its most fundamental sense, inequality refers to the restricted access to resources, enabling some members of a society (groups or individuals) to accumulate more than others (Price and Feinman 2010a; Mattison *et al.* 2016; Smith *et al.* 2018; Kerig *et al.* 2022). This definition is followed by the conceptualisation of wealth itself as an accumulation of social relations, skills, and/or materials (Borgerhoff Mulder *et al.* 2009; Beck and Quinn 2022). Currently, archaeological research suggests that some degree of inequality is to be expected in every society, regardless of its specific socio-economic conditions (Shennan 1996; Smith *et al.* 2010; Kohler and Smith 2018; Graeber and Wengrow 2021). The fundamental difference is upon what the wealth is based, what mechanism drives its increase, the scale of inequality achievable under given circumstances, and the dynamics of this process (Paynter 1989; Mattison *et al.* 2016; Kohler and Smith 2018; Mittnik *et al.* 2019).

As inequality research expanded in scope, definitions of wealth had to encompass the complexity of human experience. Material wealth corresponds to physical objects considered valuable in any cultural setting, specifically ones that can be accumulated over time (Bourdieu 1984; Borgerhoff Mulder *et al.* 2009; Beck and Quinn 2022). Relational wealth corresponds to the possibility of mobilising support from the social networks one is engaged in, as these connections can help individuals or groups sustain themselves through difficult periods, as well as organise people towards a common objective (Borgerhoff Mulder *et al.* 2009; Sztompka 2016; Beck and Quinn 2022). Finally, embodied wealth corresponds to the individual skills people acquire throughout their lives, enabling them to accomplish tasks exceptionally (Borgerhoff Mulder *et al.* 2009; Bender Jørgensen *et al.*, eds. 2017; Beck and Quinn 2022). These theoretical threads of inequality research are not mutually exclusive, as culture provides numerous opportunities for each of these types of wealth to coexist. The distinction serves to estimate potential differences between societies and their priorities in each period.

Unlike forms of wealth, mechanisms driving inequality are less formalised as they often reflect case studies and cultural settings. In terms of evolutionary research, the key driving mechanisms are economic defensibility and intergenerational transmission, as well as population and resource pressure (Feinman 1995; Borgerhoff Mulder *et al.* 2009; Gurven *et al.* 2010; Mattison *et al.* 2016). These fundamental processes should influence the cooperation-competition spectrum of human behaviour, resulting in an increase or decrease in inequality and its institutional manifestation (Price and Feinman 2010b; Mattison *et al.* 2016). This is precisely the avenue where inequality research encounters questions of political organisation, and whether resource accumulation can be decoupled from the means enabling some members of society to achieve it (Price and Feinman 1995; 2010b; Scott 2009; 2017). The core component is the aspect of property, *i.e.,* the exclusive right to things and how it is utilised in a particular society (Earle 2000; Shennan 2011). Currently, we as a Western society tend to employ a specific perspective on property as an attribute of an individual human being, although this is only one of the many forms property has taken throughout human history (Graeber 2011). Whether an extension of an individual or an attribute of a collective, the concept of property — *i.e.*, who has access and how — is the key component of all mechanisms of wealth accumulation, as it affects both intra- and inter-group behaviour.

The question of scale emerges at the intersection of wealth, mechanisms, and property itself, as determining what can be accumulated, how it becomes accumulated, and who has access to it effectively constitutes what form inequality can take. For example, in Early Neolithic Europe, the spread of Linearbandkeramik across Central and Western Europe suggests that, at least in its initial stage, land was considered 'available' until it was settled, effectively enabling a large-scale expansion of early farmers without visible inequality (Shennan 2018). Whether this represents actual 'availability' from the standpoint of hunter-gatherers already present in these areas is precisely the point where the interplay between wealth (land), mechanism (resource pressure), and property (us and them, *i.e.*, early farmers and hunter-gatherers) requires attention (Shennan 2018; Cortell-Nicolau *et al.* 2025).

The resulting model of inequality is far from static, as the accumulation of resources through a particular set of means will inevitably lead to their depletion, necessitating either redistribution or the discovery of new avenues. Whether this process will be voluntary and directed towards the improvement of the overall living conditions or coerced for the benefit of the group or individuals, is specific to a particular setting. However, there is a consensus that while some form of inequality can be common to all societies, its uncontrolled growth, which comes at the expense of others, can be halted by high mortality events, *i.e.,* outbreaks of violence (Scheidel 2017; Turchin 2023). These tragic outcomes tend to bring down inequality to more 'reasonable' levels at the expense of lost lives and destruction of wealth. Determining whether this pattern is universal is one of the driving forces of present-day research into inequality, as understanding long-term dynamics of inequality and its effects on other social responses can only be provided by archaeological research.

Although the outlined epistemological ladder is in some way familiar to the majority of ongoing research, two prevalent schools of archaeological thought have emerged. On the one hand, the quantitative school is based on the principle that past inequality can be investigated through rigorous data collection of common finds, which can then be analysed to determine overall trends in the evolution of inequality (Borgerhoff Mulder *et al.* 2009; Kohler and Smith 2018; Bogaard *et al.* 2024). These trends are then assessed against other types of data to evaluate potential links between inequality and other social phenomena, *e.g.*, violence, innovation, or resilience. On the other hand, the qualitative school is interested in determining the actual effect of inequality in human societies and how specific societies respond to its emergence (Graeber 2011; Arponen 2017). The two approaches are complementary but differ in terms of methodology and scale. The former accentuates the importance of large-scale inference using a well-defined dataset to determine the overall trajectory of change through time. At the same time, the latter emphasises the importance of localised scenarios to provide a detailed perspective on particular societies. These epistemological differences are mutually beneficial, as large-scale investigations benefit from datasets generated in small-scale research. In contrast, small-scale research draws on large-scale inference to inform its research questions. As Early Iron Age research remains in the domain of qualitative research, the following will adhere to this methodology.

EARLY IRON AGE BISKUPIN-TYPE FORTIFIED SETTLEMENTS – (PRE-)HISTORIC PARTICULARITY OR AN EVOLUTIONARY NEXT STEP?

Although we celebrated the 90th anniversary of the discovery of Biskupin in 2024, it is worth noting that we remain no closer to providing a coherent answer to this question (Grossman and Piotrowski 2016). It is an understatement to say that the role Biskupin-type fortified settlements played in the overall trajectory of Early Iron Age social changes is underdetermined. The majority of the subject literature focuses either on the historical and present-day significance of the discovery (Piotrowska 2004; Nowacki 2008; Kaczmarek 2014; Niedziółka 2023), detailed characterisation of the recovered material culture (Kostrzewski 1950; Jaskanis 1991; Grossman 2006b; Purowski 2010) or narrative-based description of how their emergence represents the final development stage of the Lusatian culture (Gedl 1975; 1988; Gardawski 1979; Szamałek 2009; Dzięgielewski 2017b; Nowakowski 2023). The accepted consensus is that the emergence of Biskupin-type fortified settlements is linked to the rapid social development in the previously provincial Eastern Greater Poland and Kuyavia region, which was caused by the decline of the Early Iron Age Lusatian culture in Silesia (Gedl 1975; 1988; Gardawski 1979).

When it comes to the origins of the particular form, the works of A. Niesiołowska-Wędzka were the last comprehensive attempt at answering this question through exploration

of potential links to the Mediterranean area (1974; 1991). However, years later, her diffusionist argument has been abandoned as evidence of earlier, Bronze Age fortified settlements has increased (Czebreszuk *et al.* 2008; Jaeger 2016; Przybyła 2016; Jędrysik and Przybyła 2018). Moreover, the dataset she used to build her argument has since undergone substantial revisions as independent dating and review of previous excavation findings have decreased the number of Late Bronze Age and Early Iron Age fortified sites, including Biskupin-type (Harding and Rączkowski 2010; Kaczmarek and Szczurek 2015; Góralczyk 2024).

The florescence phase is even more enigmatic, as there is substantial variability between individual studies (Kostrzewski 1950; Durczewski 1970; 1985; Ostoja-Zagórski 1978; 1993; Harding *et al.* 2004; Szczurek and Różański 2013). The fundamental problem is the unit of analysis, which remains the archaeological dataset recovered throughout the excavations rather than social units like houses. Numerous studies have addressed the intricate details of crafts and, unusually for Central Europe, the significance of the assemblage of wooden artefacts (Kostrzewski 1950; Durczewski 1970; Grossman 2006a; Babiński 2009). These studies indicate the scale and variability of production taking place at the site level, but remain problematic in terms of comparative research. The last point is crucial, as Biskupin-type fortified settlements tend to be investigated in isolation from the overall settlement network. As a result, they often stand out as remarkable. However, it is unclear whether this represents the differentiation of habitation strategies in the Early Iron Age or simply the level of data presentation (Mierzwiński 2000).

Unlike the onset or florescence, the decline has received extensive attention, leading to the consolidation of three prevalent theories. The oldest one, which is explicitly related to the eponymous site, is related to environmental changes causing water level rise and subsequent flooding (Gadomska-Czekalska 1950; Piasecki 1950). More recent research has linked this process to the 2.8ka event, a climatic shift that had further consequences, including a decrease in the annual average temperature and an increase in rainfall (Geel *et al.* 1997; van Geel *et al.* 2004; Dzięgielewski 2017b). The straightforward link between climatic change and settlement collapse is currently under investigation, as evidence from other similar and roughly contemporary sites reveals that while some communities might have been affected by environmental change, the scale of human anthropopressure was also a significant factor (Gałka *et al.* 2022; Kołaczek *et al.* 2025).

J. Ostoja-Zagórski explored the alternative socio-economic factors. Based on demographic and ecological factors, he proposed that the inhabitants of Biskupin-type fortified settlements operated below their carrying capacity but were unable to cope with rapidly changing environmental conditions, potentially caused by climate change (Henneberg and Ostoja-Zagórski 1984; Ostoja-Zagórski 1976; 1983; 1988). From a methodological standpoint, these early works represent the first attempts at raising the issue based on preserved domestic units or recognising the significance of the demographic aspects of human development, but have limited, if any, significance for present-day research, as the exact models

used for the estimations are implicit and contradictory (Mierzwiński 1996). However, the theoretical principles and observations made at the sites in Sobiejuchy and Jankowo are becoming increasingly plausible as new evidence from Bruszczewo, an Early Bronze Age and Early Iron Age fortified site, has recently proposed the significant impact of changes in the natural environment on human occupation (Niebieszczański *et al.* 2024; Kołaczek *et al.* 2025).

Finally, the conventional culture-historical theory proposes that the decline of Biskupin-type fortified settlements was caused by the rapid expansion of the Scythian Empire (Chochorowski 2014; Chochorowski and Krąpiec 2020; Nowakowski 2023). The increasing number of independent dating methods (dendrochronology and radiocarbon dating), as well as new findings from SE Poland, show that the relations between the area of present-day Poland and the Scythian Empire are more complex (Czopek and Krąpiec 2020; Czopek *et al.* 2023). Absolute dating of selected sites previously associated with the nomadic raids responsible for widespread destruction occurred before the Scythian presence was established in southeastern Poland. Evidence of violence from Smuszewo or Biskupin remains enigmatic in terms of drivers or causes, suggesting a different scenario for their downfall (Gadomska-Czekalska 1950; Durczewski 1970; Malinowski 1979).

A NECESSARY DETOUR ON THE HOPELESSNESS(?) OF PERIODISATION

Before discussing how new findings from the European Late Bronze Age and Early Iron Age can help identify the macroscale processes responsible for the emergence of this unique settlement form, a short detour is necessary to address the elephant in the room, *i.e.*, the present-day chronological resolution.

