Research Article

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From Foragers to Fisher-Farmers: How the Neolithisation Process Affected Coastal Fisheries in Scandinavia

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Abstract: The Neolithisation process altered human dependence on wild food sources, and dominant models of the Neolithic transition in Scandinavia still focus on cultural divisions. This study emphasises the evidence of creolization processes, in particular the exploitation of Atlantic Bluefin tuna (*Thunnus thynnus*) among Neolithic fisher-farmers north and east of the Skagerrak Sea in Scandinavia (4000–2350 cal BCE). The site Jortveit in Southern Norway, where Bluefin tuna was caught with toggling harpoons, is used as a point of departure. In order to understand this phenomenon, the first empirical review of prehistoric toggling harpoons in Central and Eastern Europe is presented. Toggling harpoons first appeared in the late Vinĉa Culture, then in the Gumelniţa, Cucuteni-Trypillia, and Sredny Stog cultural complexes further east, and finally in Central Europe and Scandinavia during the time of the Funnel Beaker Culture. Considering the accumulated evidence of long distance contact from Eastern to Central Europe and Scandinavia in the early fourth millennium BCE, it is argued that toggling harpoon technology was distributed through trade networks. Its appearance around the Skagerrak Sea in the Neolithic reflects fisher-farmers using a creolized fishing technology, inspired by Eneolithic societies.

Keywords: Europe, southern Norway, western Sweden, Neolithic, harpoon, tuna

1 Introduction

Throughout history, farming on the fringes of Europe's land cover has found a marginal position in household economies. In Norway, where the arable land is generally meagre, a combination of fishing and farming was predominant within the primary economic sector (Bryn, Strand, Angeloff, & Rekdal, 2018; Dyrvik et al., 1979; Larsen, 2014). While fishing could harvest an abundance of coastal resources, i.e. cod (*Gadus morhua*), herring (*Clupeidae*), whales (e.g. *Orcinus orca*, *Globicephala melas*), seals (e.g. *Phoca vitulina*), and even Atlantic Bluefin tuna (*Thunnus thynnus*) and basking shark (*Cetorhinus maximus*), a central function of farming and stock keeping was to reduce depletion rates of wild food sources (Alver, 1986; Lindquist, 1994a,b). The fisher-farmer combination thus formed an economic structure that could support a sedentary population still largely dependent on wild resources (Bettinger & Baumhoff, 1982; Gallagher, Shennan, & Thomas, 2019).

This study sheds new light on the context and background of the first fisher-farmers in Scandinavia, particularly on a group of sites located north and east of the Skagerrak Sea that testifies to consumption of Bluefin tuna in the Neolithic. The study follows a scalar development, starting with a presentation of the

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background of this research. Afterwards, a site analysis is outlined focusing on the fishing gear from the wetland site Jortveit in Southern Norway and the fishing techniques used there (Figure 1). Then, the comparative settlement data in Scandinavia are presented with evidence of consumption of Bluefin tuna. In order to explore the background of this phenomenon, of farmers catching big fish species (e.g. Bluefin tuna) with toggling harpoons, the distribution of this technology in Central and Eastern Europe is explored. This empirical review of toggling harpoons is the first to be presented in research, and although the archaeological record is skewed due to taphonomic and other research biases, the discovered patterns in time and space are approached as informative.

1.1 Theoretical Delimitations

As a structural inter-dependence of fishing and farming within the research area is presupposed, the simplifications imposed on past populations through the now standardised taxonomy of economic practice needs to be commented. With the terms "farmers" and "foragers," the aim is to highlight not a state of cultural dualism but the staple food in past societies, understood as the principal food a community lived on (Bishop, 2022, p. 10). This is an approach to past economies that is in line with a definition of foragers as groups subsisting mostly on wild resources, and of farmers as groups fully or near to fully dependent on domesticated plants and animals (Kelly, 2013, pp. 269–275; definitions from Winterhalder & Kennett, 2006, p. 3). Farmers and foragers, as concepts, are thus not strictly dichotomous since a spectrum where a preference is towards one or the other is expected. Previously, arguments have also been made that the concept of a fisher-farmer economy, due to its specific meaning in historical research, is not a sufficient analogy to model small-scale farming among prehistoric foragers (Prescott, 2020). Here, however, the term fisher-farmer is used descriptively and drawn on contextual, archaeological data to give new meaning to the term when used in the context of Neolithic societies.

Creolization is utilised as a central concept when building on contextual and archaeological data. Creolization here means that the cultural expression observed in the material culture is partly a result of active exchange of cultural traditions in the past (Iversen, 2015; Larsson, 2015; Stewart, 2007). A creole

Figure 1: Left: Map of Europe with the Skagerrak Coast region (black box), and the location of the site Jortveit (red square). Right: The Neolithic occupation sites in Norway and Sweden with evidence of Bluefin tuna consumption discussed in the text. Figure by Svein V. Nielsen.

cultural tradition is thereby understood as a hybrid between cultural elements, which, in theory, can be shown to point towards changes in e.g. linguistics, agriculture, cuisine, tools, etc. (Marston, 2021). As pointed out by Hylland Eriksen (2007, p. 163), creolization "highlights the open-ended, flexible, and unbounded nature of cultural processes, as opposed to the notion of cultures as bounded, stable systems of communications." Creolization represents an approach towards culture that opposes a traditional cultural–historical focus, and research on the Neolithic period in Scandinavia has already demonstrated the utility of creolization theory within this field. For instance, the Pitted Ware Culture on Zealand in Eastern Denmark has been interpreted as a creolized Funnel Beaker Culture, i.e. a result of interaction between Early and Middle Neolithic farmers and foragers (Iversen, 2010, 2015; Price, Klassen, & Sjögren, 2021). Similarly, Jennbert (2014, p. 236) proposed an interpretation of the Pitted Ware culture sites in Southwestern Sweden, more precisely the Jonstorp sites, as places "where processes of cultural encounter and complex social processes of creolization occurred." Consequently, this study seeks to illustrate that even fishing techniques and tools underwent changes due to creolization processes in the Neolithic, here exemplified through a study of toggling harpoons.

2 Background

The emergence of fisher-farmer economies in Southern Norway and Western Sweden is still little understood. Considering the abundance of coastal resources available for people throughout the Holocene, the Neolithic period is a logical starting point to explore this phenomenon. The earliest evidence of farming in this region dates to c. 4000 cal BCE and is connected to the presence of the Funnel Beaker culture (Andersson, Artursson, & Brink, 2016; Sjögren, 2012; Sørensen & Karg, 2014). This study uses the archaeological phases from the Southern Scandinavian chronology (Sørensen, 2014) with Early Neolithic I (EN I, 4000–3500 cal BCE), Early Neolithic II (EN II, 3500–3300 cal BCE), Middle Neolithic A (MN A, 3300–2800 cal BCE), Middle Neolithic B (MN B, 2800–2350 cal BCE), and Late Neolithic I (LN I 2350–1950 cal BCE).

Finds of charred cereals and bones from domesticates attest to farming shortly after c. 4000 cal BCE in Western Sweden (Sjögren, 2012), but such direct data are currently lacking from Eastern Norway. Due to this shortcoming in the archaeological record, a model of the Early Neolithic in Eastern Norway as reflecting "social and cultural practices" rooted in Mesolithic traditions is still considered plausible (Glørstad, 2009; Glørstad, Solheim, & Persson, 2020, p. 372). However, a number of observations support counter arguments towards this model. In Eastern Norway, there is a change in settlement organisation in the Early Neolithic (3900–3300 cal BCE) from the coast to additional inland oriented sites on agrarian soils with finds of Funnel Beaker culture or similar items, such as ceramics and imported, polished flint axes (Nielsen, 2021b; Østmo, 1988, 1998; Østmo & Skogstrand, 2006). The imported flint axes from the Early and Middle Neolithic periods follow the stylistic developments in Southern Scandinavia (Malmer, 1975; Nielsen, 1977, 1979), as does the pottery from the earliest phase (Glørstad & Sundström, 2014; Østmo, 2010; Sørensen, 2014). The evidence of ritual activity also supports the presence of a Funnel Beaker culture society in Eastern Norway (Glørstad & Sundström, 2014; Østmo, 2007). It is also important that the direct evidence of neolithisation taking place further along the Skagerrak and western coast of Norway in the Middle Neolithic (3300–2350 cal BCE) also forms a strong counter argument (Bergsvik, 2001; Bergsvik, Hjelle, Halvorsen, Olsen, & Zinsli, 2020; Høgestøl & Prøsch-Danielsen, 2006; Reitan, Sundström, & Stokke, 2018). This westward spread implies that a Neolithic economy was indeed present in Eastern Norway in the Early Neolithic, as it would have had to spread to these regions through the Oslo fjord area.

This Early and Middle Neolithic farming tradition in Southern Norway seem to have disappeared around 2800 cal BCE. It took another 400–500 years before farming reappeared in a very different (Late Neolithic) cultural context (Nielsen, Persson, & Solheim, 2019; Prescott, 2009, 2020; Solheim, 2021). As pointed out by Solheim (2021), the establishment of farming in Southern Norway was not a continuous process but rather went through a series events. It is important to note that cultivation and stock keeping was probably practiced differently from what can be expected from Iron Age or recent agrarian societies. For

instance, there are some indications of manuring at Early Neolithic sites in Southern Scandinavia (cf. Gron et al., 2017). However, it is generally accepted that a mixed economy – where livestock feeding and cultivation are integrated on farms in order to prevent soil depletion – first appeared in Norway and Central Sweden in the late Bronze Age (1000–500 cal BCE) (Mjærum, 2020).

The "delayed" process towards permanent farming economies in Southern Norway should be considered not only in the light of the meagre arable land, but also by the abundance of coastal resources and a dense forager populations in the fourth millennium BCE (Gron, Sørensen, & Rowley-Conwy, 2020, p. 445; Nielsen, 2021a; Shennan, 2018; Silva & Vander Linden, 2017). In Southern Scandinavia, there seems to have been a rapid replacement of the Mesolithic subsistence in major agricultural areas, while foraging survived for some centuries in suitable regions, and thus delayed the overall neolithisation process. One study found that the spread of farming within Southern Scandinavia was about 50% slower than the initial spread from the near East to Europe (Fort, Mercè Pareta, & Sørensen, 2018). Some scholars have assumed that foragers in Southern Scandinavia could have chosen to move their territories further north into other forager territories in Western Sweden and Eastern Norway, as the neolithisation process continued in Northern Germany and adjacent territories (Eigeland, 2015; Nielsen, 2021a).

There are still many unanswered questions regarding the Early Neolithic period in Eastern Norway. For instance, we know little about how people integrated and further developed their foraging strategies with a Neolithic life, to a farming economy and a demographic regime with increased sedentism and stronger population growth (Bocquet-Appel, 2008; Shennan, 2018). When Early and Middle Neolithic fisher-farmers developed adaptive strategies, did they continue in Mesolithic traditions, as has been suggested by some scholars (Glørstad et al., 2020; Prescott, 2020), or, is there evidence of creolized foraging strategies? Due to recent archaeological investigations along the Skagerrak coast in Southern Norway, we are now in a position where we can discuss this matter with new data and perspectives. In the following, insights on fishing technology gained from recent studies of the Jortveit site are highlighted, and in particular the toggling harpoons found there (Nielsen & Persson, 2020).

3 The Toggling Harpoons from Jortveit and Their Spatiotemporal Context

A high density of coastal sites and stray finds along the Skagerrak coast in Norway has attracted the attention of scholars for a long time (Nielsen, 2017a,b; Nielsen & Åkerstrøm, 2016; Nielsen, Åkerstrøm, Stokke, & Eskeland, 2016; Nummedal & Bjørn, 1930; Østmo, 1980; Reitan & Sundström, 2018). On the central stretch, there is a wetland area, which in the Neolithic was a seabed. The wetland area covers c. 35 ha and is located in the middle of a peninsula, called Homborsund. It was in connection with the work on drainage ditches on the Jortveit farm that tools of flint, slate, and osseous materials emerged in 1931 from c. 1.7 m depth, in a mud profile (Bjørn, 1932). Although the finds (Figure 2) from Jortveit did receive scholarly attention, it took nearly 90 years for the first archaeological investigations to take place (Nielsen & Persson, 2020) (Figure 3).

A photo capturing the original ditch made it possible to locate the find spot in 2018 (Figure 4a and b), and a mud profile representing a prehistoric seabed was documented in trenches along and surrounding the old ditch. Within a c. 5–10 cm vertical level, at c. 1.20–1.30 m depth, an abundance of fish bones, flint artefacts, and pieces of wood occurred. This level was named the "bone layer," and most of the bones stemmed from Bluefin tuna (Figure 4c–e) (Nielsen, 2020a,b,c). The presence of these finds within the same level forms the basis of the interpretation that the tools discovered within the wetland was used to catch the tuna. The discovery of Bluefin tuna bones on terrestrial settlements, such as Alveberget (Mansrud & Berg-Hansen, 2021), supports this interpretation. Tuna bones from Jortveit produced calibrated ages between c. 3480 and 2880 cal BCE, making them the oldest evidence of tuna fishing in Norway (Nielsen & Persson, 2020, p. 9, Table 1). The discovery of a torch and a barbed harpoon with burn marks could indicate that

Figure 2: Osseous tools from the Jortveit site. Upper right: Two fishhooks; the left hook was discovered in 2020, the right hook in 1930's. The hooks demonstrate the constant degradation of preservation conditions at Jortveit due to drainage and other earthwork. Down left: Two toggling harpoons. The toggling harpoon to the right was radiocarbon dated to 3631–3372 cal BCE (see details in the text). Right: Barbed harpoon with burn marks (a and b). This barbed harpoon has been dated to 2878–2353 cal BCE. The burn marks supports the interpretation that night fishing could had taken place within the bay at Jortveit. Photo: Svein Vatsvåg Nielsen.