Historically, the Bronze and Early Iron Age chronology of Poland has been positioned as an amalgam between the two European periodization schemes by J. Kostrzewski and his students: Northern, *i.e.*, O. Montelius's until the end of the Late Bronze Age (Period V), when it is overtaken by the Southern, *i.e.*, P. Reinecke's (Hallstatt C and D) (Kaczmarek 2012; Czopek 2014). How and whether the two can be combined is irrelevant, as the classification system has withstood the development of radiocarbon and tree-ring dating. The crucial issues are the absolute chronological spans associated with the two periods of the Early Iron Age and how their evaluation has affected the definitions of Hallstatt C and Hallstatt D.

J. Kostrzewski's pre-calibration estimates positioned the Hallstatt C period in Poland c. 650-550 bc, and the Hallstatt D c. 550-440 bc (Goslar 2019; Chochorowski and Krąpiec 2020). Initially, based on the evaluation of finds and contexts, Biskupin, as well as other comparable sites, were dated to Hallstatt D (Niesiołowska-Wędzka 1974; Śmigielski 1991). When the first radiocarbon and dendrochronological findings were reported, indicating

a chronological offset of approximately. 300 years, the site's dating as well as other contemporary sites were moved from Hallstatt D to Hallstatt C (Pazdur *et al.* 1991; Ważny 1994). This effectively meant that the entire material culture assemblage contributing to the definition of Hallstatt D was repositioned into Hallstatt C following insights of independent dating rather than stylistic or typological traits. The two previously well-defined periods were effectively mixed. As a result, the groundbreaking discoveries in Biskupin have introduced a new degree of uncertainty, at least when it comes to findings of older investigations. Currently, the distinction between Hallstatt C and Hallstatt D is well documented, at least in terms of burial rite, economy, and material culture, as the former tends to be associated with the 'sedentary' Lusatian Culture, while the latter with the 'mobile' Pomeranian culture (Dzięgielewski 2017a; Kaczmarek 2017). However, uncertainties arise when examining reports from sites published between the 1930s and 1995, and it becomes necessary to determine whether historical Hallstatt D represents present-day Hallstatt C or just Hallstatt D.

Recently, T. Goslar proposed new absolute dating by modelling radiocarbon dates from Domasław, one of the largest Bronze Age and Early Iron Age cemeteries in Silesia (Goslar 2019; Gediga *et al.* 2020). His results indicate that the distinction between Hallstatt C and D is most plausible under the assumption of transitional consecutiveness, rather than a 'hard' boundary (Goslar 2019). As a result, under the Domasław model, Hallstatt C falls between 820 and 580 cal. BCE and Hallstatt D between 549-428 cal. BCE. His assumption of transitional consecutiveness can be maintained further when comparing new

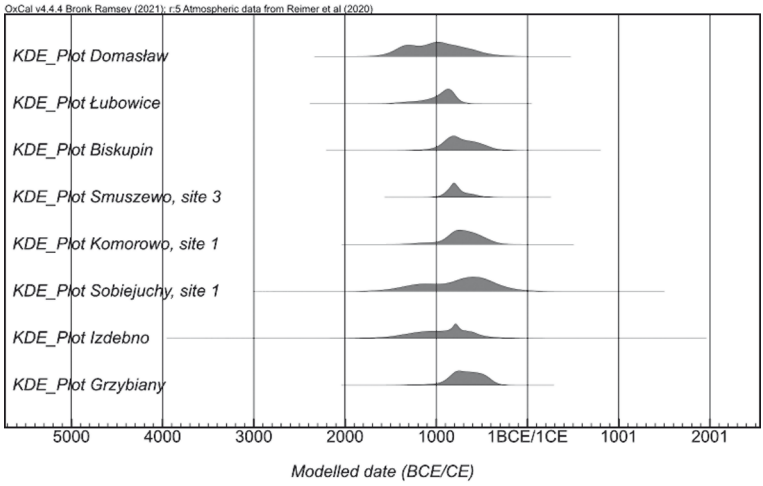

Fig. 1. Kernel Density Estimate plots showing the probability distribution of radiocarbon dating of major Late Bronze Age and Early Iron Age sites in Poland (OxCal v. 4.4.4: Bronk Ramsey 2009; calibration curve: Reimer *et al.* 2020; KDE Plot: Bronk Ramsey 2017; data after: Chochorowski and Krąpiec 2020; Filipović *et al.* 2020; Goslar 2019; Harding *et al.* 2004; Pazdur *et al.* 1991, 1994; Stolarczyk and Baron 2014; Skripkin and Kovaliukh 2004)

and legacy data on Late Bronze Age and Early Iron Age fortified sites in present-day Poland (Fig. 1). For the majority of sites linked to Hallstatt C and D, their chronological range overlaps with the proposed dating of Domasław. Only for Łubowice, Sobiejuchy and Izdebno is it probable that occupation took place prior to the 820 cal. BCE threshold. Given that Łubowice is in Silesia and the early dating of Izdebno represents an outlier, as noted already at the publication stage (Pazdur *et al.* 1994), Sobiejuchy can be considered the hallmark of centralisation in the Greater Poland-Kuyavia region. By the same merit, accounting for sampling bias, and treating the findings as a first-order approximation, this data can support the expansion of fortified sites c. 800 cal. BCE.

ORIGINS OF THE EARLY IRON AGE: DEMOGRAPHY, IDEOLOGY, MIGRATION AND/OR MOBILITY?

Unique archaeologically as they are, Biskupin-type fortified settlements developed in a common European environment initialized by the rapid adoption of cremation *ca*. 1300 BCE. This process was likely accompanied by changes in social relations, where one of the crucial determinants was differential access to resources, triggering the emergence of local elites that became increasingly interregional by Hallstatt C (Schumann and van der Vaart-Verschoof 2017; Großmann 2021; Gretzinger *et al.* 2024). How this change took place is generally explained through (1) demographic growth, (2) ideological change, and (3) mobility/migration (Ostoja-Zagórski 1988; Fokkens 1997; Harding 2000; Nikulka 2016; Kaczmarek 2020; Sørensen and Rebay-Salisbury 2023).

Population growth

The demographic turn in archaeology has revived the interest in investigating the impact of population change on human activity, social organisation, and cultural development (Shennan 2000; Chamberlain 2009; Müller 2015; French *et al.* 2020). As the majority of research has focused on the 'radiocarbon' periods, *i.e.,* periods where radiocarbon dating is the primary method of absolute dating, the Late Bronze Age-Early Iron Age is increasingly recognised as the next significant threshold for determining the trajectory of the demographic of Europe (Capuzzo *et al.* 2018; Feeser *et al.* 2019; Friman and Lagerås 2023). The limitations imposed by the overlap with the Hallstatt plateau, as well as confidence in the reliability of the typological dating for the late 2nd and early 1st millennium BCE materials, are already (in)visible in the summed probability distribution of calibrated radiocarbon dates (SPD; Shennan *et al.* 2013; Timpson *et al.* 2020; Crema 2022). However, despite the long-accepted view that this period represents a surge in the number of archaeological sites, especially cemeteries, the conceptualisation of the phenomenon, as

well as its causal mechanisms, is largely unresolved (Bukowski 1992; Kaczanowski *et al.* 1992; Mierzwiński 2012b; Nikulka 2016).

Ideas revolving around the demographic growth of Late Bronze Age-Early Iron Age societies emphasise the importance of economic transformations associated with the introduction of new crops and land-use strategies, which proved successful in previously unsettled or sparsely populated areas (Ostoja-Zagórski 1988; Piontek 1992; Szamałek 2009; Rebay-Salisbury *et al.* 2021; Reed *et al.* 2024). No specific 'trigger' has been suggested, as historically, the widespread occurrence of Late Bronze Age-Early Iron Age archaeological finds was considered evidence of a highly diversified socio-economic model that performed well across the entirety of the settled area (Kurnatowski 1992). Notably, the Urnfield culture, in general, and the Lusatian culture, specifically, are considered relatively homogeneous society (Kaczmarek 2017). As such, the significance of regional differentiation, especially factors contributing to the successful exploitation of previously underused ecological niches, is recognised but treated as secondary to the overall successful performance of the Late Bronze Age-Early Iron Age socio-economic system (Kurnatowski 1992; Kaczmarek 2002; 2017; Szamałek 2009).

Currently, the strongest candidate for driving an economic shift and resulting population growth in the late 2nd and early 1st millennium BCE is the consolidation of *Panicum miliaceum L.* (broomcorn millet) as the new staple crop (Urban 2019). Due to its short vegetational cycle, environmental resilience, and a vast array of uses, it is a potential driver of demographic growth in this period (Filipović *et al.* 2020; Pospieszny *et al.* 2021). While East Asia is generally accepted as the origin of domesticated millet between 7000 and 3300 BCE (Filipović *et al.* 2020; Pospieszny *et al.* 2021; Stevens *et al.* 2021), by approximately 1500 cal. By BCE, it had already reached Central Europe through an East-West 'corridor', which could potentially signal its quantitatively larger spread alongside the cremation rite (Moskal del Hoyo *et al.* 2015; Filipović *et al.* 2020; Pospieszny *et al.* 2021).

Unlike crops, there is little evidence of similar innovations in animal husbandry or, more broadly, the animal economy. Both the Late Bronze and Early Iron Ages are characterised by stability in their reliance on cattle as the primary source of animal produce, with microregional differences related to the importance of pigs and sheep/goats (Ostoja-Zagórski 1983; 1993; Piątkowska-Małecka 2003; 2007; Kaczmarek 2017; Ślusarska 2021). The main novelty lies in the widespread exploitation of previously unoccupied areas, which must have accompanied some adjustments in the husbandry system. However, the causal relationship – whether settling into new niches causes population growth or vice versa – remains open. Furthermore, despite this ecological expansion, which targets areas with large freshwater reservoirs, the existing data does not suggest increased reliance on wild terrestrial or aquatic animals (Makowiecki 2003; Ślusarska 2021).

One potential avenue for innovation in animal management, or rather subsistence, is the impact of increased salt availability due to organised extraction and trade (Harding

2013; Bednarczyk *et al.* 2015; Mazur and Dzięgielewski 2021; Saile 2024). Substantial amounts of salt enable the intensification of long-term preservation of produce, such as meat and cheese, thereby improving the availability of protein and fat during winter and reducing mortality caused by food shortages (Harding 2013). Reducing mortality would then have a positive effect on population growth, potentially explaining the increasing population size but not necessarily its scale, at least not by itself. For the region under consideration, the strongest evidence of such an impact could be associated with Southern Poland, where material remains of salt production dated to the Late Bronze Age-Early Iron Age have increased in the last decade (Bednarczyk *et al.* 2015; Mazur and Dzięgielewski 2021; Saile 2024). However, the areas with the most significant human concentrations (Silesia, Greater Poland, Kuyavia) have no available salt sources for exploitation or have provided evidence of local production only in later periods (Harding and Kavruk 2013; Mazur and Dzięgielewski 2021). While this does not dismiss the possibility of the positive impact of salt availability on population growth, it is necessary to discern whether such a process resulted from the direct transport of salt itself or already processed products.

Ideological change

The alternative to the population growth theory is the revolutionary ideological change associated with the spread of cremation and the accompanying increase in the frequency of burials in society (Fokkens 1997; Mierzwiński 2012b). This change in the burial rites, making it necessary to bury everyone or at least the majority of community members, is often used to explain the quantitative differences between the number of individuals found in cemeteries, especially when comparing the Late Bronze Age-Early Iron Age funerary record with the preceding periods (Sørensen and Rebay-Salisbury 2023). According to this logic, the disproportionally large numbers of burials found in urnfield cemeteries can only be explained by a radical ideological shift which more accurately reflects the actual demographics rather than a pattern of population growth (Fokkens 1997; Mierzwiński 2012b; Sørensen and Rebay-Salisbury 2023).

Accompanying the democratisation of burial rites is the standardisation of material culture deposited together with the deceased (Kaczmarek 2002; 2017). Unlike the preceding heterogeneous Middle Bronze, where not only inhumation and cremation burial were practised alongside each other but the material culture itself was characterised by pronounced morphological and decorative differences, the Late Bronze Age-Early Iron Age displays limited variability despite the large number of regional groups (Gedl 1975; Kaczmarek 2017; Staniuk 2023). The resulting common sense impression of egalitarianism is increasingly challenged as continental and local discoveries suggest that this period represents a consolidation of already present inequality, as shown by the differentiation of grave goods, funerary architecture or the spread of weaponry (Kristiansen 1998; Przybyła 2009; 2013; Harding 2015; van der Vaart-Verschoof and Schumann 2017; Gediga *et al.* 2020;

Desplanques 2022; Marzian *et al.* 2024). On a local scale, even settlement data suggest the existence of large-scale differences in living conditions, as large and small communities coexisted in parallel (Baron 2006; 2007; Bugaj and Kopiasz 2006; Dzięgielewski 2017b).

If we assume that the ideological basis was relatively similar across Urnfield Europe, the development of such pronounced differences in habitation strategies and community size is, in my opinion, the fundamental challenge in determining whether demographic or ideological theory is more valid. Or, even more plausibly, if the two should be considered complementary.

Migration and/or mobility

Aspects of mobility/migration are embedded in the discussion on the Late Bronze Age-Early Iron Age societies, predominantly in terms of the initial source of the Urnfield package (Schmid 2020; Cavazzuti *et al.* 2022; Rose *et al.* 2023), subsequent spread into other regions (Dzięgielewski *et al.* 2010), the increasingly complex network of exchange and trade (Kristiansen 1998; Purowski 2010), and finally, traces as well as effects of migrations from historical records (Chochorowski 2014). One crucial point in these discussions is the distinction between migration and mobility, where the former implies some form of permanent effect, while the latter represents an ongoing but less finite act (Metzner-Nebelsick 2010; Reiter and Frei 2019).

Mobility theories tend to pinpoint the Carpathian Basin as the most probable origin of the Urnfield phenomenon, due to its early chronology and the widespread presence of cremation already in the second millennium BCE (Cavazzuti *et al.* 2022; Sørensen and Rebay-Salisbury 2023). Considering the material culture similarities between present-day Western Poland and the Carpathian Basin, the logic that the emergence of the Lusatian culture represents an effect of migration is not an unreasonable assumption. However, cremation has a long chronology outside of the region, and more importantly, shows a gradual increase in frequency prior to the arbitrary start threshold of the Late Bronze Age 1300 BCE (Schmid 2020). Moreover, despite the problematic end of Middle Bronze Age tell communities, the spread of the cremation rite outside the Carpathian Basin is unlikely to be explained by a rapid depopulation of the region and migration (Staniuk 2021; Molloy *et al.* 2023; Bruyère *et al.* 2024). Presently, the cumulative effect of small-scale mobility between communities causing a similar pattern cannot be ruled out (Przybyła 2009, 2016).

However, the problematic onset is only part of the puzzle, as the spread of the Urnfield package remains one of the crucial questions for explaining the rapid emergence of a similar cultural model in other environments after the emergence of Lusatian culture (Cavazzuti *et al.* 2022). By the end of the Late Bronze Age, most communities of present-day Poland followed a similar cultural model, and this likeness extended further east and northeast, indicating a rapid effect of increasing mobility (Dąbrowski 1997; Lang 2007; Makarowicz 2010). The adoption of a relatively uniform cultural model in the previously highly hetero-

geneous Trzciniec Cultural Circle, without evidence of aggregations parallel to those from Western Poland, suggests a complex interplay of small-scale processes that accelerated by 1200/1100 BCE. These could have been linked to inequality, as previously limited networks of cooperation were widely extended, potentially due to limited possibilities of becoming incorporated in local structures or through means to increase resource accessibility. Some effects are visible in terms of the changing frequency of metal deposition and the emergence of hoarding behaviour in areas with previously limited depositional records (Blajer 2001). Long-term, they even indicate the emergence of aggregations, different from the ones known from Western Poland but suggestive of profound changes taking place after the spread and consolidation of the Lusatian culture (Żurek *et al.* 2023).

The arbitrary distinction between 'permanent' migration and 'temporary' mobility will not allow us to differentiate between the mechanisms of this process. It is more fruitful to approach this issue from the perspective of the scale required for the effect we see archaeologically to be justified.

BISKUPIN-TYPE FORTIFIED SETTLEMENTS: A RESPONSE TO A CHANGING ENVIRONMENT?

The emergence, florescence, and decline of Biskupin-type fortified settlements happened in a dynamic environment shaped by the effects of population growth, ideological change, and mobility, each providing sufficient avenues for inequality-based relations to affect human behaviour. In this context, the hypothesis regarding egalitarianism refers strictly to the internal processes of social organisation when the settlement was constructed (Dzięgielewski 2017b). While conclusive evidence, *i.e.,* a comparison of domestic house units and inventories, remains unaddressed, it is worth considering how this dynamic environment may have stimulated the emergence of this settlement form. Although this process was inherently social, *i.e.,* representing the ability of social groups to plan, execute, and succeed, it is worth considering first from the standpoint of material prerequisites necessary to organise it and how inequality-based relations have influenced the trajectory of change. What follows is an outline of how this process could have unfolded and what mechanisms might have driven the emergence of Biskupin-type fortified settlements.

Late Bronze Age (1218-820 cal. BCE)

First, the construction of Biskupin-type fortified settlements required areas with limited human activity for at least 100 years to enable the acquisition of wood for construction purposes (Durczewski 1970; Niewiarowski 2009). This 'natural' prerequisite is, of course, based on the assumption that wood was not a commodity. Given comparative data from other Late Bronze Age-Early Iron Age fortified sites, such large-scale settlements were

accompanied by land clearance indicators (Gałka *et al.* 2022; Szambelan 2022; Niebieszczański *et al.* 2024; Kołaczek *et al.* 2025; Szambelan *et al. in press*). This suggests that resource availability in previously provincial areas was one of the key factors for deciding where to settle.

Second, the process of population aggregation had to precede the planning itself, as area selection, preparatory works, and construction had to account for resource availability to ensure the successful execution of the project. Assuming that this process was initialized at the Sobiejuchy, as proposed by J. Ostoja-Zagórski and A. Harding as it represents the largest of all contemporary sites in the region with first occupation phase dating to the Late Bronze Age (Ostoja-Zagórski 1993; Harding *et al.* 2004), the mechanisms motivating people to abandon previously dispersed occupation and devote substantial amount of time and labour in favour of aggregations, conceptualizing how and why such a large community came together in this region requires consideration.

A. Mierzwiński has proposed that Late Bronze Age and Early Iron Age Urnfield societies practised feasting as an essential part of burial ceremonies (Mierzwiński 2012a). His exploration of the surge in drinking and serving vessels as part of the burial inventory, as well as their metric properties, indicates an increasingly collective behaviour towards the Early Iron Age. In an environment of growing population size and its expansion into other environmental niches, a persistent communal and integrative activity would provide a basis not only for maintaining cultural ties but also for establishing numerous new relationships (Dunbar 2021). Assuming that this was a time of both population growth and an ideological change, the missing link for bringing people together may be precisely the frequency of burial practices. These occasions could have provided chances for other forms of beneficial interactions to occur through maintaining familial and community ties, creating new ones through mating arrangements, and stimulating information or gift exchange. If we are looking for a social process responsible for the cultural similarity between the Late Bronze Age and Early Iron Age, a maintained form of interaction between multiple members of different communities sharing a similar background would be a good candidate.

Third, assuming that these meetings fall under the umbrella term of 'feasting', the prerequisite for their organisation is the acquisition of sufficient produce for sustenance (Hastorf 2017). The increasing reliance on millet could have been stimulated by this process as upholding the social convention would encourage individuals or groups to increase their crop yields. Repeated, successful fulfilment of this obligation could have attracted members to thriving groups, encouraging them to perform just as well or better over time. This would stimulate an increase in group-level sizes at the cost of a continuous need to maintain the growth trajectory. In instances where random events would hinder the ability to procure produce locally, the personal network could have been utilised to generate surplus, either through persuasion or coercion (Scott 2009). Alternatively, failed attempts at organising feasts or their unsuccessfulness would have an adverse and detrimental effect on their communities, temporarily hindering their growth through stagnation or even causing

dispersion. Low yields, diseases, poor organisational skills, or all of the above would convey the message that the community or individuals are not capable of fulfilling social obligations. The resulting pattern would be of a gradual decrease of settlement dispersion at the cost of centralisation, with inter-group relations gradually shaped by unequal access to resources.

Fourth, the emerging dependency for increasing food procurement would become a challenge for field and herd management, as dispersed and extensive agriculture would give way to intensive land use, as well as reducing areas for herding. For some members of society, the decreasing availability of accessible, 'free' land surrounding existing settlements would require expansion into previously unsettled areas, encouraging mobility and expansion. For others, it would require adjusting their skill set to compensate for the lack of personal fields by focusing on crafts, such as pottery, metallurgy, or both. Craft specialisation was well-established by the Late Bronze Age (Gedl 1975; Mogielnicka-Urban 1984; Hansen 1991; Dąbrowski 1997; Kaczmarek 2002; Mierzwiński 2012a; Vachta 2016), but the key question is the degree of seasonality specific to each craft, as well as intra-group dependencies between people involved in agriculture and other economic activities. It is plausible that in an environment of cooperative behaviour, landowning individuals would exchange produce for specific objects, assistance in field management, or share resources based on familial or community ties. However, it is plausible that this differential access will eventually lead to internal tensions based on material wealth inequality.

Fifth, tensions between growth, food procurement, and social obligations would culminate in the rise of external and internal inequality, encouraging competition. This could trigger raiding behaviour as well as other hostile actions aimed at reducing the success of certain groups. Acts of violence like stealing cattle by skirmishers, setting fields on fire, or even disrupting safe passage in movement corridors are all examples of strategies utilised to counteract centralising tendencies in agricultural societies (Scott 2009; 2017). Whether these actions were undertaken by members of the same groups or not is of secondary importance, since the detrimental effect on growth would be the same. It is only that in the first instance, internal tensions would accelerate the process of social disintegration.

Sixth, counter-acting such behaviours would be directed first towards protection and deterrence, through labour investment in manufacturing weaponry or fortifications (Fogel 1979; 1988; Hansen and Krause 2018). Generally, Late Bronze Age and Early Iron Age societies were well-equipped with weapons and used to resolve their disputes or interact through violence (Kristiansen 1998; Horn and Kristiansen 2018). It is plausible that violence was the ever-present reality of this system, and the highly cooperative model of inter-group interaction is a too optimistic assumption (Kadrow 2001; Turchin 2015). However, the destructive nature of the cremation rite on osteological evidence of violence is likely the reason why research on Late Bronze Age violence in Central Europe relies so heavily on material culture studies and settlement data. If violence became more common due to centralisation, the growing number of fortified settlements would indicate the

importance of defensive strategies rather than manifestations of individual status. This is not to say that inequality was not present on an individual level. Given the shifts in metal deposition between the Bronze Age Period V and Hallstatt C (Blajer 2001), hoarding became an important practice for mitigating the cumulative effects of wealth accumulation and transmission (Borgerhoff Mulder *et al.* 2009). However, once hostile actions towards specific communities became a means not only to hinder their expansion but also to offset negative conditions in less successful communities, deterrence had to become the norm, and ensuring safety became one of the prerequisites for new groups to emerge (Roscoe 2009).