Figure 3: (a) A photo from 1931 of the ditch at Jortveit within which artefacts and fish bones first appeared (from Bakke, 1933, p. 36, Figure 1). (b) Investigating the drainage ditch in 2018. (c) A soil profile in trench 6 with the "bone layer" uncovered at c. 132 cm depth in the bottom of the trench. (d) The "bone layer" in trench 6 exposed with visible Bluefin tuna bones. (e) A selection of Bluefin tuna vertebrae from different trenches at Jortveit. Photos by Svein V. Nielsen, except (a).

Figure 4: The area around the site Jortveit (yellow dot) with sea level elevated 10 m (c. 3000–2500 cal BCE), and a selection of Neolithic finds in the surrounding area. Circles: Single stray finds. Squares: Settlement sites. Top left: Flint arrowhead of type C (Becker, 1951). Down left: Thick butted and polished flint axe. Top right: Fragment of polygonal battle-axe of type K III (Zápotocký, 1992), typical of the Funnel Beaker Culture in Sweden and Norway. Down right: The two toggling harpoons from Jortveit. The harpoon to the right dates directly to 3631–3372 cal BCE (at 95.4%, LuS-13503, 4715 ± 45). Figure by Svein V. Nielsen.

night fishing might also have taken place at Jortveit in the Neolithic. A sample of bone powder from the barbed harpoon was dated to 2878–2353 cal BCE (at 95.4%, LuS-13502, 4050 ± 75), placing it in the youngest activity phase at Jortveit. One lower jaw stemming from an orca was dated to c. 3300 cal BCE (LuS-13505, 4885 ± 55, –12.9 δC13), showing that even whales had entered the bay.

In comparison to the dated bones, charcoal and wood samples collected *in situ* at Jortveit were dated to between c. 3680 and 2730 cal BCE (Nielsen & Persson, 2020, p. 9, Table 1). These samples probably represent waste from nearby settlements, once situated on the Neolithic shore (Figure 4). In the early third millennium BCE, the local sea level was about 10 m higher than today, and several stray finds and settlements in the surrounding area attests to this. Some artefacts even point to long distance contact and direct identification with the Funnel Beaker culture, e.g. polished flint axes and a stone battle-axe (Figure 4, upper right).

The significance of these battle-axes is further discussed below. Only one pottery sherd has been found in the wetland at Jortveit, but the lack of decoration makes it hard to date more precisely than to the Neolithic period.

Among the bone tools from Jortveit, there were also two toggling harpoons, both found during ditch maintenance work in the early 1930s. One is 120 mm long, and 12 mm at the widest. It has a drilled hole in the centre and the "feather" (Figure 4) has a u-shaped incision. A sample of bone powder extracted from this artefact dated to 3631–3372 cal BCE (at 95.4%, LuS-13503, 4715 ± 45) (Nielsen & Persson, 2020), which is overlapping with the earliest tuna bones from Jortveit. The second harpoon is 98 mm long and 11 mm at the widest. It exhibits the same morphological traits as the first, but lacks the u-shaped incision. This artefact has not been dated.

In the current research, toggling harpoons are also known under other technical terms, such as "conical harpoons" (Krištofić, 2016, p. 35), "Lanzespitze" (Reinerth, 1929), or "Knebelharpunen" (Torke, 1993). Similar harpoons to those found at Jortveit were also discovered by the excavations at Skipshelleren, a rock shelter site located on the south side of Vikafjorden in Western Norway (Bøe, 1934). Two tuna bones were found in layers initially defined as Mesolithic (Faltinsen, 2018, pp. 45–52; Olsen, 1976), but recent radiocarbon dates and finds of cattle bones in the same layer suggest the presence of mixed levels at Skipshelleren (Rosvold, Andersen, Linnell, & Hufthammer, 2013). Considering this and the small size of Mesolithic fishhooks, including those from Skipshelleren (Bergsvik & David, 2015; Bøe, 1934), it is unlikely that they were used for tuna fishing. Compared to these, the hooks from Jortveit are considerably larger, and seem more suitable for catching larger fish species.

Apart from the possible Mesolithic bones from Skipshelleren, a few tuna bones have also been found at the Late Mesolithic sites Tågerup and Löddesborg in Southern Sweden, and Italiensvej in Eastern Denmark (Enghoff, MacKenzie, & Nielsen, 2007; Jonsson, 1988; Karsten & Knarrström, 2003), but the small occurrences from these sites do not suggest tuna was an important prey in the Mesolithic. In Sweden and Denmark, toggling harpoons have not been recorded so far, and barbed harpoons, similar to the single rowed barbed harpoon from Jortveit, seem to have been most widespread in the Neolithic (Andersen, 1972, pp. 92–93; Becker, 1951, p. 161, Figure 2; Janzon 1974, pp. 259, 266, 277–8, 280, 301, 311, 327, 333).

4 The Regional Context of Bluefin Tuna Fishing in the Neolithic

The evidence of Bluefin tuna fishing at Jortveit is not unique, as there is a group of sites spread along the northern and eastern shores of the Skagerrak coast that testify to such catchments in the Scandinavian Early and Middle Neolithic periods (4000–2350 cal BCE) (Figures 1 and 5). In addition to Jortveit, we have the sites Hakeröd, Ånneröd, Gröninge, and Sandhem in Western Sweden (Alin, 1955, p. 195; Jonsson, 2002, p. 3, Table 1; 2007; Munkenberg, 2007, p. 114, Table 1; Särlvik, 1976), and Alveberget in Southern Norway (Mansrud & Berg-Hansen, 2021). Bones from Bluefin tuna have been documented on all of these, but the degree of excavation and thus documentation varies greatly.

The site Hakeröd was excavated twice, in 1935 and 2004. This revealed a coastal dwelling area occupied in the period c. 3300–2400 cal BCE (Alin, 1955; Jonsson, 2002; Persson, 2005). Ånnerød was excavated multiple times in the twentieth century (1905–1906, 1921, 1977–1978, 1988, and 1991–1992), and these investigations, combined with subsequent studies of excavation data, have identified a coastal dwelling site occupied in the period c. 3000–2300 cal BCE (Iversen, Philippsen, & Persson, 2021, p. 38, Figure 9; Strinnholm, 2001). At Gröninge, artefacts typical of the Middle Neolithic were collected by laymen for decades in the 20th century before a small scale excavation took place in 1970, showing that most of the Neolithic dwelling area had already been destroyed by sand outcrops (Moberg & Kaelas, 1966; Särlvik, 1976). A small-scale excavation took place at Sandhem in 2003, resulting in the identification of a dwelling site with a find inventory typical of the Middle Neolithic (3300–2350 cal BCE) coastal sites within the region (Hernek, Jonsson, & Streiffert, 2004). In 2018, a comprehensive rescue excavation at Alveberget uncovered a coastal dwelling area occupied in the period c. 3300–2200 cal BCE, with finds of both burnt and unburnt tuna bones (Mansrud & Berg-Hansen, 2021).

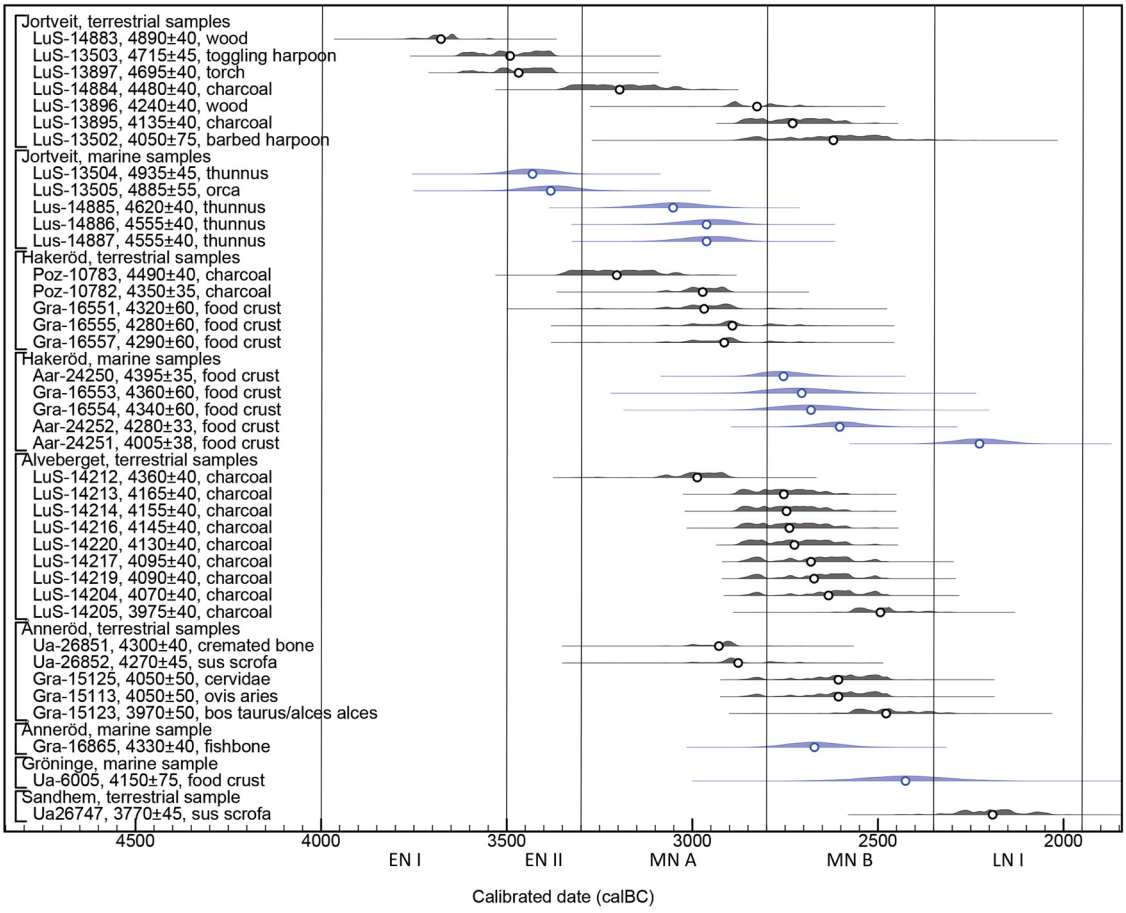

Figure 5: Radiocarbon dates from the Neolithic sites within the research area where there is evidence of consumption of Bluefin tuna. Probability distributions of calibrated radiocarbon dates are shown with complete ranges and mean values (circles). Blue probability distributions refer to samples with a marine content where the calibrations have taken into account a reservoir age of 300 ± 30 years. There is no straightforward procedure for calculating marine reservoir offsets but 300–400 years is often expected (Iversen et al., 2021; Philippsen, 2013). Detailed sample information for all dates was published by Iversen et al. (2021), Mansrud and Berg-Hansen (2021), and Nielsen and Persson (2020). Dates have been calibrated using IntCal20 (Reimer et al., 2020) and OxCal 4.4 (Bronk Ramsey, Van der Plicht, & Weninger, 2001). Figure by Svein V. Nielsen.

It is unfortunate that microfauna, such as birds and fish, are often excluded from osteological datasets due to methodological challenges related to recovery and reporting (e.g. Gaastra, de Vareilles, & Vander Linden, 2022). This is also the case for the investigated sites here. Like the site documentations, so does the documentation of fish bones vary considerably (Table 1). In the case of Ånneröd and Gröninge, it is only noted that tuna bones were found on the sites (A. Bagge, in Alin, 1955, p. 195; Moberg & Kaelas, 1966, p. 43). A detailed analysis of the fish bones from Jortveit will, however, soon be published. When all present species at Alveberget are considered, tuna made up 36% of the total number of NISPs (Mansrud & Berg-Hansen, 2021), and at Sandhem and Hakeröd about 1.8% of the total number of bones (Jonsson, 2002). It thus seems as if Bluefin tuna may have been a particularly staple food source at the Norwegian sites, i.e. Jortveit and Alveberget, but the varied quality in documentation do suggest a cautious approach towards the representability of fish. For instance, even though a detailed analysis of the fish bones from Gröninge does not exist, Jonsson (2002, p. 4) noted that Bluefin tuna was "the most frequent fish" at that site.