Seventh, deterrence and ensuring safety to maintain the status of the settlement could have overtaken the importance of maintaining soft power ties between communities in favour of a highly competitive, coercion-based system. As the previous system of communal, integrative activities was beset by challenges for ensuring sufficient food and material supply with restricted, defensible fields, decisions had to be made on how to designate tasks in an increasingly complex organisational system, while maintaining a sufficient workforce to execute them. It is possible that by the end of the Late Bronze Age, social members were forced to join communities as a way of ensuring manpower. Given the shared cultural background, this might not have been accompanied by further social differentiation into free and unfree, as evidence of internal hierarchies remains dubious. However, this is where the depth of ideological change in this period requires consideration, as it is possible that from a thanatological perspective, earthly status had limited effects on the perception of the afterlife (Mierzwiński 2012b). Unfree in life would not necessarily mean unfree in death.

Early Iron Age (820-580 cal. BCE)

Bearing in mind that the proposed pathway is just a possible inequality-based model (Fig. 2) of how, by the Early Iron Age, community size, organisational skills, resource economy, and defensive behaviour were already intertwined, it is possible to outline how the emergence of Biskupin-type fortified settlements became possible.

As mentioned earlier, by 820 cal. BCE, areas with defensive capabilities and easily accessible woodlands were the first choice for establishing new, defensive settlements as a community effort. Exploitation of woodlands had the simultaneous effect of creating lands suitable for agriculture, while the existing networks were sufficient to mobilise large populations capable of executing such endeavours. Distance from existing centres was beneficial as it reduced the risk of raids and coercion into existing communities. Finally, the limited effect of existing overexploitation of soils in densely inhabited or exploited areas offered an additional advantage to survive winters.

The groups building Biskupin-type fortified sites were probably operating in an environment of shared cultural identity amplified by familial and community ties, which

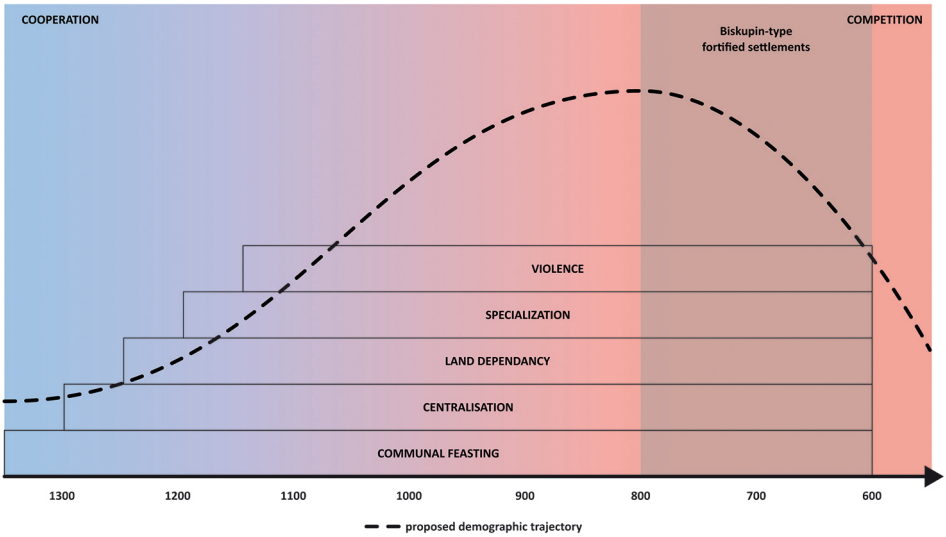

Fig. 2. A theoretical model of how the Biskupin-type fortified settlements emerge in an increasingly competitive environment at the onset of the Early Iron Age

formed a 'stable' basis to start 'fresh', avoiding the pitfalls of growth accompanied by increasing competition. The shared, relatively egalitarian burial rite, together with a strong sense of community and diverse skillset (woodworking, pottery production, metal production, and other crafts) would have enabled the inhabitants to quickly resume regular economic activities, maintaining their usual practices, while expanding their contact networks towards new areas which were explored in a limited fashion.

Whether the process was initiated at Sobiejuchy or other roughly contemporary sites, indicating the fissioning of the founding group, is currently of secondary importance. The crucial aspect to account for is that now, the same cultural setting that initially enabled a relatively peaceful population growth through a system of fulfilling social obligations based on accountability was no longer the only organising principle. Maintained, high food supply dependency was already in place, and some relations between individuals and communities were strained, limiting the possibilities of offsetting below-average yields through soft power. Acquiring the necessary resources through raiding, either neighbouring communities or travelling groups, was an ever-present possibility.

The ultimate decline of this settlement model, characterised by high population density, was likely a unique story specific to each site. Some could have maintained their growth for a prolonged period (*e.g.*, Wicina – Bugaj 2022), while others were less successful (*e.g.*, Smuszewo – Durczewski, 1970), and some managed to adapt to even more complex circumstances caused by random events (*e.g.*, Biskupin – Kostrzewski, 1950). It is even plausible that the different archaeological sites reflect a long history of a large, single

community moving across the landscape, as each consecutively occupied area became unsuitable for continued settlement due to the prevailing socio-economic model and its environment. However, while such a model cannot be ruled out, it currently cannot be assessed based on the existing data.

CONCLUSIONS

It has been more than 90 years since the first excavation campaign in Biskupin, and the question of how and why this particular settlement model emerged requires urgent addressing if archaeology is to incorporate it in research on the evolution of human societies. By reviewing research on inequality in archaeology and discussing existing theories on the emergence, florescence, and decline of Biskupin-type fortified settlements, I propose a theoretical, qualitative model as a potential pathway for conceptualising their emergence. In it, the emergence of these sites is explained through a long trajectory of Late Bronze Age social change, from highly cooperative to highly competitive communities developing in the Polish lowlands. The relatively homogeneous and egalitarian society established and maintained a strong network of connections, not only through feasting practices. I suggest that through coupling with the overall population increase enabled by the spread of millet, this process stimulated community growth. At the same time, the emergent reliance on fulfilling social obligations created a dependency for maintaining the growth trajectory. As centralisation processes began to emerge, their negative effects became more pronounced, particularly in maintaining food supplies, necessitating expansion into new areas, creating a further reliance on supply networks, and increasing specialisation to offset the decreasing availability of land. Initially, inter-group inequality became pronounced to provide the necessary resources for growing populations. Later, intra-group inequality became more pronounced as group membership was no longer based on benevolent interaction but coercion. I propose in the model that the emergence of Biskupin-type fortified settlements is a consequence of a competitive, violent environment, encouraging communities to settle outside of previously established centres as an attempt to propose structural solutions to problems that drove communities away from the previous areas. However, these solutions were no longer suitable in a highly competitive environment, where new, high-density communities proved unsuccessful due to anthroporessure, scalar stress, or random events.

(In)validating the model I outline above will require archaeological empirical work through dating, modelling, and comparing sites. However, it will also require theoretical and analytical testing of the proposed sequence of events. Site-based investigations, providing high-resolution data on domestic economies, will be crucial, as will macro-scale investigations into patterns of cultural change between the Late Bronze Age and the Early Iron Age. Perhaps by the 100th anniversary of the first excavation campaign in Biskupin, we will be able to say at least which of the above processes I have outlined above were the least likely to have taken place.

Acknowledgements

The research was supported by the grants NAWA Polish Returns 2023 (BPN/PPO/2023/1/00013/U/00001) and the Polish National Science Centre Research Component (2024/03/1/HS3/00008) awarded for the project 'Coming together, staying together, and failing – population aggregation and dispersion in the Early Iron Age Smuszewo microregion'. I would like to express my gratitude to Marcin Maciejewski (Maria Curie-Skłodowska University) for his kind invitation to contribute to this special issue, his patience in allowing me to extend the manuscript submission deadline continuously, and his helpful suggestions on how to improve the first draft. Additional thanks are due to Mateusz Jager (Adam Mickiewicz University, Poznań) for his detailed reading and thoughtful comments on the first draft. Finally, I would like to thank Sarah Martini (Yale University) for her remarks and language correction. All their suggestions have greatly improved the original text. The errors, omissions, and mistakes are my own.

References

Arponen V. 2017. The Capability Approach and Inequality in Archaeology. In S. Hansen and J. Müller (eds), *Rebellion and Inequality in Archaeology. Proceedings of the Kiel Workshops 'Archaeology of Rebellion' (2014) and 'Social Inequality as a Topic in Archaeology' (2015)* (= *Universitätsforschungen zur prähistorischen Archäologie* 308). Bonn: Dr. Rudolf Habelt GmbH, 35-45.

Babiński L. ed. 2009. *Stan i perspektywy zachowania drewna biskupińskiego* (= *Biskupińskie Prace Archeologiczne* 7). Biskupin: Muzeum Archeologiczne w Biskupinie.

Baron J. 2006. Zabudowa i organizacja przestrzenna osady ludności kultury łużyckiej w Polwicy na Śląsku. In B. Gediga and W. Piotrowski (eds), *Architektura i budownictwo epoki brązu i wczesnych okresów epoki żelaza. Problemy rekonstrukcji* (= *Biskupińskie Prace Archeologiczne* 5). Biskupin, Wrocław: Muzeum Archeologiczne w Biskupinie, 163-174.

Baron J. 2007. Intra-Site Analysis at Bronze Age Settlements in SW Poland. *Analecta Archaeologica Ressoviensia* 2, 83-100.

Beck J. and Quinn C. P. 2022. Balancing the scales: archaeological approaches to social inequality. *World Archaeology* 54/4, 572-583.

Bednarczyk J., Jaworska K., Marciniak A. and Ruiz del Arbol Moro M. 2015. Ancient salt exploitation in the Polish lowlands: recent research and future perspectives. In R. Brigand and O. Weller (eds), *Archaeology of Salt. Approaching an Invisible Past*. Leiden: Sidestone Press, 103-121.

Bender Jørgensen L., Sofaer J. and Sørensen M. L. S. eds 2017. *Creativity in the Bronze Age. Understanding Innovation in Pottery, Textile, and Metalwork Production*. Cambridge: Cambridge University Press.

Blajer W. 2001. *Skarby przedmiotów metalowych z epoki brązu i wczesnej epoki żelaza na ziemiach polskich*. Kraków: Uniwersytet Jagielloński, Instytut Archeologii.

Bogaard A., Ortman S., Birch J., Quequezana G. C., Chirikure S., Crema E. R., Cruz P., Feinman G.,

Fochesato M., Green A. S., Gronenborn D., Hamerow H., Jin G., Kerig T., Lawrence D., McCoy M. D., Munson J., Roscoe P., Rosenstock E., Thompson A., Petrie C.A. and Kohler T. A. 2024. The Global Dynamics of Inequality (GINI) project: analysing archaeological housing data. *Antiquity* 98(397), e6. https://doi.org/10.15184/aqy.2023.188.

Borgerhoff Mulder M., Bowles S., Hertz T., Bell T., Beise J., Clark G., Fazzio I., Michael G., Hill K., Hooper P. L., Irons W., Kaplan H., Leonetti D., Low B., Marlowe F., McElreath R., Naidu S., Nolin D., Piraino P., Quinlan R., Schniter E., Sear R., Shenk M., Smith E. A., von Rueden C. and Wiessner P. 2009. Intergenerational Wealth Transmission and the Dynamics of Inequality in Small-Scale Societies. *Science* 326(5953), 682-688.

Bourdieu P. 1984. *Distinction. A Social Critique of the Judgement of Taste*. Cambridge, Massachusetts: Harvard University Press.

Bronk Ramsey C. 2009. Bayesian analysis of radiocarbon dates. *Radiocarbon* 51/1, 337-360.

Bronk Ramsey C. 2017. Methods for summarizing radiocarbon datasets. *Radiocarbon* 59/6, 1809-1833.

Bruyère C., Molloy B., Jovanović D., Birclin M., Pendić J., Topić G., Milašinović L., Mirković-Marić N. and Šalamon A. 2024. Integrating and Dividing in a Late Bronze Age Society: Internal Organization of Settlements of the Tisza Site Group in the Southern Carpathian Basin, 1600-1200 b.c. *Journal of Field Archaeology* 49/7, 547-572.