It is not surprising that domesticated animals appear at some of these sites, but the occurrence of Bluefin tuna – a fish species that can reach c. 400 kg – is significant since it marks a distinction between Neolithic foraging and Mesolithic foraging in these regions of Scandinavia in terms of prey size (e.g. Enghoff et al., 2007; Ritchie, 2010; Solheim, 2020). Past Bluefin tuna consumption in Norway is primarily associated

Table 1: Quantitative overview of Bluefin tuna bones from Early and Middle Neolithic sites located along the Skagerrak and Kattegat coast in Norway and Sweden (NISP: Number of identified specimen)

Site	Number of bones	% of total *N* bones	NISP	% of total NISP	Weight (g)	% of total weight	Reference
Jortveit	182	<95	—	—	<600	<95	
Alveberget	—	—	27	36	49	50	Mansrud and Berg-Hansen (2021)
Ånneröd	—	—	—	—	—	—	Alin (1955)
Sandhem	18	1.8	—	—	—	—	Jonsson (2007)
Hakeröd	2	1.8	—	—	2.1	0.7	Jonsson (2002)
Gröninge	—	—	—	—	—	—	Moberg and Kaelas (1966)

with the Medieval or later periods, because it is expected that only complex societies could organise fishing and distribution of such large fish (e.g. Herteig, 1973). Clearly, there is evidence today to the contrary. The dwellings mentioned above were located along the Neolithic shore line, and some were covered by waste middens, also known as "køkkenmødding" (kitchen midden) (Hernek et al., 2004; Jonsson, 2007, p. 236, Figure 1; Nordqvist, Jonsson, & Johansson, 2009; Strinnholm, 2001). Middle Neolithic middens are numerous along the western Swedish coast (Alin, 1955, p. 27; Jonsson, 2007, p. 236, Figure 1). The sites discussed here are also part of a widespread, coastally oriented settlement phenomenon in the Nordic countries that emerged at the transition from the Early to the Middle Neolithic, i.e. around 3300 cal BCE, but Jortveit differs in this respect because the earliest site activity dates to the EN II period (3500–3300 cal BCE).

5 The Continental Backdrop

Beyond the Skagerrak coast in Southern Norway and Western Sweden, big fish catchments by the use of toggling harpoons were also present in Central and Eastern Europe in the Neolithic. As contexts are rarely investigated where osseous tools are preserved, there is no doubt that the archaeological record is skewed in this respect. Direct dates of well-preserved osseous tools are also rare, in part because of their well-preserved state. It is also often the case that only half-fabricated bone tools are found at excavated settlements, while the actual harpoons were frequently lost while in use at places other than settlements (de Capitani, Deschler-Erb, Leuzinger, Marti-Grädel, & Schibler, 2002, p. 338). In such cases, type identification of harpoons or other formal organic tools become problematic. Therefore, for the study of organic tools, such biases must be taken into account when making interpretations; either the spatial distribution of these tools can be explained by the present state of our data – which we know is limited due to taphonomic and behavioural biases, or there are causes beyond our data that we cannot account for yet. In Section 5.1, a brief overview of the research that touches upon the presence of toggling harpoons in Europe is presented, and interpretations which assume that the data we have today are informative for reconstructions of past events are proposed.

5.1 Toggling Harpoons from Central and Eastern Europe

After Munro (1890, p. 173, Figure 42) first depicted a toggling harpoon discovered in the Ljubljana marshes in Slovenia, more harpoons have been discovered at Neolithic sites in Central and Eastern Europe (Anthony, 2007, p. 242, Figure 11.7; Auler, 1994, pp. 135–136, abb. 4–5; Bøe, 1934, pl. 2, Figures 14–16; Choyke, 2015, p. 249, Figure 14; Cristiani, Dimitrijević, & Vitezović, 2016, p. 139, Figure 4; Hansen, 2015,

p. 289, Figure 39; Kostyleva and Macane, 2018, pp. 147, Figure 1; Lübke, Lüth, & Terberger, 2009, p. 325, pl. 3; Nielsen & Persson, 2020, p. 5, Figure 3; Schlenker, 1994; Torke, 1993, pp. 61–63, abb. 12–14; Tsybriy, Tsybriy, & Kiyashko, 2017, p. 106, Figure 1; Vitezović, 2011; 2017, p. 215, Figure 8; 2018, p. 179, Figure 10; Wininger, 1992). The sites with toggling harpoons presented in Table 2 and plotted spatially in Figure 6 were identified based on published illustrations that secured a correct type-identification. In this work, the somewhat similar but considerably younger bone points known as "Doppelspitzen" ("double-edged points") from Swiss lake sites (Schlenker, 1994; Wininger, 1992) are not included, nor the so-called "Tüllenspitzen" known from the Iron Age in Northern Europe (Schatte, 2013). Some sites should, with reference to the diverse research traditions in Europe, rather be classified as Eneolithic, Chalcolithic, Middle or Late Neolithic, depending on regional coherence (Kadrow, 2015, pp. 248–249; 2017, pp. 68–69). Here the term Neolithic has been chosen to be used as a broad category for all the sites, and the term Eneolithic for sites that are considered as part of a Copper Age based on previous research.

In the lower Danube region, toggling harpoons are known to have occurred at the tell settlements Vinča-Belo Brdo in Serbia and at Pietrele in Romania (Cristiani et al., 2016; Hansen, 2015). First, it should be mentioned that there has been some confusion regarding the harpoon types in the Vinča culture period (5700–4500 cal BCE). It has been mentioned in some studies that the only harpoon type from this phase were barbed (Vitezović, 2020, p. 168, Figure 8; Zalai-Gaál, 2004), but Cristiani et al. (2016) recently showed that toggling harpoons were also found at Vinča-Belo Brdo, and that they belonged to the "final phases," or the Early Eneolithic horizon (c. 4500–4000 cal BCE) (Borić, 2015, p. 177, Figure 19; Roberts, Marić, & Cvetković, 2021; Tasić et al., 2015; Whittle et al., 2016). Yet during this horizon, the site was used for burials within which there were finds typical of the Eneolithic Bodrogkeresztúr culture. Two of the Eneolithic graves at Vinča-Belo Brdo dated to c. 4298 cal BCE (Burial 1, OxA-24922, 5451 ± 35 BP) and c. 4162 (Burial

Table 2: List of sites with toggling harpoons mentioned in the text

Country	Site	Period	Reference
Hungary	Győr-Szabadrét-domb	Baden Boleráz	Choyke (2015)
Slovenia	Ljubljana marshes	Eneolithic	Munro (1890), Korošec and Korošec (1969), Greif (1997), Gaspari (2008)
Romania	Malnaş-Băi	Cucuteni-Trypillia BI	Sztanes and Beldiman (2014)
Germany	Ostorf-Tannenwerde	Funnel Beaker culture	Lübke et al. (2009)
Norway	Jortveit	Funnel Beaker culture	Nielsen and Persson (2020)
Romania	Pietrele	Gumelniţa culture	Hansen et al. (2014)
Romania	Vităneşti-Măgurice	Gumelniţa culture	Margarit et al. (2022)
Germany	Siedlung Dullenried	Horgen culture	Torke (1993)
Switzerland	Steinhausen-Sennweid	Horgen culture	Röder and Huber (2007)
Germany	Siedlung Forschner	Horgen culture	Torke (1993
Germany	Wasserburg Buchau	Horgen culture	Torke (1993)
Switzerland	Zürich-Alpenquai	Horgen culture	Auler (1994)
Switzerland	Nidau-Steinberg BE	Horgen culture	Auler (1994)
Switzerland	Auvernier NE	Horgen culture	Rychner (1979a)
Norway	Skipshelleren	Scandinavian Neolithic	Bøe (1934)
Russia	Razdorskoye I	Sredny Stog culture	Tsybriy et al. (2017)
Ukraine	Soroki I	Sredny Stog culture	Tsybriy et al. (2017)
Ukraine	Sredny Stog	Sredny Stog culture	Anthony (2007)
Ukraine	Strilcha Skelya	Sredny Stog culture	Anthony (2007)
Croatia	Jakovo-Kormadin	Vinča Phase D	Krištofić (2016)
Serbia	Vinča-Belo Brdo	Vinča Phase D	Cristiani et al. (2016)
Serbia	Divostin	Vinča Phase D	Vitezović (2013)
Serbia	Drenovac	Vinča Phase D	Vitezović (2011)
Russia	Sakhtysh II	Volosovo culture	Kostyleva and Macane (2018)
Serbia	Sarvaš-Gradac	Vučedol culture	Vitezović (2018)
Serbia	Zók	Vučedol culture	Vitezović (2018)

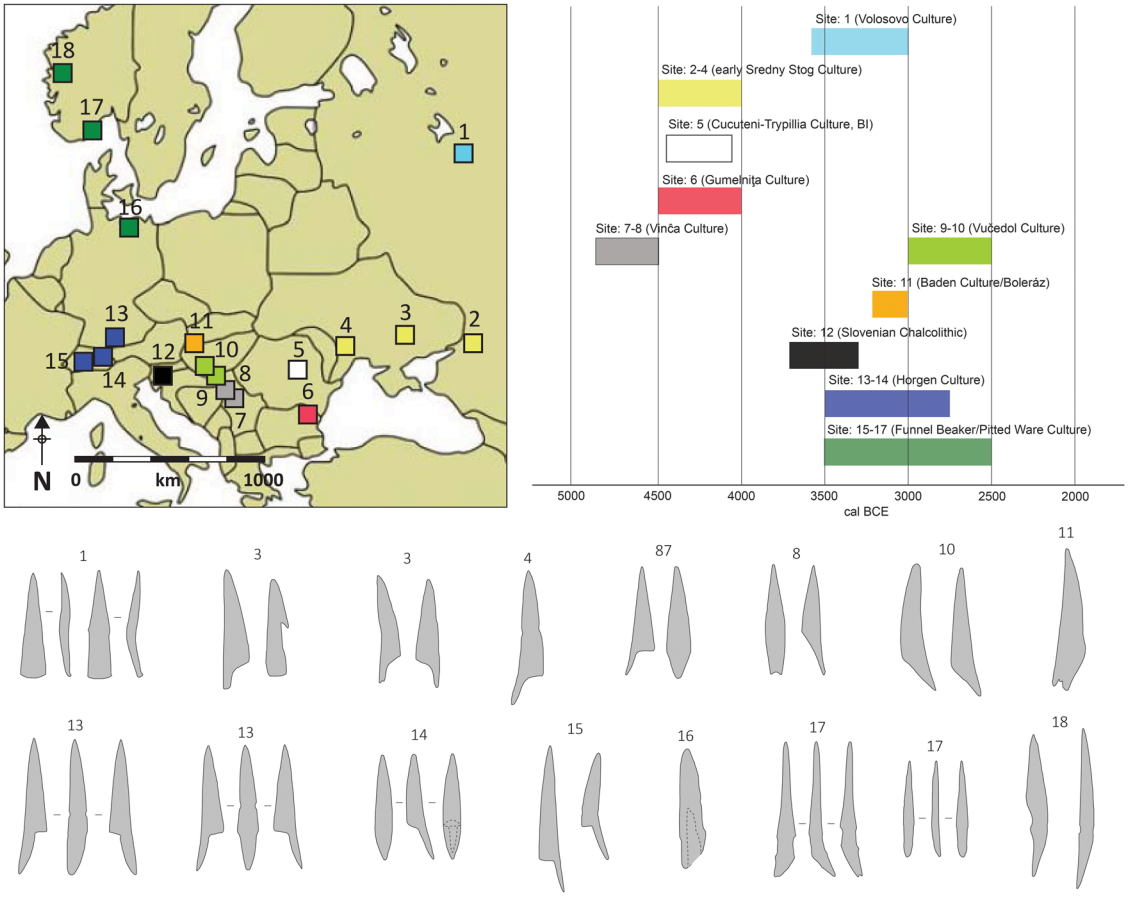

Figure 6: The distribution of Neolithic sites with toggling harpoons in Europe and their associated chronological phases. Sakhtysh II (1), Razdorskoye I (2), Sredny Stog and Strilcha Skelya (3), Soroki I (4), Malnaş-Băi (5), Pietrele and Vităneşti-Măgurice (6), Divostin and Drenovac (7), Vinča-Belo Brdo and Jakovo-Kormadin (8), Sarvaš-Gradac (9), Zók (10), Gyor-Szabadret-domb (11), Ljubljana marshes (12), Lake Federsee (13), Siedlung Forschner, Dullenried, Wasserburg Buchau, Zurich-Alpenquai, and Steinhausen-Sennweid, (14), Nidau-Steinberg and Auvernier (15), Ostorf-Tannenwerder (16), Jortveit (17), and Skipshelleren (18). See the main text for site references. The timespan presented in colour for each region reflect the age of radiocarbon dated contexts and artefacts, and for further details see the main text. Example drawings of harpoons from selected sites are based on published illustrations and have been scaled approximately. Figure by Svein V. Nielsen.

2, OxA-24923, 5335 ± 34 BP), which is in line with the typological dating (Borić, 2015, pp. 25, Figure 16). It is therefore important to note that the toggling harpoons at Vinča-Belo Brdo were not found in any of the Eneolithic burials, but that they belonged to the final Vinča occupation phase. Based on the occurrence of toggling harpoons at both Vinča-Belo Brdo and other Vinča culture sites, such as Divostin (Vitezović, 2013, pp. 116, Figure 5; 2017), Drenovac (Vitezović, 2011, p. 125), and Jakovo-Kormadin (Krištofić, 2016, pp. 35–36), the harpoons can be given a tentative dating to c. 4850–4500 cal BCE. This date is also in line with the latest occupation stage, i.e. stage D, at Vinča-Belo Brdo (Borić, 2015, p. 163, Figure 2).

In the case of the site Pietrele in Romania, Benecke et al. (2013), Hansen (2015), and Hansen et al. (2014) associated the toggling harpoons with the Gumelniţa culture (c. 4500–4000 cal BCE) occupation phase, making them a few centuries younger than the harpoons from the Vinča region further west. Benecke et al. (2013, p. 186) referred to comparable Late Mesolithic harpoons from Northern Germany, which would be fully contemporary with the site activity at Pietrele. However, these Late Mesolithic artefacts, such as the barbed harpoon from Travenbrück (cf. Hartz, Lübke, & Terberger, 2007, p. 577, Figure 6), deviate from the type definition of toggling harpoons. On the contrary, the harpoons are more in line with the Ertebølle type harpoons defined by Andersen (1972), which are barbed and perforated in the proximal end. As argued by Hartz et al. (2007), there is evidence of trade and therefore distribution of exotic artefacts into the Late

Mesolithic communities in Northern Germany, but nothing suggests that new harpoon types were adopted due to such external influence.

Production waste from the manufacturing of toggling harpoons was found at the contemporary tell settlement Vitănești-Măgurice, which was located only a few miles west from Pietrele (Margarit, Andreescu, Modoveanu, Mirea, & Torcica, 2022). Although the finds are few in number, toggling harpoons are also known from the contemporary Cucuteni-Trypillia culture (phase BI, 4300–4100 cal BCE) further north in Romania, for instance at the site Malnaş-Băi, which was radiocarbon dated to c. 4460–4050 cal BCE (Sztanes & Beldiman 2014, p. 270, Figure 4). Thus, we can observe that toggling harpoons were in use within a relatively large Eneolithic region in Southeastern Europe during the second half of the fifth millennium BCE. Hansen (2015, p. 114) suggested that the toggling harpoons from the Gumelniţa culture could represent "a Copper Age innovation," and that they were used specifically to catch very large fish, but as argued here, toggling harpoons were already in use at late Vinĉa culture sites.

Further east, in Ukraine, toggling harpoons have also appeared on sites dating to the period c. 4500–4000 cal BCE, also called the early Sredny Stog cultural complex (Anthony 2007, p. 242, Figure 11.7; Mallory 1991, p. 209, Figure 111; Telegin, Lillie, Potekhina, & Kovaliukh, 2015; Tsybriy et al., 2017, pp. 106, 112). Although Anthony (2007, p. 242) emphasised that the early Sredny Stog period was contemporary with the demise of the tell settlements in the Vinĉa culture region, the dating of the toggling harpoons within the Sredny Stog region and chronology is somewhat unclear. Mallory (1991, p. 209, Figure 111) pictured toggling harpoons as part of the tool inventory of the complete time span of the Sredny Stog culture. Anthony (2007, p. 242, Figure 11.7) later connected them more precisely with the sites Sredny Stog (*Locus classicus*) and Strilcha Skelya, both of which date to the early phase. A similar dating frame is indicated at other Sredny Stog sites with toggling harpoons, such as Razdorskoye I, where part of an assemblage was collected from an eroded riverside, while one toggling harpoon was found in a stratigraphic layer dated to the late Mariupul period (5500–4000 cal BCE) (Telegin, Potekhina, Lillie, & Kovaliukh, 2002, p. 361; Tsybriy et al., 2017). Considering the site Soroki I, several radiocarbon dates have been published throughout the years (cf. Gimbutas, 1988), but these show a large span, and it is not certain which are representative of the harpoons. Thus, how far back in time toggling harpoons stretch within the area of the Sredny Stog culture, or the Pontic Steppe, is unresolved. There is, however, no evidence of such harpoons during the late Sredny Stog period, for instance from Dereivka (e.g. Telegin, 1986).

It is interesting to note that toggling harpoons also appear at younger sites located north of the Pontic Steppe, as well as northwest of Vinĉa-Belo Brdo. At the site Sakhtysh II in Central Russia, toggling harpoons were found close to a group of excavated features called "ritual hoards," which were radiocarbon dated to c. 3600–3000 cal BCE (Kostyleva & Macane, 2018; Macāne, Nordqvist, & Kostyleva, 2019; Piezonka, Kostyleva, Zhilin, Dobrovolskaya, & Terberger, 2013). Sakhtysh II is a burial site interpreted as belonging to the Eneolithic Volosovo culture (c. 3500–2500 cal BCE), and the ritual hoards that were excavated consisted of "clusters of artifacts with traces of exposure to fire" (Kostyleva & Macane, 2018, p. 148). Northwest of Vinĉa-Belo Brdo, the sites Sarvaš-Gradac and Zók have been interpreted as belonging to the Vučedol cultural complex (3000–2500 cal BCE) (Vitezović, 2018). The site Gyõr-Szabadrét-domb in Hungary have an occupation phase radiocarbon dated to c. 3200–3100 cal BCE, which corresponds to the Boleráz phase of the Baden culture (Choyke, 2015). This could mean that the tool type was kept in use for some centuries after its introduction in the Eneolithic. Choyke (2015, p. 250) also pointed out that harpoons similar to the toggling harpoon from Gyõr-Szabadrét-domb do appear on other Bronze Age sites in Hungary. Toggling harpoons are also known from two Bronze Age sites located within the Carpathian region, namely, Pecica and Klárafalva Hajdova (Nicodemus, 2014, p. 394), but these have not been plotted in Figure 6 due to their post-Neolithic ages.

To the southwest of the Vinĉa region, in Slovenia, toggling harpoons have occurred at Eneolithic (Greif, 1997, p. 35; Korošec & Korošec, 1969) and Bronze Age sites (Gaspari, 2008). According to Gaspari (2008, pp. 72–73), these harpoons also occurred at Hočevarica, a pile dwelling dated specifically to c. 3700–3600 cal BCE (Čufar & Kromer, 2004), but illustrations of these artefacts have unfortunately not been published. Considering the evidence of pile dwelling in the Ljubljana marshes from the period c. 3700–3300 cal BCE (Budja & Mlekuž, 2010; Čufar, Kromer, Tolar, & Velušček, 2010; Velušček, 2004), it is feasible that toggling

harpoons were in use during that time period, but with no direct dates nor well-dated contexts, this assertion remains speculative. Velušček (2004, pp. 146–147) suggested that toggling harpoons were used in the Slovenian Eneolithic period to catch Wels catfish (*Siluris glanis*), which can reach 300 kg, when the fish moved to shallow water during spawning season.

In Central Europe, toggling harpoons are known from a number of sites dating to the Horgen Cultural complex (c. 3500–2750 cal BCE). Several were found at sites surrounding Lake Federsee in Southern Germany, such as Siedlung Dullenried which dated to the Horgen culture (Manning et al., 2014; Reinerth, 1929, p. 66, Figure 16; Schlichtherle, 2004), and Wasserburg Buchau and Siedlung Forschner, which dated to the Bronze Age (Torke 1990, 1993, 2016). In Switzerland, such harpoons were found at the sites Zürich-Alpenquai, Nidau-Steinberg BE, Auvernier NE, and Steinhausen-Sennweid (Auler, 1994; Hafner & Suter 2003b, p. 23, Tafel 8 No. 15; Röder & Huber, 2007, p. 378, Tabel 38 No 548; Rychner, 1979a, p. 41; 1979b, p. 261). Although the harpoons from the Swiss lake sites could date as early as the Pfyn cultural period (3900–3500 cal BCE), the artefacts have not been directly dated and the discovery of a few finds of harpoons made of bronze do indicate that the tool type was kept in use for centuries. Alternatively, it was reintroduced in the region during the Bronze Age. Hafner and Suter (2003a) dated the finds from Steinhausen-Sennweid to 3000–2750 cal BCE, but radiocarbon dates from the Horgen culture occupation at the site pointed to the period 2869–2859 cal BCE (Röder & Huber, 2007, p. 315). Röder and Huber (2007, p. 266) argued that the harpoon from Steinhausen-Sennweid could belong to an even later occupation phase (Bronze Age), but considering the evidence from Siedlung Dullenried and the Ljubljana marshes, to place this tool in the Horgen culture horizon is more coherent. Auler (1994) even suggested that the toggling harpoons from Wasserburg Buchau and Siedlung Forschner should rather be dated to a Neolithic occupation, congruent with Siedlung Dullenried.

In Northern Germany, at the flat-grave cemetery Ostorf-Tannenwerder, one cone-shaped bone tool found in grave 16/04 could well represent a toggling harpoon (Bastian, 1961, p. 31; Lübke et al., 2009, p. 325, Plate 3, No. 1). The artefact was fragmented but it clearly had a socketed base and lacked barbs along the edges. A cranial fragment from grave 16/04 dated directly to 3951–3659 cal BCE (UtC-7443, 5023 ± 45 BP) but could be about 400 years younger due to a freshwater marine reservoir effect, which according to Lübke et al. (2009, p. 323) is in line with a typological dating of the find inventory in the grave. A calibration of the date from grave 16/04 that takes into account the reservoir age of the site proposed by Fernandes, Grootes, Nadeau, and Nehlich (2015) give 3762–3127 cal BCE (at 95.4%) with 3451 cal BCE as median age. In Scandinavia, as mentioned, toggling harpoons occurred at the wetland site Jortveit and at the rock shelter site Skipshelleren in Western Norway (Bøe, 1934; Nielsen & Persson, 2020).

6 Summary

To summarize, toggling harpoons first appeared at late Vinča culture tell sites including the eponymous Vinča-Belo Brdo (phase D). After c. 4500 cal BCE, they are also present further east, in the Gumelniţa, the Cucuteni-Trypillia, and the Sredny Stog culture, and then, closer to c. 3500 cal BCE, even in Central Russia. Northwest of the Vinča region, the toggling harpoons are found at the Ljubljana marshes, the possibly earliest from c. 3700 cal BCE. From around 3500 cal BCE, they also appear within the area of the Horgen culture in Southern Germany and Switzerland. Finally, the toggling harpoons were then discovered at sites associated with the Funnel Beaker culture in Scandinavian and Northern Germany – although there is some uncertainty associated with the harpoon type from grave 16/04 at Ostorf-Tannenwerder. Characteristic of these northernmost sites is their geographical location along the coast or lakes, and generally at the outskirts of rich agricultural areas. Although I have not studied first hand most of the harpoons mentioned in this review, previously published illustrations demonstrate clear morphological similarities between artefacts from the Eastern and Central European sites. The harpoons from more northern areas are longer and slimmer, but the u-shaped incision on the feather on the harpoons from Jortveit is also present at other sites, e.g. Vinča-Belo Brdo.

Besides the morphological similarities between the toggling harpoons produced within the Gumelniţa and Cucuteni-Trypillia regions and those discovered at Central European sites, the proposed east-west distribution pattern finds support in other sources of evidence as well. Contemporary with the Gumelniţa and Cucuteni-Trypillia BI, an interaction zone was formed in Northern Germany between agricultural groups (i.e. Michelsberg and Late Lengyel), which resulted in the formation of the Funnel Beaker culture around 4100 cal BCE (cf. Müller, 2011). Around 4000 cal BCE, funnel-necked beakers appeared in Southern Scandinavia, marking the onset of the Neolithic period. New social networks were established, reflecting the geographical extent of the Funnel Beaker culture (Bakker, 1979, 2010). The first centuries of the 4th millennium BCE also represented a period of increased westward contact and flow of technologies from Eastern to Central Europe and Scandinavia along the river systems (Figure 7). This is here indicated by the spread of copper technology (Gebauer, Sørensen, Taube, & Wielandt, 2020), stone sceptres (Anthony, 2007, p. 235, Figure 11.5; Dergachev, 2007; Ebbesen, 1988; Glob, 1952), and battle-axes (Ebbesen, 1998; Mikkelsen, 1984; Nielsen, 2021b; Zápotocký, 1992, note that type III axes in Zápotocký is equal to type V in Ebbesen).

The earliest phase of the Eneolithic Mondsee group in Austria, from which copper artefacts were distributed to Scandinavia, dates to 3800–3000 cal BCE (Frank & Pernicka, 2012, p. 112; Nørgaard, Pernicka, & Vandkilde, 2021, p. 2, Table 1). The chemical composition in the Mondsee copper artefacts is identical to contemporary copper in Southeastern Europe, and copper artefact types from this period, such as the Cucuteni daggers, follow the same east-west distribution (Frank & Pernicka, 2012, p. 151, Figure 12; Gross et al., 2021, p. 13 Figure 11; Klassen, 2014, p. 242, Figure 141). As pointed out by Klassen (2014), one of the possible long-distance traveling routes in Europe in the early fourth millennium BCE followed the Danubian trail, from the Black Sea to the Neckar Valley and the Kraichgau region in Germany. As shown above, the distribution of toggling harpoons seems to follow this route. It could also be mentioned that a characteristic fishing tool within the Pfyn culture and early Horgen culture in Switzerland was the rod harpoon (de Capitani et al., 2002, p. 338), which was widely used within the Gumelniţa culture and Cucuteni-Trypillia culture, with the mentioned site Pietrele being no exception (Hansen, 2015).