Bugaj E. and Kopiasz J. 2006. Próba interpretacji zabudowy osady z wczesnej epoki żelaza na stanowisku Milejowice 19, pow. Wrocławski. In B. Gediga and W. Piotrowski (eds), *Architektura i budownictwo epoki brązu i wczesnych okresów epoki żelaza. Problemy rekonstrukcji* (= *Biskupińskie Prace Archeologiczne* 5). Biskupin, Wrocław: Muzeum Archeologiczne w Biskupinie, 175-207.

Bugaj M. 2022. Historia badań wykopaliskowych pradziejowej osady obronnej w Wicinie, gm. Jasień, woj. Lubuskie. *Raport Archeologiczny* 17, 151-295.

Bukowski Z. 1992. Niektóre szczegóły obrządku grzebalnego w świetle badań cmentarzysk birytualnych kultury łużyckiej na Górnym Śląsku. *Archeologia Polski* 37/1-2, 57-88.

Capuzzo G., Zanon M., Dal Corso M., Kirleis W. and Barceló J. A. 2018. Highly diverse Bronze Age population dynamics in Central-Southern Europe and their response to regional climatic patterns. *PLOS ONE* 13(8), e0200709. https://doi.org/10.1371/journal.pone.0200709.

Cavazzuti C., Arena A., Cardarelli A, Fritzl M., Gavranović M., Hajdu T., Kiss V., Köhler K., Kulcsár G., Melis E., Rebay-Salisbury K., Szabó G. and Szeverényi V. 2022. The First 'Urnfields' in the Plains of the Danube and the Po. *Journal of World Prehistory* 35, 45-86.

Chamberlain A. 2009. Archaeological Demography. *Human Biology* 81/3, 275-286.

Chochorowski J. 2014. Scytowie a Europa Środkowa – historyczna interpretacja archeologicznej rzeczywistości. *Materiały i Sprawozdania Rzeszowskiego Ośrodka Archeologicznego* 35, 9-58.

Chochorowski J. and Krąpiec M. 2020. The Nature of the Hallstattian Cultural Change in Northern Central Europe in Light of Radiocarbon Dating of the Late Bronze Age Stronghold at Łubowice Near Racibórz (Southwest Poland). *Radiocarbon* 62/6, 1613-1623.

Cortell-Nicolau A., Rivas J., Crema E. R., Shennan S., García-Puchol O., Kolář J., Staniuk R. and Timpson A. 2025. Demographic interactions between the last hunter-gatherers and the first farmers.

Proceedings of the National Academy of Sciences 122(14), e2416221122. https://doi.org/10.1073/pnas.2416221122.

Crema E. R. 2022. Statistical Inference of Prehistoric Demography from Frequency Distributions of Radiocarbon Dates: A Review and a Guide for the Perplexed. *Journal of Archaeological Method and Theory* 29/4, 1387-1418.

Czebreszuk J., Kadrow S. and Müller J. eds 2008. *Defensive Structures from Central Europe to the Aegean in the 3rd and 2nd millennia BC* (= *Studien zur Archäologie in Ostmitteleuropa / Studia nad Pradziejami Europy Środkowej* 5). Poznań, Bonn: Dr. Rudolf Habelt GmbH.

Czopek S. 2014. Chronologia i podziały kulturowe późnej epoki brązu i wczesnej epoki żelaza na ziemiach polskich w ujęciu Józefa Kostrzewskiego: próba oceny z 'perspektywy południowej'. *Fontes Archaeologici Posnanienses* 50/1, 69-77.

Czopek S., Krąpiec M., Pawlyta J. and Tokarczyk T. 2023. Absolute Chronology of the Rampart of the Early Iron Age Hillfort in Chotyniec near Radymno (Southeastern Poland) in the Context of Radiocarbon Dating. *Radiocarbon* 66/6, 1556-1565.

Czopek S. and Krąpiec M. 2020. The cult area (zolnik) from a Scythian hillfort in Chotyniec near Radymno (Southeastern Poland) in the context of radiocarbon dating. *Radiocarbon* 62/6, 1599-1611.

Dąbrowski J. 1997. *Epoka brązu w północno-wschodniej Polsce* (= *Prace Białostockiego Towarzystwa Naukowego* 36). Białystok: Białostockie Towarzystwo Naukowe, Instytut Archeologii i Etnologii Polskiej Akademii Nauk.

Desplanques E. 2022. Protohistoric metal-urn cremation burials (1400-100 BC): a pan-European phenomenon. *Antiquity* 96(389), 1162-1178.

Dunbar R. 2021. *Friends: Understanding the Power of Our Most Important Relationships*. London: Little, Brown.

Dunbar R. 2023. *How Religion Evolved: And Why It Endures*. London: Pelican Books.

Durczewski D. 1970. *Prasłowiański gród w Smuszewie* (= *Biblioteka popularnonaukowa Muzeum Archeologicznego w Poznaniu* 5). Poznań: Muzeum Archeologiczne w Poznaniu.

Durczewski D. 1985. *Gród ludności kultury łużyckiej z okresu halsztackiego w Smuszewie woj. pilskie. Część I* (= *Biblioteka Fontes Archaeologici Posnanienses* 6). Poznań: Muzeum Archeologiczne w Poznaniu.

Dzięgielewski K. 2017a. Late Bronze Age and Early Iron Age communities in the northern part of the Polish Lowland (1000-500 BC). In U. Bugaj (ed.), *The Past Societies. Polish lands from the first evidence of human presence to the Early Middle Ages, vol. 3, 2000-500 BC*. Warszawa: Institute of Archaeology and Ethnology, Polish Academy of Sciences, 295-340.

Dzięgielewski K. 2017b. The rise and fall of Biskupin and its counterparts. In U. Bugaj (ed.), *The Past Societies. Polish lands from the first evidence of human presence to the Early Middle Ages, vol. 3, 2000-500 BC*. Warszawa: Institute of Archaeology and Ethnology, Polish Academy of Sciences, 341-366.

Dzięgielewski K., Przybyła M. S. and Gawlik A. 2010. Reconsidering migration in Bronze and Early Iron Age Europe: bridging a gap in European mobility? In K. Dzięgielewski, M. S. Przybyła and

A. Gawlik (eds), *Migration in Bronze and Early Iron Age Europe* (= *Prace Archeologiczne* 63). Kraków: Księgarnia Akademicka, 9-35.

Earle T. 2000. Archaeology, Property, and Prehistory. *Annual Review of Anthropology* 29, 39-60.

Feeser I. Dörfler W., Kneisel J., Hinz M. and Dreibrodt S. 2019. Human impact and population dynamics in the Neolithic and Bronze Age: Multi-proxy evidence from north-western Central Europe. *The Holocene* 29/10, 1596-1606.

Feinman G. M. 1995. The Emergence of Inequality. A Focus on Strategies and Processes. In T. D. Price and G. M. Feinman (eds), *Foundations of Social Inequality* (= *Fundamental Issues in Archaeology*). New York: Springer Science+Business Media, LLC, 255-279.

Feinman G. M., Cervantes Quequezana G., Green A., Lawrence D., Munson J., Ortman S., Petrie C., Thompson A. and Nicholas L. M. 2025. Assessing grand narratives of economic inequality across time. *Proceedings of the National Academy of Sciences* 122(16), e2400698121. https://doi.org/10.1073/pnas.2400698121.

Filipović D. Meadows J., Dal Corso M., Kirleis W., Alsleben A., Akeret Ö., Bittmann F., Bosi G., Ciută B., Dreslerová D., Effenberger H., Gyulai F., Heiss A. G., Hellmund M., Jahns S., Jakobitsch T., Kapcia M., Klooß S., Kohler-Schneider M., Kroll H., Makarowicz P., Marinova E., Märkle T., Medović A., Mercuri A. M., Mueller-Bieniek A., Nisbet R., Pashkevich G., Perego R., Pokorný P., Pospieszny Ł., Przybyła M., Reed K., Rennwanz J., Stika H. – P., Stobbe A., Tolar T., Wasylikowa K., Wiethold J. and Zerl T. 2020. New AMS 14C dates track the arrival and spread of broomcorn millet cultivation and agricultural change in prehistoric Europe. *Scientific Reports* 10/1, 13698. https://doi.org/10.1038/s41598-020-70495-z.

Fogel J. 1979. *Studia nad uzbrojeniem ludności kultury łużyckiej w dorzeczu Odry i Wisły*. Poznań: Wydawnictwo Naukowe Uniwersytetu im. Adama Mickiewicza w Poznaniu.

Fogel J. 1988. *Militaria kultury łużyckiej z dorzecza Odry i Wisły (źródła)* (= *Seria Archeologia* 32). Poznań: Wydawnictwo Naukowe UAM.

Fokkens H. 1997. The genesis of urnfields: economic crisis or ideological change? *Antiquity* 71(272), 360-373.

French J. C., Riris, P., Fernandéz-López de Pablo J., Lozano S. and Silva F. 2020. A manifesto for palaeodemography in the twenty-first century. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 376(1816), 20190707. https://doi.org/10.1098/rstb.2019.0707.

Friman B. and Lagerås P. 2023. From Neolithic Boom-and-Bust to Iron Age Peak and Decline: Population and Settlement Dynamics in Southern Sweden Inferred from Summed Radiocarbon Dates. *European Journal of Archaeology* 26/2, 168-188.

Gadomska-Czekalska A. 1950. Podłoże geologiczne grodu prasłowiańskiego w Biskupinie. In J. Kostrzewski (ed.), *III sprawozdanie z prac wykopaliskowych w grodzie kultury łużyckiej w Biskupinie w powiecie żnińskim za lata 1938-1939 i 1946-1948*. Poznań: Poznańskie Towarzystwo Prehistoryczne, 28-38.

Gałka M., Kołaczek P., Sim T. G., Knorr K.-H., Niedzielski P., Lewandowska A., Szczurek G. 2022. Palaeoenvironmental conditions and human activity in the vicinity of the Grodzisko fortified set-

tlement (central Europe, Poland) from the late-Neolithic to the Roman period. *Geoarchaeology* 37/2, 385-399.

Gardawski A. 1979. Czasy zaniku kultury łużyckiej. Okres halsztacki D i lateński. In J. Dąbrowski and Z. Rajewski (eds), *Od środkowej epoki brązu do środkowego okresu* lateńskiego (= *Prahistoria ziem polskich* 4). Wrocław, Warszawa, Kraków, Gdańsk: Zakład Narodowy imienia Ossolińskich, Wydawnictwo Polskiej Akademii Nauk, 117-146.

Gediga B., Józefowska A., Łaciak D. and Dolata-Daszkiewicz I. 2020. *Cmentarzysko wczesnej epoki żelaza w Domasławiu 10/11/12, powiat wrocławski. Tom 4 – Synteza*. Wrocław: Fundacja Przyjaciół Instytutu Archeologii i Etnologii Polskiej Akademii Nauk Instytut Archeologii i Etnologii Polskiej Akademii Nauk.

Gedl M. 1975 *Kultura łużycka*. Kraków: Uniwersytet Jagielloński.

Gedl M. 1988. Europa w okresie halsztackim D. In J. Kmieciński (ed.), *Pradzieje ziem polskich. Tom I. Od paleolitu do środkowego okresu lateńskiego. Część 2. epoka brązu i początki epoki żelaza*. Warszawa, Łódź: Państwowe Wydawnictwo Naukowe, 561-570.

van Geel B., Bokovenko N. A., Burova N. D., Chugunov K. V., Dergachev V. A., Dirksen V. G., Kulkova M., Nagler A., Parzinger H., van der Plicht J., Vasiliev S. S. and Zaitseva G. I. 2004. Climate change and the expansion of the Scythian culture after 850 BC: a hypothesis. *Journal of Archaeological Science* 31/12, 1735-1742.