The distribution of stone sceptres indicates a different route, namely, through the Cucuteni-Trypillia region and the Funnel Beaker culture areas in Poland. This route is interesting because it has been suggested before that the tradition of making exceptionally long flint blades and thin-butted flint axes spread through this route to Scandinavia (cf. Anthony, 2007, p. 247; Kadrow, 2016; Klimscha, 2007). The flint blades that distributed through the Funnel Beaker culture in Poland could measure up to 34 cm in length (Migal, 2006), and hoards with long blades are known also from Southern Scandinavia and Norway (Ebbesen, 1982; Nielsen, 2017a). However, the toggling harpoons do not seem to follow this trail. It is, of course, possible that the harpoon technology was adopted by para-Neolithic groups (i.e. Neman culture) in Poland, and that it spread through such groups to Northern Germany, but there is presently no evidence from para-Neolithic sites that suggests such a specific scenario (e.g. Nowak, 2017; 2021). The Danubian trail mentioned above therefore seem more plausible concerning the northern spread of toggling harpoons.

The westward spread of copper technology to Central Europe in the early fourth millennium BCE has by some scholars been connected to a collapse of Eneolithic societies in Southeastern Europe around c. 4100 cal BCE (Anthony, 2007, p. 228; Klassen, 2014, pp. 239–247; Price & Gebauer, 2017, pp. 142–143). Although this transitional period is still poorly understood (cf. Roberts et al., 2021, p. 42), it seems nonetheless to have had a notable demographic impact on Central Europe (Müller, 2015; Windler et al., 2013). According to a model presented by Müller (2015, p. 209, Figure 17.7), there was a relative increase in population in Central Europe of c. 0.5 million and an equally large decrease in Eastern Europe during the centuries after 4500 cal BCE. As argued by Petrequin (1993, p. 45), there were several "traditional boundaries" in Central Europe during this period, and the presence of such territorial limits can explain why the toggling harpoon technology did not distribute even further west, nor to the northeast and Baltic region. Klassen, Cassen, and Pétrequin (2012) demonstrated how the spatial distribution of jade axes (western region) and copper and gold (eastern region) reflected these regional boundaries in the period c. 4800–3800 cal BCE. Yet the toggling harpoon technology seem to have spread to Central Europe at the very end of this development, and there is a notable "gap" in the data presented here, between the Gumelniţa-Cucuteni-Trypillia-Sredny Stog periods, and the Eneolithic in Slovenia and the Horgen culture further west.

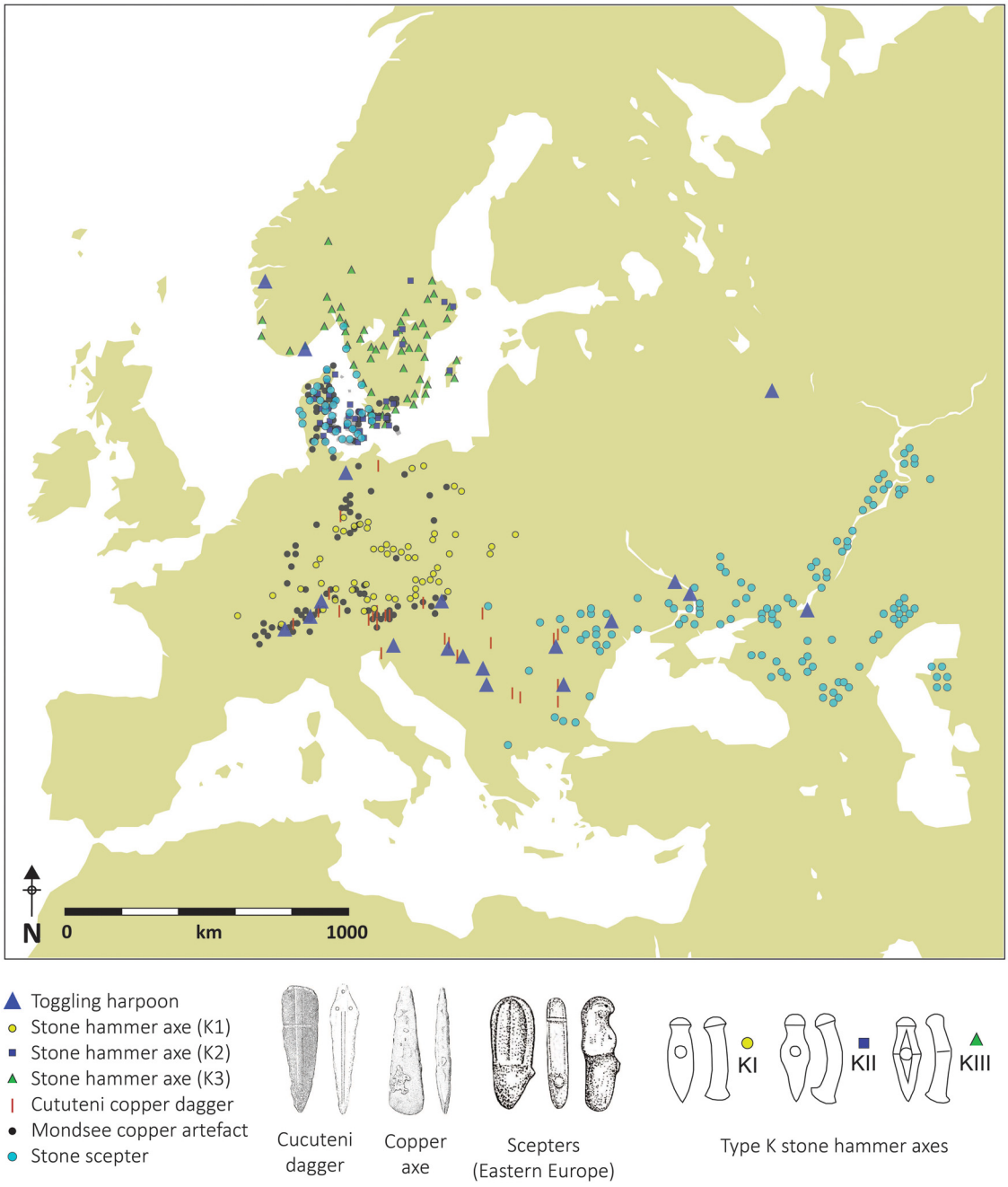

Figure 7: Distribution map of artefact types discussed in the article (see legend). Battle-axes (i.e. Stone hammer axes) after Zápotocký (1992, pp. 529–531, Tafel 129–131) and Ebbesen (1998, p. 89, Figure 13), copper artefacts after Klassen (2001, p. 63, Figure 9; 2014, pp. 229, 242, Figure 134) and Nielsen (2016, p. 160, Figure 7). Stone sceptres after Dergachev (2000, pp. 307–308, Figure 15, Map 16), Ebbesen (1988, pp. 11–13, Figures 5–7), Glob (1952, Figures 83, 85, 87), Hartz (2015), and Hinsch (1955). Note that example illustrations of artefacts are not shown with correct measurements. Figure by Svein V. Nielsen.

7 Catching Big Fish in the Past and Present

Fish bones found at the sites with toggling harpoons discussed above indicate consumption of large fish species, in particular Wels catfish at inland sites and Bluefin tuna at coastal sites (Figure 8). Wels catfish were documented at Pietrele in Romania, showing that fishing had played an important role in the household economies there (Hansen, 2015, p. 285). As pointed out by Benecke et al. (2013), fishing was probably

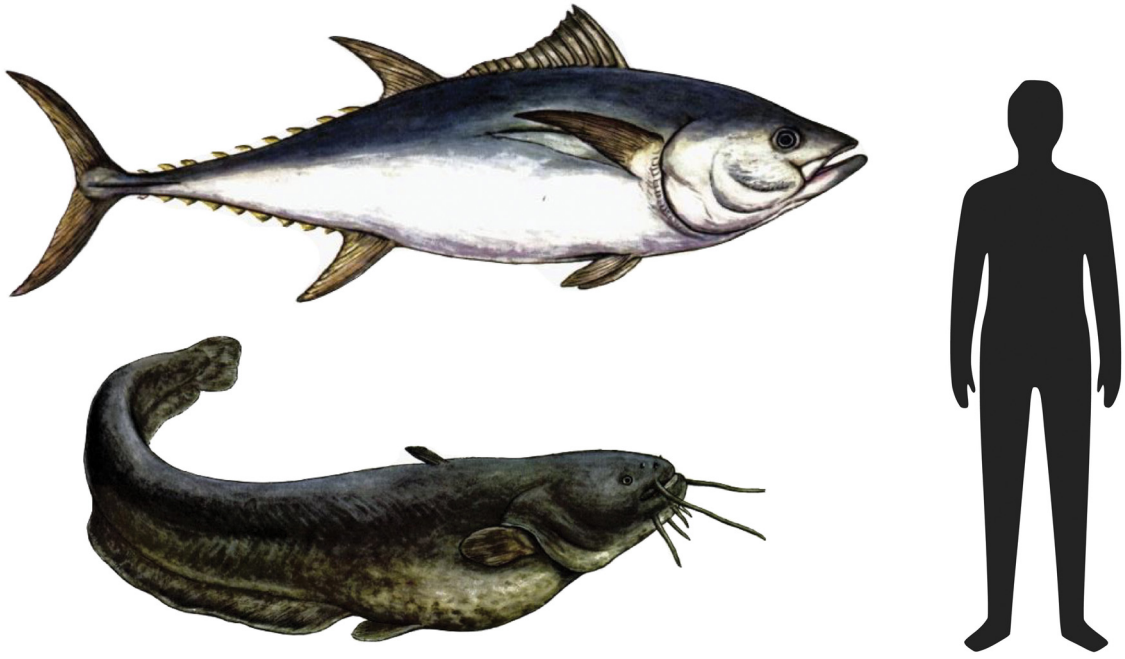

Figure 8: Atlantic Bluefin tuna (upper) and Wels catfish (below) (from Røise, 1962, pp. 29, 47, Figures 26 and 121). Approximate sizes for large individuals and an adult person. Figure by Svein V. Nielsen.

an activity for specialists at and around these tell settlements, and the toggling harpoons were therefore likely part of a tool kit designed specifically for such catchments. Bones from Wels catfish were also well represented at the Horgen culture sites surrounding Lake Federsee in Southern Germany (Torke, 1993), and "an increase in deliberate capture of larger individuals" has been documented on Swiss lake sites at the transition to the Pfyn period (3900–3500 cal BCE) (Schibler, Jacomet, Hüster-Plogmann, & Brombacher, 1997, p. 566). While food waste was not documented at the grave site Ostorf-Tannenwerder, isotopic values from human bones showed fresh water fish had been a main food source (Lübke et al., 2009). At Gröninge in Western Sweden, and at Alveberget and Jortveit in Norway, tuna was among the primary target species.

Bluefin tunas weighing at least 70 kg were butchered at Alveberget (Mansrud & Berg-Hansen, 2021), while the bones from Sandhem indicated butchering of tunas of about 1 m in length (L. Jonsson in Hernek et al., 2004, p. 31). The largest tunas from Jortveit were estimated to c. 150 kg, but many bones found at Jortveit could represent "failed catches" rather than consumption (Nielsen & Persson, 2020, p. 16). As we know from recent history that schools of tunas can easily damage fishing gear (e.g. MacKenzie & Myers, 2007), it is only reasonable to expect that some fish died and sunk to the bottom of the bay at Jortveit with harpoons still dislodged inside them.

In order to gain an impression of how toggling harpoons were used to catch Bluefin tuna in the distant past, a turn to more recent times can be helpful. In the early twentieth century, spawning areas for Bluefin tuna in Europe was in the Black Sea, the Levantine Sea, the Sicily channel, the Tyrrhenian Sea, and in the Balearic Sea (MacKenzie & Mariani, 2012). In the Mediterranean, evidence of Bluefin tuna consumption dates as far back as the Mousterian period (Brown, Fa, Finlayson, & Finlayson, 2011), and from more recent times, we know that Bluefin tuna was a vital economic factor to communities, for instance at the Maldives (Andrews et al., 2022; Cort & Albuanza, 2019; Joseph, 1998; Perlès, 2016). The diversity of tuna fishing traps in the Mediterranean from more recent times has been documented in detail (e.g. Di Natale, 2012a), and Perlès (2016, p. 52) suggested that fishing traps were used for Bluefin tuna fishing in the Mediterranean already in the Final Mesolithic period (Pickard & Bonsall, 2004, p. 283).

The Mediterranean Bluefin tuna has its primary feeding area along the Norwegian coast, where it migrates primarily between day 200 and 350 (July–December) (Di Natale, 2012b, p. 110; Nøttestad, Boge,

& Ferter, 2020; Tangen, 2008). A variety of sizes feed in the North Sea while smaller fish (mean size: 2.0 m/200 kg) were usually caught in the Skagerrak Sea and Kattegat Sea. The base data in question stem from direct observations of tunas and historical sources documenting catches, particularly from the boom in tuna fishery in Norway and Western Sweden in the early twentieth century (Bennema, 2018).