Geel B. V., van der Plicht J., Kilian M. R., Klaver E. R., Kouwenberg J. H. M., Renssen H., Reynaud-Farrera I. and Waterbolk H. T. 1997. The Sharp Rise of Δ14C ca. 800 cal BC: Possible Causes, Related Climatic Teleconnections and the Impact on Human Environments. *Radiocarbon* 40/1, 535-550.

Góralczyk A. 2024. Podstawy datowania grodów kultury łużyckiej na ziemiach polskich. *Folia Praehistorica Posnaniensia* 29, 57-88.

Goslar T. 2019. Chronologia i periodyzacja cmentarzyska z epoki brązu i wczesnej epoki żelaza w Domasławiu, pow. wrocławski, na podstawie datowania radiowęglowego. *Przegląd Archeologiczny* 67, 31-48.

Graeber D. 2011. *Debt: the first 5,000 years*. Brooklyn, New York: Melville House.

Graeber D. and Wengrow D. 2021. *The Dawn of Everything. A New History of Humanity*. London: Allen Lane.

Gretzinger J., Schmitt F., Mötsch A., Carlhoff S., Lamnidis T. C., Huang Y., Ringbauer H., Knipper C., Francken M., Mandt F., Hansen L., Freund C., Posth C., Rathmann H., Harvati K., Wieland G., Granehäll, L., Maixner F., Zink A., Schier W., Krausse D., Krause J. and Schiffels S. 2024. Evidence for dynastic succession among early Celtic elites in Central Europe. *Nature Human Behaviour* 8/8, 1467-1480.

Grossman A. 2006a. Rozwiązania konstrukcyjne osady obronnej kultury łużyckiej w Biskupinie – standardy czy nowości? In B. Gediga and W. Piotrowski (eds), *Architektura i budownictwo epoki brązu i wczesnych okresów epoki żelaza. Problemy rekonstrukcji* (= *Biskupińskie Prace Archeologiczne* 5). Biskupin, Wrocław: Muzeum Archeologiczne w Biskupinie, 91-123.

Grossman A. 2006b. Zarys rozwoju osadnictwa kultury łużyckiej w biskupińskim mikroregionie osadniczym a środowisko przyrodnicze. In W. Blajer (ed.), *Z badań nad osadnictwem epoki brązu i wczesnej epoki żelaza w Europie Środkowej*. Kraków: Wydawnictwo Uniwersytetu Jagiellońskiego, 9-34.

Grossman A. and Piotrowski W. 2016. Czy rzeczywiście fenomen Biskupina? In B. Gediga, A. Grossman and W. Piotrowski (eds), *Europa w okresie od VIII wieku przed narodzeniem Chrystusa do I wieku naszej ery* (= *Biskupińskie Prace Archeologiczne* 11). Biskupin-Wrocław: Muzeum Archeologiczne w Biskupinie, 197-214.

Großmann R. 2021. *Insights into Social Inequality. A Quantitative Study of Neolithic to Early Medieval Societies in Southwest Germany* (= *ROOTS Studies* 1). Leiden: Sidestone Press.

Gurven M., Borgerhoff Mulder M., Hooper P. L., Kaplan H., Quinlan R., Sear R., Schniter E., von Rueden C., Bowles S., Hertz T. and Bell A. 2010. Domestication Alone Does Not Lead to Inequality. *Current Anthropology* 51/1, 49-64.

Hansen S. 1991. *Studien zu den Metalldeponierungen während der Urnenfelderzeit im Rhein-Main-Gebiet* (= *Universitätsforschungen zur prähistorischen Archäologie* 5). Bonn: Dr. Rudolf Habelt GmbH.

Harding A., Ostoja-Zagórski J., Palmer C. and Rackham J. 2004. *Sobiejuchy: a Fortified Site of the Early Iron Age in Poland* (= *Polskie Badania Archeologiczne* 35). Warsaw: Institute of Archaeology and Ethnology, Polish Academy of Sciences.

Harding A. 2013. *Salt in Prehistoric Europe*. Leiden: Sideston Press.

Harding A. 2015. The emergence of elite identities in Bronze Age Europe. *Origini* 37(2), 111-121.

Harding A. and Kavruk V. 2013. Slovakia and Poland. In A. Harding and V. Kavruk (eds), *Explorations in Salt Archaeology in the Carpathian Zone*. Budapest: Archeolingua, 175-183.

Harding A. and Rączkowski W. 2010. Living on the lake in the Iron Age: new results from aerial photographs, geophysical survey and dendrochronology on sites of Biskupin type. *Antiquity* 84(324), 386-404.

Harding A. F. 2000 *European Societies in the Bronze Age* (= *Cambridge World Archaeology*). Cambridge: Cambridge University Press.

Haselgrove C., Rebay-Salisbury K. and Wells P. S. (eds) 2023. *The Oxford Handbook of the European Iron Age*. Oxford: Oxford University Press.

Hansen S. and Krause R. eds 2018. *Bronzezeitliche Burgen zwischen Taunus und Karpaten/Bronze Age Hillforts between Taunus and Carpathian Mountains* (= *Universitätsforschungen zur prähistorischen Archäologie* 319). Bonn: Dr. Rudolf Habelt GmbH.

Hastorf C. A. 2017. *The social archaeology of food. thinking about eating from prehistory to the present*. New York: Cambridge University Press.

Henneberg M. and Ostoja-Zagórski J. 1984. Use of a general ecological model for the reconstruction of prehistoric economy: the Hallstatt period culture of northwestern Poland. *Journal of Anthropological Archaeology* 3/1, 41-78.

Horn C. and Kristiansen K. 2018. *Warfare in Bronze Age Society*. Cambridge: Cambridge University Press.

Ignaczak M. 2002. *Ze studiów nad genezą kultury łużyckiej w strefie Kujaw* (= *Materiały do Syntezy Pradziejów Kujaw* 10). Poznań: Instytut Prahistorii UAM.

Jaskanis J. (ed.) 1991. *Prahistoryczny gród w Biskupinie. Problematyka osiedli obronnych na początku epoki żelaza*. Warszawa: Wydawnictwo Naukowe PWN.

Jaeger M. 2010. Stanowisko Pudliszki 5 w ramach domniemanej sieci wczesnobrązowych osad obronnych wielkopolski. In J. Müller, J. Czebreszuk and J. Kneisel (eds), *Bruszczewo II: Ausgrabungen und Forschungen in einer prähistorischen Siedlungskammer Großpolens / Badania mikroregionu osadniczego z terenu Wielkopolski*. Bonn: Dr. Rudolf Habelt GmbH. 784-850.

Jaeger M. 2016. *Bronze Age Fortified Settlements in Central Europe* (= *Studien zur Archäologie in Ostmitteleuropa / Studia nad Pradziejami Europy Środkowej* 17). Bonn, Poznań: Wydawnictwo Nauka i Innowacje In Kommission bei Dr Rudolf Habelt GmbH.

Jędrysik J. and Przybyła M. S. 2018. Bronze Age fortified settlement on Zyndram's Hill at Maszkowice (Polish Carpathians). *Gesta* 17/2, 9-33.

Kaczanowski K., Kurnatowski S., Malinowski A. and Piontek J. 1992. *Zaludnienie ziem polskich między XIII w. p.n.e. a IV w. n.e. – materiały źródłowe, próba oceny* (= *Monografie i opracowania* 342). Warszawa: Szkoła Główna Handlowa Instytut Statystyki i Demografii.

Kaczmarek M. 2002 *Zachodniowielkopolskie społeczności kultury łużyckiej w epoce brązu* (= *Seria Archeologia* 48). Poznań: Wydawnictwo Naukowe UAM.

Kaczmarek M. 2012. The Józef Kostrzewski Poznań school of archaeology. Several reflections on the illuminations and shadows of prehistory studies in respect to the Bronze and Early Iron Ages. *Folia Praehistorica Posnaniensia* 17, 25-40.

Kaczmarek M. 2014. Józef Kostrzewskiego koncept kultury łużyckiej. *Fontes Archaeologici Posnanienses* 50/1, 59-67.

Kaczmarek M. 2017. The Snares of Ostensible Homogeneity. Lusatian Culture or Lusatian Urnfields? In U. Bugaj (ed.), *The Past Societies. Polish lands from the first evidence of human presence to the Early Middle Ages 3, 2000-500 BC*. Warszawa: Institute of Archaeology and Ethnology, Polish Academy of Sciences, 264-293.

Kaczmarek M. 2020. Urnfields in the middle Oder basin – a perspective of a Lubusz-Greater Polish territorial community. *Praehistorische Zeitschrift* 94/2, 379-413.

Kaczmarek M. and Szczurek G. 2015. The Early Iron Age Fortified Settlements in Wielkopolska (western Poland) – past and present perspectives in archaeological research. *Praehistorische Zeitschrift* 90/1-2, 245-270.

Kadrow S. 2001. *U progu nowej epoki. Gospodarka i społeczeństwo wczesnego okresu epoki brązu w Europie Środkowej*. Kraków: Instytut Archeologii i Etnologii Polskiej Akademii Nauk Odział w Krakowie.

Kerig T., Bröcker J., Ohlrau R., Schreiber T., Skorna H. and Wilkes F. 2022. An archaeological perspective on social structure, connectivity and the measurements of social inequality. In J. Müller (ed.), *Connectivity Matters! Social, Environmental and Cultural Connectivity in Past Societies* (= *ROOTS Studies* 2). Leiden: Sidestone Press, 93-114.

Kohler T. A. and Smith M. E. eds 2018. *Ten Thousand Years of Inequality: The Archaeology of Wealth Differences*. Tucson: University of Arizona Press.

Kołaczek P., Rzodkiewicz M., Karpińska-Kołaczek M., Hildebrandt-Radke I., Gałka M., Jaeger M., Kneisel J. and Niebieszczański J. 2025. The impact of Lusatian Urnfield and subsequent prehistoric cultures on lake and woodland ecosystems: insights from multi-proxy palaeoecological investigations at Bruszczewo, western Poland. *Vegetation History and Archaeobotany* 2025. https://doi.org/10.1007/s00334-024-01022-7.

Kostrzewski J. (ed.) 1950. *III sprawozdanie z prac wykopaliskowych w grodzie kultury łużyckiej w Biskupinie w powiecie żnińskim za lata 1938-1939 i 1946-1948*. Poznań: Polskie Towarzystwo Prehistoryczne.

Kristiansen K. 1998. *Europe before History* (= *New Studies in Archaeology*). Cambridge: Cambridge University Press.

Kurnatowski S. 1992. Próba oceny zmian zaludnienia ziem polskich między XIII w. p.n.e. a IV w. n.e. In K. Kaczanowski, S. Kurnatowski, A. Malinowski and J. Piontek (eds), *Zaludnienie ziem polskich między XIII w. p.n.e. a IV w. n.e. – materiały źródłowe, próba oceny* (= *Monografie i opracowania* 24). Warszawa: Szkoła Główna Handlowa Instytut Statystyki i Demografii, 15-111.

Lalueza-Fox C. 2022. *Inequality. A Genetic History*. Cambridge, Massachusetts: The MIT Press.

Lang V. 2007. *The Bronze and Early Iron Ages in Estonia* (= *Estonian Archaeology* 3). Tartu: Tartu University Press.

Makarowicz P. 2010. *Trzciniecki krąg kulturowy – wspólnota pogranicza Wschodu i Zachodu Europy* (= *Archeologia Bimaris. Monografie* 3). Poznań: Wydawnictwo Poznańskie.

Makowiecki D. 2003. *Historia ryb i rybołówstwa w holocenie na Niżu Polskim w świetle badań archeoichtiologicznych*. Poznań: Instytut Archeologii i Etnologii Polskiej Akademii Nauk.

Malinowski A. 1979. Opis antropologiczny materiałów osteologicznych z grodziska halsztackiego w Smuszewie, woj. pilskie. *Fontes Archaeologici Posnanienses* 28 (1977), 56-57.