7.1 Historical Sources

Toggling harpoons have been used for both tuna fishing and whaling in many regions on the globe (Fielding, 2014; Fitzhugh, 2001; Ickerodt, 2013; Kaplan, 1953; Losey & Yang, 2007; Olsen, 1994; Yesner, 1980). The design of the toggling harpoons enables them to penetrate the skin of a prey, detach from its shaft, expand laterally inside the flesh, to be kept tight by a line or rope. The expansion enabled by the proximal twist, also known as the "feather" or "wing" (Birket-Smith, 1959, p. 82), compensates the lack of barbs (also described by Alver, 1986; Lindquist, 1994b, p. 1097). Some scholars have therefore referred to the toggling harpoon as a "sophisticated sort of hook" (Christensen, Legoupil, & Pétillon, 2016, p. 248). Little is currently known of where and when the modern toggling harpoon used in Norway was developed, but it seems clear that it was not adapted from the Inuit by European blacksmiths in the nineteenth century (which was proposed by Christensen et al., 2016, p. 246). In 1762, the Norwegian priest and topographer Hans Strøm already described an iron harpoon called "skutel," which was then widespread among fishers on the northwest coast of Norway:

> This tool consists of an iron rod, which is one ell long, thick in the upper part and hollow, but narrow and pointed below, and equipped with a feather, which is tied to the rod with a thread (...). The feather is not pointed, but oval-rounded, thin, and sharp; it is slightly thinner and narrower in the middle part, where it is tied to the rod, rather than in both ends. In the hollow end of the iron rod, a wooden rod is inserted, 2 to 2 fathoms long, where a long rope is also tied (Strøm, 1762, p. 455, translated by the authors. Note that 1 fathom equals 1.8288 m).

As far as we know, the "skutel" was used for Bluefin tuna fishing in Norway from the eighteenth to the early twentieth century. Though Lindquist (1994a) has argued that the study of fishing in history is problematic because the name of fish species changed throughout history – partly because some fish names were adjectives and described either the behaviour or physiology of the fish (Nordgaard, 1912) – there are sources testifying how Bluefin tuna fishing was practiced in Norway during that period (Table 3). In short, the fishing took place in July–December in connection with herring fishery. The fish were caught near the coast from small boats by use of harpoons, but also fishhooks, seine nets, or lines were used (Abrahamsen, 1983; Christoffersen, 1984; Iversen, 1937; Langen, 1959; Midgaard & Tande, 1953; Næsheim, 1978; Rathke, 1907; Rød Olavesen, 1985; Schønwetter, 1988; Steinsnes, 1956; Strøm, 1762; Tangen, 2008). The type of line mentioned here refers to either "line" or "bakke" in Norwegian, describing a string of hooks with bait sunk into the sea. On some occasions, herring or sprat were thrown at sea as bait to attract tuna if shoals were spotted. Seine nets (i.e. which are characteristic of the large scale tuna fisheries in the post-war period) were used on one occasion only in the early twentieth century, as part of a planned experiment with economic incentives (Tangen, 2008). On one occasion, tunas were also closed off inside a bay and harpooned with a technique developed mainly for coast near whaling (Kalland, 2014; Rathke 1907). In accordance with Pickard and Bonsall's (2004, p. 274) classification of fishing activities, the Bluefin tuna fishing described here would count as "inshore fishing."

In historical times, rumour of tuna fishing quickly spread within fisher-farmer communities in Southern Norway, and both tuna and small whales were distributed on local markets, where people from near and far gathered. Incentives for hasty distribution in markets were economic as well as health related, because consumption of spoiled tuna meat can cause scombrotoxic food poisoning (or histamine fish poisoning) (Attaran & Probst 2002). Scombrotoxic poisoning is not lethal, but does create urticarial, allergy like rashes in the face and neck regions c. 10 min to 2 h after consumption. Other symptoms include nausea, vomiting, diarrhoea, cramps, and hypotension (McLauchlin, Little, Grant, & Mithani, 2006). Unfortunately, we know

Table 3: References to eighteenth to twenty-first century coast near fishing events of Bluefin tuna in Norway

Reference	Period	Area of Norway	Event
Strøm (1762, pp. 455–456)	Eighteenth century	Mørekysten (northwestern coast)	When tuna was spotted on the fjord, 2 or 3 fishers took one small boat, wherein one rowed; one threw herring on the sea for bait, and one stood in the back holding the spear with a toggling harpoon attached in one hand and the rope in the other. When the tuna was close enough, he pierced the harpoon into the tuna. If hit deep enough, the harpoon would twist, the feather would fasten, and the spear would float naturally. The rope was tied to the boat, and the tuna was caught by the fishers when exhausted
Rathke (1907, p. 66)	1800–1802	Skogsvåg (central western coast)	A few hundred tuna caught inside a closed bay by use of several small boats and large fishing nets (Norwegian: not), and then caught with harpoons. Same technique as used for small whales
Steinsnes (1956, p. 79)	Early twentieth century	Ryfylke (southwestern coast)	Tunas caught in connection with herring fishery. Schools of tuna were attracted to the herring, and single tunas were caught from small boats using harpoons. The rope was tied to a floating device (Norwegian: kagg), which was thrown into the water once the tuna was pierced. The fishers had to row after the tuna, and they could catch it when exhausted
Abrahamsen (1983, pp. 57–58)	Early twentieth century	Sandøya (Skagerrak coast)	Tuna was caught using line, i.e. a fishing line with a row of hooks (Norwegian: bakke, langline)
Tangen (2008, p. 80)	1922–1923	Oslo fjord	Tuna was caught using a seine net not specialised for tuna catchment. 100 tunas were caught in 1923
Rød Olavesen (1985, p. 239)	1920–1930s	Østfold (eastern Oslo fjord)	Tuna (60–100 kg) caught occasionally from small boats using harpoons
Tangen (2008, p. 80)	1925	Along the coast	125 tunas were caught using harpoon rifle and hooks
Iversen (1937, p. 119)	A long time ago	Lygrefjorden (central western coast)	Fishers would attract tunas by throwing sprat from small boats. When close enough, the tuna would be pierced with harpoon and the rope was attached to a floating device (Norwegian: en bunt glasskuler). Fishers would then sell these tunas in the markets
Midgaard and Tande (1953, p. 382)	1940s	Sannidal and Skåtøy (Skagerrak coast)	Tunas were regularly caught by fishers
Schønwetter (1988, pp. 91–92)	1949	Larvik (Skagerrak coast)	Tunas were caught from motorboats using harpoons
Christoffersen (1984, p. 126)	1950–1980s	Langesund (Skagerrak coast)	Sports fishing of tunas using motorboats, rod and hook, or harpoon

little concerning food preservation techniques in the Neolithic beyond the more obvious cooking and short-term storage in ceramic or organic vessels. Studies of lipid residues on Neolithic vessels have found that some pots were used to contain meat or fat from seals, but this is likely evidence of food preparation and not preservation (Koch, 1998; Østmo, 2008). One experimental study found that Funnel Beaker type pots were functional for fermentation processes but encouraged bacterial and fungal growth as containers (Schenk,

2014). This does not rule out the practice of fish fermentation in the distant past as well, which is mentioned in Norwegian and Swedish written sources from the fourteenth century AD and onwards (Riddervold & Heuch, 1999; Boethius, 2016). In the case of the Central European lake settlements, Greif (1997, p. 77) suggested that fish meats could have been preserved by immersion in frozen lakes and rivers.

8 Creolization Processes in Southern Norway

The spread of toggling harpoons in Europe during the fourth millennium BCE reflects a process of creolization of harpoon technology between societies practicing different economic specialisations. Technological innovations are social innovations, not only in their sense of being "immaterial" (Furholt, 2021), but even physically and therefore also spatially. The Neolithic sites in Scandinavia with evidence of Bluefin tuna fishing are spread primarily along the coast from Eastern Norway to Western Sweden. As the activity emerged in the mid-fourth millennium BCE, it coincides with the development of early farming economies within the same geographical regions (Nielsen, 2021b; Østmo, 2007; Sjögren, 2012), the establishment of specialised hunting stations within the Funnel Beaker culture in Southern Scandinavia (Skaarup, 1973), and the subsequent appearance of previously defined Neolithic forager groups with a predominant marine subsistence. With reference to recent interpretations of the origins of the Pitted Ware culture in Southern Scandinavia (Iversen, 2010; Iversen et al., 2021), and the evidence presented here of the continental origins of toggling harpoon technology and big fish catchments, the theory that new forager strategies in the Neolithic followed Mesolithic traditions is in need of revision. Rather, the spread of toggling harpoon technology provides a concrete example of how creolization and otherwise "flexible" cultural processes in Europe during the fourth millennium BCE affected both the foragers and farmers.

Some of the main artefact types of the Funnel Beaker culture in Southern Scandinavia, namely, stone battle-axes, stone sceptres, and copper artefacts, were imported, re-worked, and re-designed in the Early Neolithic period. As shown by previous research (Hallgren, 2008; Hinsch, 1955; Mikkelsen, 1984; Zápotocký, 1992), the polygonal stone battle-axes types typical in Sweden and Norway were developed on the basis of Central European battle-axes which, in turn, were inspired by copper and stone battle-axes from Southeastern Europe (Childe, 1929, pp. 121–122; Sørensen, 2014, pp. 176–177). The spatial distribution of the battle-axes in Southern Norway is mostly coast near (Nielsen, 2021b, p. 101, Figure 14), and one axe (type K III) was also found close to the Jortveit site (Figure 4). Creolization processes during the Early Neolithic in Southern Norway are also visible in the imported and polished flint axes, which occur in great quantities as stray finds and in fragmented states on settlement sites. Though these axes might have served as symbolic commodities of condensed wealth (e.g. Stafford, 1999, p. 128), finds of polished flint flakes on occupation sites show that imports also served utilitarian purposes. Because of their high frequency in the archaeological record, the Middle Neolithic thick-butted flint axes (Figure 4, down left) are considered the primary axe type of the Pitted Ware culture (Hinsch, 1955). Due to their functionality and durability, such flint axes could also indicate the presence of robust boats (Glørstad, 2005, p. 40), the inspiration of which could have been those used in the initial spread of farming and husbandry to the Danish islands, Southern Sweden, the Baltic Sea islands, and the British Isles (Rowley-Conwy, 2011; Rowley-Conwy et al., 2020).

Neolithic technocomplexes that exhibit an economic orientation in favour of wild food sources are indeed known from many places in Europe, e.g. the Cord-Stamp culture in Southern Norway (c. 3500–2000 cal BCE), Pitted Ware culture (c. 3400–2200 cal BCE) in Sweden and Denmark, Zedmar (c. 4300–2600 cal BCE) and Neman culture (c. 4000–2000 cal BCE) in the Southeastern Baltic, Horgen culture (c. 3500–2750 cal BCE) in Southern Germany and Switzerland, Wartberg culture (c. 3500–2800 cal BCE) in Western Germany, and Seine-Oise-Marne (c. 3400–2700 cal BCE) in Northern France and Southern Belgium (Augereau et al., 2007; Becker, 1951; Gabel, 1958; Iversen et al., 2021; Nowak, 2021; Østmo, 2010; Raetzel-Fabian, 2002). Though research used to portray such groups as Mesolithic survivors in Neolithic times (e.g. Gabel, 1958), there is now growing evidence of integration in a Neolithic world.

Studies of aDNA have identified genetic continuity from Anatolian farmers, and thus the Funnel Beaker culture, in the Pitted Ware culture in Denmark (Allentoft, 2020). However, the analysed sample was found in a waste pit and not a grave, which weakens its association with the site activity. An admixture of farmer and forager ancestry is identified in the Pitted Ware culture in Eastern Sweden, as well as in the Wartberg culture in Germany (Bollongino et al., 2013; Fraser et al., 2018; Immel et al., 2021). In the fourth millennium BCE, admixture with foragers also increased among farmers, in the Baalberge group (4000–3500 cal BCE) (Rivollat et al., 2020), and in the Bernburg group (sample dated to c. 3100 cal BCE) (Brandt et al., 2013). Some studies have nonetheless found that the source of forager admixture in early farmers on the European continent often predate the age of the analysed samples by centuries, which suggests a cautious approach towards interpretations of older studies (e.g. Papac et al., 2021, pp. 4–5). For instance, Fraser et al. (2018, p. 331, Figure 6a) placed the aDNA profile of individuals from Ostorf-Tannenwerder between the Pitted Ware culture and the Bernburg group of the Funnel Beaker culture, but the admixture history within the Ostorf-Tannenwerder samples remains unknown. They could, as mentioned, be centuries older. More importantly, there is archaeological evidence of cross-cultural creolization processes in the material culture between the forager and farmer communities in Norway (Østmo, 2007, 2010), Sweden (Larsson, 2009), and Denmark (Iversen, 2010, 2015), and in contrast to previous models, many Pitted Ware culture groups did practice farming and stock-keeping in addition to foraging (Vanhanen et al., 2019).

In the region of Western Sweden, where the coastal sites Ånneröd, Sandhem, Hakeröd, and Gröninge are situated, studies of stable isotopes have pointed to continued consumption of marine food sources in the Early Neolithic period, but with a significant element of terrestrial and thus agricultural foods in the Middle Neolithic (Ahlström & Sjögren, 2007; Sjögren & Ahlström, 2016). The inland Funnel Beaker culture occupations show a very different and plant based consumption (Sjögren, 2017). The coastal sites themselves do show that consumption of marine foods continued in the Middle Neolithic period, when it also included the Bluefin tuna. In contrast to the northern shore of the Skagerrak Sea, the eastern is one of the three "megalithic regions" in Sweden. A total of 51 dolmens are documented in Western Sweden, a majority of which were located close to the Neolithic shore (Sjögren, 2003). Dolmens are, however, nearly absent from the northern Skagerrak shore, where Jortveit and Alveberget are situated (cf. Rassmann & Schafferer 2012, p. 112, Figure 3). The closest megaliths to Jortveit and Alveberget are located at Holtenes in the inner Oslo fjord, and at Skjeltorp just north of Bohuslän (Østmo, 1982, 2007). In the floor layers at Holtenes III and Skjeltorp, excavations discovered arrowheads of flint and slate, which according to Østmo (2007, p. 133) suggested that the Funnel Beaker culture "was following local customs in terms of point technology." Polished slate arrowheads were found at every site mentioned here with finds of Bluefin tuna bones (Alin, 1955, p. 223; Hernek, 2007, p. 201; Mansrud & Berg-Hansen, 2021, p. 876, Figure 6; Nielsen & Persson 2020, p. 4, Figure 2d; Särlvik, 1976, p. 9).

Considering the state of the evidence at hand, to say precisely how knowledge of toggling harpoon technology reached the Skagerrak coast settlements in the mid-fourth millennium BCE is of course challenging. One aspect of these societies is, as mentioned above, their capacities to travel long distances along the coast, which is a key component in order to understand how knowledge and information was passed on. The distribution of Early and Middle Neolithic artefacts that we know were produced in either Norway or Sweden, such as the arrowheads and knives made of polished slate that are found in Southern Scandinavia, could be another reflection of these interactions (Ebbesen, 1981; Hallgren, 2012; Sørensen, 2014, p. 176; Taffinder, 1998). Though trade was an integrated part of such voyages, there is no doubt, considering historical and ethnographic data (e.g. Helms, 1988), that a myriad of incentives were important to the people who travelled long distances in the Neolithic.

In addition to representing an abundance of food for a fully or partly farming-based society, the share size of Bluefin tuna and Wels catfish also point to non-utilitarian usage of fish (Ritchie et al., 2021). Like documented in historical times, both whaling and Bluefin tuna fishing within the studied region of Scandinavia was likely a communal activity in the Neolithic, and the massive amounts of meat gained during the season probably encouraged ritual activities and feasting. There is currently no evidence of ritual activity at Jortveit, but at some of the midden sites in Western Sweden, field observations show that the ground was

sometimes coloured with red ochre before organic materials were deposited (Jonsson, 2005). Thus, it seems at least plausible that there was an aspect of ritualized social behaviour inherent to the Bluefin tuna fishing in Scandinavia, which in general is characteristic of the Neolithic period (Andersen, 2000; Fischer, 2002; Jennbert, 1984; Østmo, 2007; Rasmussen, 1984; Vanhanen et al., 2019).

9 Conclusion

The appearance of toggling harpoons and Bluefin tuna fishing in the Scandinavia Neolithic, more precisely along the coast north and east of the Skagerrak Sea reflects well-organised fisher-farmer societies who used a "creolized" fishing technology. The technology was inspired by fishing tools used by contemporary Eneolithic societies on the continent, who used toggling harpoons to catch big fish species, such as Wels catfish. In this study, the toggling harpoon technology that appeared in Central Europe probably around c. 3500 cal BCE has been traced back to Eneolithic societies in Eastern Europe, more precisely the Gumelniţa, Cucuteni-Trypillia, and Sredny Stog cultural complexes. Based on the current state of the evidence, these societies in turn adopted the technology from the societies of the late Vinĉa culture. Being a tool of low "commercial value" compared to other items traded in the fourth millennium BCE in Europe, it is likely that the spread of toggling harpoon technology was a result of cultural negotiation, diversification, and creolization, during long-distance voyages. There is growing evidence today, particularly from the peripheral regions of Neolithic societies in Europe, of creolization processes within populations practicing mixed or mostly foraging based economies. Mixed subsistence have remained paramount through much of prehistory and until historical times (Ahedo, Zurro, Caro, & Galán, 2021), economic differences have not discouraged contact, social networking, or the exchange of novel technologies in prehistory.

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References

Abrahamsen, E. (1983). *Breviks Historielag Årbok 1984*. Skien: Breviks Historielag og Kr. Johnsens Bokbinderi.

Ahedo, V., Zurro, D., Caro, J., & Galán, J. M. (2021). Let's go fishing: A quantitative analysis of subsistence choices with a special focus on mixed economies among small-scale societies. *PLoS One*, *16*, 1–47.

Ahlström, T., & Sjögren, K.-G. (2007). Kvinnan från Österöd – ett tidigmesolitiskt skelett från Bohuslän. *In Situ*, *7*, 47–64.

Alin, J. (1955). *Förteckning över stenåldersboplatser i norra Bohuslän*. Göteborg: Göteborgs Och Bohusläns Fornminnesförening.

Allentoft, M. E. (2020). Genetic six and haplogroup identification of the pitted ware culture human upper jaw from Kainsbakke, Djursland. In L. Klassen (Ed.), *The pitted ware culture on Djursland. Supra-regional significance and contacts in the Middle Neolithic of Southern Scandinavia* (pp. 447–450). Aarhus: Aarhus University Press.

Alver, B. (1986). Bønder veiding på Vestlands-kysten. *Norveg*, *29*, 95–112.

Andersen, N. H. (2000). Cult and rituals in the TRB-culture. *KUML*, *1999*, 49–57.

Andersen, S. H. (1972). Ertebøllekulturens harpuner. *KUML*, *1971*, 73–125.
Andersson, M., Artursson, M., & Brink, K. (2016). Early neolithic landscape and society in South-West scania - new results and perspectives. *Journal of Neolithic Archaeology*, *18*, 23–114.
Andrews, A. J., Di Natale, A., Bernal-Casasola, D., Aniceti, V., Onar, V., Queslati, T., … Tinti, F. (2022). Exploitation history of Atlantic bluefin tuna in the eastern Atlantic and Mediterranean – insights from ancient bones. *ICES Journal of Marine Science*, 1–17.
Anthony, D. W. (2007). *The horse the wheel and language. How Bronze-Age Riders from the Eurasian steppes shaped the modern world*. Princeton: Princeton University Press.
Attaran, R. R., & Probst, R. (2002). Histamine fish poisoning: A common but frequently misdiagnosed condition. *Emergency Medical Journal*, *19*, 474–475.
Augereau, A., Brunet, P., Costa, L., Cottiaux, R., Hamon, T., Ihuel, E., … Sohn, M. (2007). Le Néolithique récent dans le Centre-Nord de la France (3400/3300-2800/2700 av. J.C.): L'avenir du Seine-Oise-Marne en question. *Bulletin de la Société Préhistorique Française Études et Travaux*, *3*, 165–185.
Auler, J. (1994). Bronzezeitliche Harpunen mit Tüllenknebelspitzen. *Archäologie der Schweiz*, *17*, 134–139.
Bakke, G. P. (1933). Stenalderfund i Eide. *Medlemsblad Eide Sognelag*, *1933*, 32–37.
Bakker, J. A. (1979). *The TRB West group. Studies in the chronology and geography of the makers of Hunebeds and Tiefstich Pottery*. Amsterdam: Sidestone Press.
Bakker, J. A. (2010). Is a social differentiation detectable in the TRB culture? *Journal of Neolithic Archaeology*, 1–14.
Bastian, W. (1961). Das jungsteinzeitliche Flachgräber–feld von Ostorf, Kreis Schwerin. Jahrbuch Bodendenkmalpflege in Mecklenburg–Vorpommern, *1961*, 7–130.
Becker, C.-J. (1951). Den grubekeramiske kultur i Danmark. *Aarbøger Nordisk Oldkyndighed og Historie*, 1950, 153–274.
Benecke, N., Hansen, S., Nowacki, D., Reingruber, A., Ritchie, K., & Wunderlich, J. (2013). Pietrele in the lower Danube region: Integrating archaeological, faunal and environmental investigations. *Documanta Praehistica*, *XL*, 175–193.
Bennema, F. P. (2018). Long-term occurrence of Atlantic bluefin tuna Thunnus thynnus in the North Sea: Contributions of non-fishery data to population studies. *Fisheries Reseach*, *199*, 177–185.
Bergsvik, K. A. (2001). Sedentary and mobile hunter-fishers in Stone Age Western Norway. *Arctic Anthropology*, *38*, 2–26.
Bergsvik, K. A., & David, E. (2015). Crafting bone tools in Mesolithic Norway: A regional eastern-related know-how. *European Journal of Archaeology*, *18*, 190–221.
Bergsvik, K. A., Hjelle, K. L., Halvorsen, L. S., Olsen, A. B., & Zinsli, C. (2020). Low-level agriculture on Neolithic Western Norway. In K. J. Gron, L. Sørensen, & P. Rowley-Conwy (Eds.), *Farmers at the Frontier: A Pan-European Perspective on Neolithisation* (pp. 339–362). Oxford: Oxbow Books.
Bettinger, R. L., & Baumhoff, M. A. (1982). The numic spread: Great basin cultures in competition. *American Antiquity*, *47*, 485–503.
Birket-Smith, K. (1959). *The Eskimos*. London: *Methuen & Co. Ltd*.
Bishop, R. R. (2022). Hunter-gatherer carbohydrate consumption: Plant roots and rhizomes as staple foods in Mesolithic Europe. *World Archaeology*, *53*, 1–25.
Bjørn, A. (1932). Et eiendommelig stenaldersfunn fra Sørlandet. *Universitetets Oldsaksamlingen Årbok*, *1930*, 27–35.
Bocquet-Appel, J.-P. (2008). Explaining the Neolithic demographic transition. In J.-P. Bocquet-Appel & O. Bar-Yosef (Eds.), *The Neolithic demographic transition and its consequences* (pp. 35–55). New York: Springer.
Bøe, J. (1934). *Boplassen i Skipshelleren på Straume i Nordhordaland*. Bergen: Bergen Museums Skrifter 17.
Bollongino, R., Nehlich, O., Richards, M. P., Orschiedt, J., Thomas, M. G., Sell, C., … J. Burger. (2013). 2000 years of parallel societies in Stone Age Central Europe. *Science*, *342*, 479–481.
Boethius, A. (2016). Something rotten in Scandinavia: The world's earliest evidence of fermentation. *Journal of Archaeological Science*, *66*, 169–180.
Borić, D. (2015). The end of the Vinča world: Modelling the Neolithic to copper age transition and the notion of archaeological culture. In S. Hansen, P. Raczky, A. Anders, & A. Reingruber (Eds.), *Neolithic and Copper Age between the Carpathians and the Aegean Sea. Chronologies and technologies from 6th to 4th millennium BCE*, (pp. 177–237). Bonn: Verlag Marie Leidorf GmbH.
Brandt, G., Haak, W., Adler, C. J., Roth, C., Szecsenyi-Nagy, A., Karimnia, S., … K. W. Alt. (2013). Ancient DNA reveals key stages in the formation of central European mitochondrial genetic diversity. *Science*, *342*, 257–261.
Bronk Ramsey, C, Van der Plicht, J, & Weninger, B. (2001). "Wiggle Matching" Radiocarbon Dates. Radiocarbon, *43*(*2A*), 381–389. doi: 10.1017/S0033822200038248.
Brown, K., Fa, D. A., Finlayson, G., & C. Finlayson. (2011). Small game and marine resource exploitation by Neanderthals: The evidence from Gibraltar. In N. F. Bicho, J. A. Haws, & L. G. Davis (Eds.), *Trekking the shore. Chaning coastlines and antiquity of coastal settlement* (pp. 247–272). New York: Springer.
Bryn, A., Strand, G., Angeloff, M., & Rekdal, Y. (2018). Land cover in Norway based on an area frame survey of vegetation types. *Norges Geografiske Tidsskrift*, *72*, 131–145.
Budja, M., & Mlekuž, D. (2010). Lake or floodplain? Mid-Holocene settlement patterns and the landscape dynamic of the Ižica floodplain (Ljubljana Marshes, Slovenia). *The Holocene*, *20*, 1269–1275.

de Capitani, A., Deschler-Erb, S., Leuzinger, U., Marti-Grädel, E., & J. Schibler. (2002). *Die Jungsteinzeitlische Seeufersiedlung Abron Bleiche 3: Funde*. Frauenfeld: Archäologi im Thurgau 11, Department für Erziehung und Kultur des Kantons Thurgau.

Childe, V. G. (1929). *The Danube in Prehistory*. Oxford: Clarendon Press.

Choyke, A. M. (2015). Continuities by the hearth? Bone objects from the Middle Copper Age Boleráz settlement at Győr–Szabadrét-domb, Hungary. In A. Kőrösi & Á. Szotyori-Nagy (Eds.), *Hungarian Grey, Racka, Mangalitsa Papers Presented at the International Conference Honouring János Matolcsi, 25–26 November 2013* (pp. 239–254). Budapest: Museum and Library of Hungarian Agriculture.

Christensen, M., Legoupil, D., & Pétillon, J.-M. (2016). Hunter-gatherers of the old and new worlds: Morphological and functional comparison of osseous projectile points. In M. C. Langley (Ed.), *Osseous projectile weaponry: Towards an understanding of pleistocene cultural variability* (pp. 237–252). Oxford: Springer.

Christoffersen, H. (1984). *Jakt og Fiske i Telemark*. Skien: Oluf Rasmussens forlag.

Cort, J. L., & Albuanza, P. (2019). *The bluefin tuna fishery in the bay of biscay. Its relationship with the crisis of catches of large specimens in the East Atlantic fisheries from the 1960s*. Cham: Springer.