Marzian J., Laabs J., Müller J. and Requate T. 2024. Inequality in relational wealth within the upper societal segment: evidence from prehistoric Central Europe. *Humanities and Social Sciences Communications* 11/1, 1-12.

Mazur M. and Dzięgielewski K. 2021. Stan badań nad warzelnictwem soli w epoce brązu i wczesnej epoce żelaza w Polsce, ze szczególnym uwzględnieniem podkrakowskiego ośrodka solowarskiego. In J. Gancarski (ed.), *Epoka brązu i wczesna epoka żelaza w Karpatach*. Krosno: Muzeum Podkarpackie w Krośnie, 217-258.

Mattison S. M., Smith E. A., Shenk M. K. and Cochrane E. E. 2016. The evolution of inequality. *Evolutionary Anthropology: Issues, News, and Reviews* 25(4), 184-199.

Metzner-Nebelsick C. 2010. Aspects of mobility and migration in the Eastern Carpathian Basin and adjacent areas in the Early Iron Age (10th-7th centuries BC). In K. Dzięgielewski, M. S. Przybyła and A. Gawlik (eds), *Migration in Bronze and Early Iron Age Europe* (= *Prace Archeologiczne* 63). Kraków: Księgarnia Akademicka, 121-151.

Mierzwiński A. 1996. Konkretyzacja modelu przemian osadniczych a problematyka demograficzna na przykładzie łużyckiego cyklu chronologicznego mezoregionu Sobiejuchy. *Przegląd Archeologiczny* 44, 41-57.

Mierzwiński A. 2000. Zagadnienie obronności osiedli typu biskupińskiego. O potrzebie alternatywnej interpretacji. *Przegląd Archeologiczny* 48, 141-151.

Mierzwiński A. 2012a. *Biesiady w rytuale pogrzebowym nadodrzańskiej strefy pól popielnicowych*. Wrocław: Wydawnictwo Instytutu Archeologii i Etnologii Polskiej Akademii Nauk.

Mierzwiński A. 2012b. *Tajemnice pól popielnicowych. Pogranicze doczesności i zaświatów w perspektywie pradziejowej antropologii śmierci*. Wrocław: Wydawnictwo Instytutu Archeologii i Etnologii Polskiej Akademii Nauk.

Mittnik A., Massy K., Knipper C., Wittenborn F., Friedrich R., Pfrengle S., Burri M., Carlichi-Witjes N., Deeg H., Furtwängler A., Harbeck M., von Heyking K., Kociumaka C., Kucukkalipci I., Lindauer S., Metz S., Staskiewicz A., Thiel A., Wahl J., Haak W., Pernicka E., Schiffels S., Stockhammer P. W. and Krause J. 2019. Kinship-based social inequality in Bronze Age Europe. *Science* 366(6466), 731-734.

Mogielnicka-Urban M. 1984. *Warsztat ceramiczny w kulturze łużyckiej* (= *Biblioteka Archeologiczna* 27). Wrocław, Warszawa, Kraków, Gdańsk, Łódź: Zakład Narodowy imienia Ossolińskich, Wydawnictwo Polskiej Akademii Nauk.

Molloy B., Jovanović D., Bruyere C., Estanqueiro M., Birclin M., Milašinović L., Šalamon A., Penezić K., Bronk Ramsey C. and Grosman D. 2023. Resilience, innovation and collapse of settlement networks in later Bronze Age Europe: New survey data from the southern Carpathian Basin. *PLOS ONE* 18(11), e0288750. https://doi.org/10.1371/journal.pone.0288750.

Moskal-del Hoyo M., Lityńska-Zając M., Korczyńska M., Cywa K., Kienlin T. L., Cappenberg K. 2015. Plants and environment: results of archaeobotanical research of the Bronze Age settlements in the Carpathian Foothills in Poland. *Journal of Archaeological Science* 53, 426-444.

Müller J. 2015. Eight million Neolithic Europeans: social demography and social archaeology on the scope of change – from the Near East to Scandinavia. In K. Kristiansen, L. Šmejda and J. Turek (eds), *Paradigm Found – Archaeological Theory: Present, Past and Future. Essays in Honour of Evžen Neustupný*. Oxford & Philadelphia: Oxbow Books, 200-214.

Niebieszczański J., Kołaczek P., Karpińska-Kołaczek M., Hildebrandt-Radke I., Gałka M. and Kneisel J. 2024. Consequences of Lake Expansion and Disappearance for the Complex of Bronze and Iron Age Settlements at Bruszczewo (Western Poland, Central Europe). *Environmental Archaeology* 29/6, 543-561.

Niedziółka K. 2023. Poland Reborn: The Ethnic Origin of Past Societies and Contemporary Land Affiliation – Polish and German Prehistorians During the Twentieth Century. In M. Eickhoff, D. Modl, K. Meheux and E. Nuijten (eds), *National-Socialist Archaeology in Europe and its Legacies*. Cham: Springer International Publishing, 127-145.

Niesiołowska-Wędzka A. 1974. *Początki i rozwój grodów kultury łużyckiej* (= *Polskie Badania Archeologiczne* 18). Wrocław, Warszawa, Kraków, Gdańsk: Zakład Narodowy imienia Ossolińskich, Wydawnictwo Polskiej Akademii Nauk.

Niesiołowska-Wędzka A. 1991. Procesy urbanizacyjne w kulturze łużyckiej. In J. Jaskanis (ed.), *Prahistoryczny gród w Biskupinie. Problematyka osiedli obronnych na początku epoki żelaza*. Warszawa: Wydawnictwo Naukowe PWN, 57-80.

Niewiarowski W. 2009. Główne cechy środowiska geograficznego okolic Biskupina ze szczególnym uwzględnieniem półwyspu i Jeziora Biskupińskiego. In L. Babiński (ed.), *Stan i perspektywy zachowania drewna biskupińskiego* (= *Biskupińskie Prace Archeologiczne* 7). Biskupin: Muzeum Archeologiczne w Biskupinie, 35-61.

Nikulka F. 2016. *Archäologische Demographie: Methoden, Daten und Bevölkerung der europäischen Bronze- und Eisenzeiten*. Leiden: Sidestone Press.

Nowacki M. 2008. Visitor's perception of the Biskupin Archaeological Festival. *Studies in Physical Culture and Tourism* 15/3, 211-220.

Nowakowski W. 2023. Eastern Central Europe. Between the Elbe and the Dnieper. In C. Haselgrove, K. Rebay-Salisbury and P.S. Wells (eds), *The Oxford Handbook of the European Iron Age*. Oxford: Oxford University Press, 193-216.

Ostoja-Zagórski J. 1976. Ze studiów nad zagadnieniem upadku grodów kultury łużyckiej. *Slavia Antiqua* 23, 39-74.

Ostoja-Zagórski J. 1978. *Gród halsztacki w Jankowie nad Jeziorem Pakoskim*. Zakład Narodowy im. Ossolińskich: Wrocław.

Ostoja-Zagórski J. 1983. Aspekte der Siedlungskunde, Demographie und Wirtschaft hallstattzeitlicher Burgen vom Biskupin-Typ. *Praehistorische Zeitschrift* 58/2, 173-210.

Ostoja-Zagórski J. 1988. Demographic and Economic Changes in the Hallstatt Period of the Lusatian Culture. In D. B. Gibson and M. N. Geselowitz (eds), *Tribe and Polity in Late Prehistoric Europe: Demography, Production, and Exchange in the Evolution of Complex Social Systems*. Boston, MA: Springer US, 119-135.

Ostoja-Zagórski J. 1993. *Mezoregion Sobiejuchy na Pałukach. Dynamika procesów zasiedlania w starożytności*. Warszawa, Żnin: Instytut Archeologii i Etnologii Polskiej Akademii Nauk.

Paynter R. 1989. The Archaeology of Equality and Inequality. *Annual Review of Anthropology* 18, 369-399.

Pazdur M. F., Awsiuk R., Goslar T., Pazdur A., Walanus A. and Zastawny A. 1994. Gliwice radiocarbon dates XI. *Radiocarbon* 36/2, 257-279.

Pazdur M. F., Mikłaszewska-Balcer R., Piotrowski W. and Węgrzynowicz T. 1991. Chronologia bezwzględna osady w Biskupinie w świetle datowań radiowęglowych. In J. Jaskanis (ed.), *Prahistoryczny gród w Biskupinie. Problematyka osiedli obronnych na początku epoki żelaza*. Warszawa: Wydawnictwo Naukowe PWN, 115-125.

Piasecki D. 1950. Geneza grodu biskupińskiego w świetle badań morfologicznych. In J. Kostrzewski (ed.), *III sprawozdanie z prac wykopaliskowych w grodzie kultury łużyckiej w Biskupinie w powiecie żnińskim za lata 1938-1939 i 1946-1948*. Poznań: Poznańskie Towarzystwo Prehistoryczne, 19-27.

Piątkowska-Małecka J. 2003. Cattle as the basis of breeding economy in the Lusatian culture in early Iron Age. *Archeozoologia* 21, 143-160.

Piątkowska-Małecka J. 2007. Gospodarka zwierzętami ludności kultury łużyckiej na ziemiach polskich. In M. Makohonienko, D. Makowiecki and Z. Kurnatowska (eds), *Studia interdyscyplinarne nad środowiskiem i kulturą w Polsce* (= *Środowisko-Człowiek-Cywilizacja* 1). Poznań: Bogucki Wydawnictwo Naukowe, 129-137.

Piontek J. 1992. Wyniki badań antropologicznych materiałów kostnych z cmentarzysk ciałopalnych ludności kultury łużyckiej. In Kaczanowski K., Kurnatowski S., Malinowski A. and Piontek J., *Zaludnienie ziem polskich między XIII w. p.n.e. a IV w. n.e. – materiały źródłowe, próba oceny* (= *Monografie i opracowania* 342). Warszawa: Szkoła Główna Handlowa Instytut Statystyki i Demografii, 179-186.

Piotrowska D. 2004. Biskupin – ideologie – kultura. In B. Gediga and W. Piotrowski (eds), *Archeologia. Kultura. Ideologie* (= *Biskupińskie Prace Archeologiczne* 3). Biskupin, Wrocław: Muzeum Archeologiczne w Biskupinie, 91-155.

Pospieszny Ł., Makarowicz P., Lewis J., Górski J., Taras H., Włodarczak P., Szczepanek A., Ilchyshyn V., Jagodinska M., Czebreszuk J., Muzolf P., Nowak M., Polańska M., Juras A., Chyleński M., Wójcik I., Lasota-Kuś A., Romaniszyn J., Tunia K., Przybyła M. M., Grygiel R., Matoga A., Makowiecki D. and Goslar T. 2021. Isotopic evidence of millet consumption in the Middle Bronze Age of East-Central Europe. *Journal of Archaeological Science* 126, 105292.

Price T. D. and Feinman G. M. eds 1995. *Foundations of Social Inequality (= Fundamental Issues in Archaeology*). New York: Springer Science+Business Media, LLC.

Price T. D. and Feinman G. M. eds 2010a. *Pathways to Power. New Perspectives on the Emergence of Social Inequality* (= *Fundamental Issues in Archaeology*). New York, Dordrecht, Heidelberg, London: Springer.

Price T. D. and Feinman G. M. 2010b. Social Inequality and the Evolution of Human Social Organization. In D. T. Price and G. M. Feinman (eds), *Pathways to Power. New Perspectives on the Emergence of Social Inequality* (= *Fundamental Issues in Archaeology*). New York, Dordrecht, Heidelberg, London: Springer, 1-14.

Przybyła M. S. 2009. *Intercultural contacts in the Western Carpathian area at the turn of the 2nd and 1st millennia BC*. Warszawa: Narodowe Centrum Kultury.

Przybyła M. S. 2013. Mating systems in prehistoric populations. An evolutionary approach and archaeological evidence. *Praehistorische Zeitschrift* 88/1-2, 208-225.

Przybyła M. S. 2016. Middle Bronze Age social networks in the Carpathian Basin. *Recherches Archéologiques Nouvelle Serie* 8, 47-84.

Purowski T. 2010. Paciorki szklane zdobione linią zygzakowatą odkryte w międzyrzeczu Odry i Wisły na stanowiskach z wczesnej epoki żelaza. *Archeologia Polski* 55/1-2, 23-88.

Quinn C. P. and Beck J. 2016. Essential Tensions: A Framework for Exploring Inequality Through Mortuary Archaeology and Bioarchaeology. *Open Archaeology* 2/1, 18-41.

Rebay-Salisbury K., Dunne J., Salisbury R. B., Kern D., Frisch A. and Evershed R. 2021. Feeding Babies at the Beginnings of Urbanization in Central Europe. *Childhood in the Past* 14/2, 102-124.

Reed K., Kudelić A., Essert S., Polonijo L. and Vrdoljak S. 2024. House of Plenty: Reassessing Food and Farming in Late Bronze Age Croatia. *Environmental Archaeology* 29/2, 165-181.

Reimer P. J., Austin W. E. N., Bard E., Bayliss A., Blackwell P. G., Bronk Ramsey C., Butzin M., Cheng H., Edwards R. L., Friedrich M., Grootes P. M., Guilderson T. P., Hajdas I., Heaton T. J., Hogg A. G., Hughen K. A., Kromer B., Manning S. W., Muscheler R., Palmer J. G., Pearson C., Plicht J. van der, Reimer R. W., Richards D. A., Scott E. M., Southon J. R., Turney C. S. M., Wacker L., Adolphi F.,

Büntgen U., Capano M., Fahrni S. M., Fogtmann-Schulz A., Friedrich R., Köhler P., Kudsk S., Miyake F., Olsen J., Reinig F., Sakamoto M., Sookdeo A. and Talamo S. 2020. The IntCal20 northern hemisphere radiocarbon age calibration curve (0-55 cal kbp). *Radiocarbon* 62/4, 725-757.

Reiter S. S., Frei K. M. 2019. Interpreting Past Human Mobility Patterns: A Model. *European Journal of Archaeology* 22/4, 454-469.

Rönnlund R. 2024. 'Princely seats' and Thessalian hillforts: pre-urban Greece and the diffusion of urbanism in Early Iron Age Europe. *Antiquity* 98(399), 743-757.

Roscoe P. 2009. Social Signaling and the Organization of Small-Scale Society: The Case of Contact-Era New Guinea. *Journal of Archaeological Method and Theory* 16, 69-116.

Rose H. A., Louwen A. and Christensen L. 2023. Beyond urnfields – an introduction. In H. A. Rose, L. Christensen, and A. Louwen (eds), *Beyond Urnfields. New Perspectives on Late Bronze Age – Early Iron Age Funerary Practices in Northwest Europe* (= *Schriften des Museums für Archäologie Schloss Gottorf* 16). Kiel: Ludwig, 11-15.

Saile T. 2024. Late Bronze Age salt production in the Carpathians and its socio-economic context. *Quaternary Science Reviews* 343, 108757. https://doi.org/10.1016/j.quascirev.2024.108757.

Scheidel W. 2017. *The Great Leveler. Violence and the History of Inequality from the Stone Age to the Twenty-First Century*. Princeton and Oxford: Princeton University Press.

Schmid C. 2020. Evaluating Cultural Transmission in Bronze Age burial rites of Central, Northern and Northwestern Europe using radiocarbon data. *Adaptive Behavior* 28/5, 359-376.

Schumann R. and van der Vaart-Verschoof S. eds 2017. *Connecting elites and regions. Perspectives on contacts, relations and differentiation during the Early Iron Age Hallstatt C period in Northwest and Central Europe*. Leiden: Sidestone Press.

Scott J. C. 2009. *The Art of Not Being Governed. An Anarchist History of Upland Southeast Asia* (= *Yale Agrarian Studies Series*). New Haven and London: Yale University Press.

Scott J. C. 2017. *Against the Grain: A Deep History of the Earliest States*. New Haven and London: Yale University Press.

Shennan S. 1996. Social inequality and the transmission of cultural traditions in forager societies. In J. Steele and S. Shennan (eds), *The Archaeology of Human Ancestry. Power, Sex and Tradition*. London, New York: Routledge, 326-340.

Shennan S. 2000. Population, Culture History, and the Dynamics of Culture Change. *Current Anthropology* 41/5, 811-835.

Shennan S. 2011. Property and wealth inequality as cultural niche construction. *Philosophical Transactions of the Royal Society B: Biological Sciences* 366(1566), 918-926.

Shennan S., Downey S. S., Timpson A., Edinborough K., Colledge S., Kerig T., Manning K. and Thomas M. G. 2013. Regional population collapse followed initial agriculture booms in mid-Holocene Europe. *Nature Communications* 4/1, 2486. https://doi.org/10.1038/ncomms3486.

Shennan S. 2018. *The First Farmers of Europe. An Evolutionary Perspective* (= *Cambridge World Archaeology*). Cambridge: Cambridge University Press.

Skripkin V. V. and Kovaliukh N. N. 2004. Radiouglierodnoe datirovanie kostnogo materiala. In T. Malinowski (eds), *Komorowo, stanowisko 1. Grodzisko kultury łużyckiej i osadnictwo wczesnośredniowieczne. Badania specjalistyczne*. Zielona Góra: Uniwersytet Zielonogórski. 151-158.

Smith E. A., Hill K., Marlowe F. W., Nolin D., Wiessner P., Gurven M., Bowles S., Borgerhoff Mulder M., Hertz T. and Bell A. 2010. Wealth Transmission and Inequality among Hunter-Gatherers. *Current Anthropology* 51/1, 19-34.

Smith M. E., Dennehy T., Kamp-Whittaker A., Colon E. and Harkness R. 2014. Quantitative Measures of Wealth Inequality in Ancient Central Mexican Communities. *Advances in Archaeological Practice* 2(4), 311-323.

Smith M. E., Kohler T. A. and Feinman G. M. 2018. Studying Inequality's Deep Past. In T. A. Kohler and M.E. Smith (eds), *Ten Thousand Years of Inequality: The Archaeology of Wealth Differences*. Tucson: University of Arizona Press, 3-38.

Sørensen M. L. S. and Rebay-Salisbury K. eds 2023. *Death and the Body in Bronze Age Europe. From Inhumation to Cremation*. Cambridge: Cambridge University Press. https://doi.org/10.1017/9781009247429.001.

Staniuk R. 2021. Early and Middle Bronze Age Chronology of the Carpathian Basin Revisited: Questions Answered or Persistent Challenges? *Radiocarbon* 63/5, 1525-1546.

Staniuk R. 2023. Social relations and communication: a bronze-based case study from the boundary area of Silesia and Greater Poland. In M. Jaeger, J. Kneisel and J. Czebreszuk (eds), *Revisting the Middle Bronze Age Barrows of South-Western Poland* (= *Studien zur Archäologie in Ostmitteleuropa / Studia nad Pradziejami Europy Środkowej* 21). Bonn: Dr. Rudolf Habelt GmbH, 143-162.

Stevens C. J., Shelach-Lavi G., Zhang H., Teng M. and Fuller D. Q. 2021. A model for the domestication of Panicum miliaceum (common, proso or broomcorn millet) in China. *Vegetation History and Archaeobotany* 30/1, 21-33.

Stolarczyk T. and Baron J. 2014. *Osada kultury pól popielnicowych w Grzybianach koło Legnicy*. Legnica, Wrocław: Muzeum Miedzi w Legnicy.

Szamałek K. 2009. *Procesy integracji kulturowej w młodszej epoce brązu i początkach epoki żelaza na Pojezierzu Wielkopolskim*. Poznań: Instytut Archeologii i Etnologii Polskiej Akademii Nauk.

Szambelan W. 2022. Osadnictwo ludności łużyckich pól popielnicowych w mikroregionie Bruszczewa, woj. wielkopolskie. Analiza przestrzenna i środowiskowa. *Fontes Archaeologici Posnanienses* 58, 21-51.

Szambelan W., Niebieszczański J., Karpińska-Kołaczek M., Lamentowicz M., Marcisz K., Leszczyńska K., Poolma E., Amon L., Veski S. and Kołaczek P. *in press*. Tracing the Environmental Footprint of a Lusatian Urnfield Culture Stronghold in Northern Poland. *Journal of Archaeological Science: Reports*.

Szczurek G. and Różański A. eds 2013. *Grodzisko z wczesnej epoki żelaza i wczesnego średniowiecza w Grodzisku gm. Pleszew, woj. wielkopolskie. Studia i materiały*. Poznań: Fundacja Ochrony Zabytków w Poznaniu, Wydawnictwo i pracownia archeologiczna Profil-Archeo.

Sztompka P. 2016. *Kapitał społeczny. Teoria przestrzeni międzyludzkiej*. Kraków: Znak Horyzont.

Ślusarska K. 2021. Wild Resources in the Economy of Bronze and Early Iron Ages Between Oder and Bug Rivers – Source Overview. *Open Archaeology* 7/1, 177-210.

Śmigielski W. 1991. Grody kultury łużyckiej w Wielkopolsce. Wstęp do problematyki. In J. Jaskanis (ed.), *Prahistoryczny gród w Biskupinie. Problematyka osiedli obronnych na początku epoki żelaza*. Warszawa: Wydawnictwo Naukowe PWN, 23-35.

Timpson A., Barberena R., Thomas M. G., Méndez C. and Manning K. 2020. Directly modelling population dynamics in the South American Arid Diagonal using 14C dates. *Philosophical Transactions of the Royal Society B: Biological Sciences* 376(1816), 20190723. https://doi.org/10.1098/rstb.2019.0723.

Turchin P. 2015. *Ultrasociety: How 10,000 Years of War Made Humans the Greatest Cooperators on Earth*. Chaplin, CT: Beresta Books.

Turchin P. 2023. *End Times. Elites, Counter-Elites and the Path of Political Disintegration*. London: Penguin Books.

Urban J. 2019. *Gospodarka rolna społeczności tzw. kultury łużyckiej*. Warszawa: Instytut Archeologii i Etnologii Polskiej Akademii Nauk.

van der Vaart-Verschoof S. and Schumann R. 2017. Differentiation and globalization in Early Iron Age Europe. Reintegrating the early Hallstatt period (Ha C) into the debate. In R. Schumann and S. van der Vaart-Verschoof (eds), *Connecting elites and regions. Perspectives on contacts, relations and differentiation during the Early Iron Age Hallstatt C period in Northwest and Central Europe*. Leiden: Sidestone Press, 9-27.

Vachta T. 2016. *Bronzezeitliche Hortfunde und ihre Fundorte in Böhmen* (= *Topoi – Berlin Studies of the Ancient World* 33). Berlin: PRO BUSINESS digital printing Deutschland GmbH.

Ważny T. 1994. Dendrochronology of Biskupin – Absolute Dating of the Early Iron Age Settlement. *Bulletin of the Polish Academy of Sciences. Biological Sciences* 42/3, 283-289.

Wengrow D. 2010. *What Makes Civilization? The Ancient Near East and the Future of the West*. Oxford: Oxford University Press.

Żurek K., Kalicki T. and Wawrusiewicz A. 2023. Settlement pattern of Lusatian culture in Podlasie (NE Poland) and man-environment interaction. *Praehistorische Zeitschrift* 98/1, 223-237.

Skripkin V. V. and Kovaliukh N. N. 2004. Radiouglerodnoe datirovanie kostnogo materiala. In T. Malinowski (eds), *Komorowo, stanowisko 1. Grodzisko kultury łużyckiej i osadnictwo wczesnośredniowieczne. Badania specjalistyczne*. Zielona Góra: Uniwersytet Zielonogórski, 151-158.