Cristiani, E., Dimitrijević, V., & Vitezović, S. (2016). Fishing with lure hooks at the Late Neolithic site of Vinča – Belo Brdo, Serbia. *Journal of Archaeological Science*, *65*, 134–147.

Čufar, K., & Kromer, B. (2004). Radiocarbon dating of tree-ring chronologies from Hočevarica. In A. Velušček (Ed.), *Hočevarica* (pp. 281–285). Ljubljana: Opera Instituti Archaeologici Sloveniae 8.

Čufar, K., Kromer, B., Tolar, T., & Velušček, A. (2010). Dating of 4th millennium BC pile-dwellings on Ljubljansko barje, Slovenia. *Journal of Archaeological Science*, *37*, 2031–2039.

Dergachev, V. A. (2000). The migration theory of Marija Gimbutas. *Journal of Indo-European Studies*, *28*, 257–339.

Dergachev, V. A. (2007). *On scepters, horses and war: Studies in defense of the migration concept M. Gimbutas, Hestor-History*. Moscow and St. Petersburg: Institute of Cultural Heritage of the Moldavian Republic. (In Russian)

Dyrvik, S., Fossen, A. B., Grønlie, T., Hovland, E., Nordvik, H., & S. Tveite (1979). *Norsk Økonomisk Historie 1500–1970*. Bergen: Universitetsforlaget.

Ebbesen, K. (1981). Offerfundet fra Suldrup i Himmerland. *Fra Himmerland og Kjær Herred*, 91–109.

Ebbesen, K. (1982). Flintflækker som offergave. *Fra Holbæk Amt. Årbog for Historisk Samfund for Holbæk Amt* (pp. 7–26). Holbæk: Historisk Samfund for Holbæk Amt.

Ebbesen, K. (1988). Tidligneolitiske tapkøller. *Aarbøger for Nordisk Oldkyndighed og Historie*, *1987*, 7–26.

Ebbesen, K. (1998). Frühneolithische streitäxte. *Acta Archaeologica*, *69*, 77–112.

Eigeland, L. (2015). *Maskinmennesket i Steinalderen. Endring og Kontinuitet i Steinteknologi fram mot Neolitiseringen av Øst-Norge*. Oslo: Avhandling for graden Ph.d. Universitetet i Oslo.

Enghoff, I. B., MacKenzie, B. R., & Nielsen, E. E. (2007). The Danish fish fauna during the warm Atlantic period (ca. 7000-3900 bc): Forerunner of future changes? *Fisheries Research*, *87*, 167–180.

Faltinsen, T. (2018). *Skipshelleren. En Analyse av Fiskebein fra de Mesolittiske Lagene*. Bergen: Masteroppgave i arkeologi, Universitetet i Bergen.

Fernandes, R., Grootes, P., Nadeau, M. J., & Nehlich, O. (2015). Quantitative diet reconstruction of a Neolithic population using a Bayesian mixing model (FRUITS): The case study of Ostorf (Germany). *American Journal of Physical Anthropology*, *158*, 325–340.

Fielding, R. (2014). The liminal coastline in the life of a whale: Transition, identity, and food-production in the Eastern Caribbean. *Geoforum*, *54*, 10–16.

Fischer, A. (2002). Food for feasting. In A. Fischer & K. Kristiansen (Eds.), *The Neolithisation of Denmark – 150 years of debate* (pp. 343–393). Sheffield: Sheffield Archaeological Monographs 12 J.R. Collis Publications.

Fitzhugh, B. (2001). Risk and invention in human technological evolution. *Journal of Anthropological Archaeology*, *20*, 125–167.

Fort, J., Mercè Pareta, M., & Sørensen, L. (2018). Estimating the relative importance of demic and cultural diffusion in the spread of the Neolithic in Scandinavia. *Journal of the Royal Society Interface*, *15*, 1–11.

Frank, C., & Pernicka, E. (2012). Copper artefacts of the Mondsee group and their possible sources. In M. S. Midgley & J. Sanders (Eds.), *Lake Dwellings after Munro* (pp. 113–138). Leiden: Sidestone Press.

Fraser, M., Sanchez-Quinto, F., Evans, J., Storå, J., Götherström, A., Wallin, P., … Jakobsson, M. (2018). New insights on cultural dualism and population structure in the Middle Neolithic Funnel Beaker culture on the island of Gotland. *Journal of Archaeological Science Reports*, *17*, 325–334.

Furholt, M. (2021). Innovations and social heterogeneity in Late Neolithic Europe. In F. Klimscha, S. Hansen, & J. Renn (Eds.), *Contextualising ancient technology* (pp. 185–195). Berlin: Berlin Studies of the Ancient World 73, University of Berlin.

Gaastra, J. S., de Vareilles, A., & Vander Linden, M. (2022). Bones and Seeds: An integrated approach to understanding the spread of farming across the Western Balkans. *Environmental Archaeology*, *27*, 44–60.

Gabel, W. C. (1958). European secondary Neolithic cultures. A study of prehistoric culture contact. *The Journal of the Royal Anthropological Institute of Great Britain and Ireland*, *88*, 97–107.

Gallagher, E., Shennan, S., & Thomas, M. G. (2019). Food income and the evolution of forager mobility. *Science Reports*, *9*, 1–10.

Gaspari, A. (2008). Bronastodobno kolišče Mali Otavnik pri Bistri na Ljubljanskem barju. *Arheolo Arheološki Vestnik*, *59*, 57–89.

Gebauer, A. B., Sørensen, L. V., Taube, M., & Wielandt, D. K. P. (2020). First metallurgy in Northern Europe: An Early Neolithic crucible and a possible tuyère from Lønt, Denmark. *European Journal of Archaeology*, *24*, 1–21.

Gimbutas, M. (1988). Chronologies of Eastern Europe: Neolithic through Early Bronze Age. In R. W. Ehrich (Ed.), *Chronologies in old world archaeology* (pp. 395–415). Chicago: University of Chicago Press.

Glob, P. V. (1952). *Danske Oldsager II. Yngre Stenalder*. København: Gyldendalske Boghandel.

Glørstad, H. (2005). Tangen - En neolittisk boplass fra Kragerø kommune i Telemark. *Viking*, *LXVIII*, 25–54.

Glørstad, H. (2009). The Northern Province? The Neolithisation of Southern Norway. In H. Glørstad & C. Prescott (Eds.), *Neolithisation as of history mattered. Processes of Neolithisation in North-Western Europe* (pp. 135–168). Lindome: Bricoleur Press.

Glørstad, H., Solheim, S., & Persson, P. (2020). Culture and context of the Scandinavian Neolithic. In K. J. Gron, L. Sørensen, & P. Rowley-Conwy (Eds.), *Farmers at the frontier. A Pan-European perspective on Neolithisation* (pp. 363–379). Oxford & Philadelphia: Oxbow Books.

Glørstad, H., & Sundström, L. (2014). Hamremoen – An enclosure for the hunter-gatherers? In M. Furholt, M. Hinz, D. Mischka, G. Noble, & D. Olausson (Eds.), *Landscapes, histories and societies in the Northern European Neolithic* (pp. 29–48). Kiel: Frühe Monumentalität und soziale Differenzierung 4. Institut für Ur- und Frühgeschichte der CAU Kiel.

Greif, T. (1997). *Prazdogovinska kolišča na Ljubljanskem barju*. Ljubljana: Arheo 18/1997.

Gron, K. J., Gröcke, D. R., Larsson, M., Sørensen, L., Larsson, L., Rowley-Conwy, P., & Church, M. J. (2017). Nitrogen isotope evidence for manuring of Early Neolithic Funnel Beaker Culture cereals from Stensborg, Sweden. *Journal of Archaeological Science Reports*, *14*, 575–579.

Gron, K. J., Sørensen, L., & Rowley-Conwy, P. (2020). Conclusion. The Early Neolithic origins of agriculture. In K. J. Gron, L. Sørensen, & P. Rowley-Conwy (Eds.), *Farmers at the Frontier* (pp. 443–447). Oxford & Philadelphia: Oxbow Books.

Gross, E., van Willigen, S., Villa, I. M., Schaeren, G. F., Vergani, R. C., Nielsen, E. H., … Hildbrand, E. (2021). Diversity of resources and volatility of metallurgical networks—multi-methodological provenance analysis of neolithic and EBA-copper-artefacts from Switzerland and eastern France. *Archaeological Anthropological Science*, *13*, 1–34.

Hafner, A., & Suter, P. J. (2003a). Das Neolithikum in der Schweiz -Katalog - und Tafelteil. *Journal of Neolithic Archaeology*, *3*, 1–34.

Hafner, A., & Suter, P. J. (2003b). Das Neolithikum in der Schweiz. *Journal of Neolithic Archaeology*, *3*, 1–75.

Hallgren, F. (2008). *Identitet i Praktik. Lokala, Regionala och Överregionala Sociala Sammanhang Inom Nordlig Trattbägarkultur*. (PhD dissertation). Coast to Coast Project, Department of Archaeology and Ancient History, Uppsala University, Uppsala.

Hallgren, F. (2012). A permeable border – Long-distance contacts between hunters and farmers in the Early Neolithic of Scandinavia. In C. Damm & J. Saarikivi (Eds.), *Networks, Interactions and Emerging Identities in Fennoscandia and Beyond. Papers from the Conference Held in Tromsø, Norway, October 13-16 2009* (pp. 139–154). Helsinki: Suomalais-Ugrilainen Seura Helsinki 2012, Memoires De La Societe Finno-Ougrienne.

Hansen, S. (2015). Pietrele – A lakeside settlement, 5200-4250 BC. In S. Hansen, P. Raczky, A. Anders, & A. Reingruber (Eds.), *Neolithic and Copper Age between the Carpathians and the Aegean Sea. Chronologies and Technologies from the 6th to 4th Millennium BC* (pp. 273–293). Bonn: Archäologie in Eurasien 31.

Hansen, S., Toderas, M., Wunderlich, J., Beutler, K., Benecke, N., Dittus, A., … Vachta, T. (2014). Pietrele am, Lacul Gorgana". Bericht uber die Ausgrabungen in der neolithischen und kupferzeitlichen Siedlung und die geomorphologischen Untersuchungen in den Sommern 2012–2016. *Eurasia Antiquq*, *20*, 1–116.

Hartz, S. (2015). Opfer für die Götter? Zapfenkeule aus der Ostsee. *Archäologie in Deutschland*, *2*, 5.

Hartz, S., Lübke, H., & Terberger, T. (2007). From fish and seal to sheep and cattle: New research into the process of neolithisation in northern Germany. In A. Whittle & V. Cummings (Eds.), *Going Over: The Mesolithic-Neolithic Transition in North-West Europe* (pp. 567–594). British Academy Scholarship Online.

Helms, M. W. (1988). *Ulysses' sail. An ethnographic odyssey of power, knowledge, and geographical distance*. Princeton: Princeton University Press.

Hernek, R. (2007). Sandhem. Presentation och tankar kring en nyfunnen kökkenmödding. In M. Lönn & P. Claesson (Eds.), *Vistelser Vid Vatten. Gropkeramiska Platser Och Kokgropar Från Bronsålder Och Järnålder* (pp. 181–232). Göteborg: Riksantikvarieämbetet, Arkeologiska Undersökningar, Skrifter nr. 69.

Hernek, R., Jonsson, L., & Streiffert, J. (2004). *Boplatser och kökkenmöddingar från yngre neolitikum. Arkeologisk utredning och förundersökning inför rätning av Bohusbanan. Bohuslän, Skee socken, Hedängen 3:6, 3:10 och Sandhem 3:6, RAÄ 1617 och 1618*. Mölndal: Riksantikvarieämbetet UV Väst Rapport 2004:22.

Herteig, A. E. (1973). *Kaupangen på Borgund*. Bergen: Borgund og Giske Bygdeboknemnd, L/L Boktrykk.

Hinsch, E. (1955). Traktbegerkultur - Megalitkultur. En studie av Øst-Norges eldste, neolitiske gruppe. *Universitetets Oldsaksamlingen Årbok, 1951–1953*, 10–177.

Høgestøl, M., & Prøsch-Danielsen, L. (2006). Impulses of agro-pastoralism in the 4th and 3rd millennia BC on the south-western coastal rim of Norway. *Environmental Archaeoloy*, *11*, 19–34.

Hylland Eriksen, T. (2007). Creolization in anthropological theory and in Mauritius. In C. Stewart (Ed.), *Creolization: History, ethnography, theory* (pp. 153–177). Walnut Creek: Left Coast Press.

Ickerodt, U. F. (2013). Barbed points through time – A hunting weapon between ethnoarchaeological argumentation and functional analysis. In O. Grimm & U. Schmölcke (Eds.), *Hunting in Northern Europe Until 1500 AD* (pp. 113–146). Wackholtz: Schriften des Archäologischen Landesmuseums Band 7.

Immel, A., Pierini, F., Rinne, C., Meadows, J., Barquera, R., Szolek, A., … Krause-Kyora, B. (2021). Genome-wide study of a Neolithic Wartberg grave community reveals distinct HLA variation and hunter-gatherer ancestry. *Communications Biology*, *4*, 1–10.

Iversen, R. (2010). In a world of worlds. The pitted ware complex in a large scale perspective. *Acta Archaeologica*, *81*, 5–43.

Iversen, R. (2015). Creolization processes in the later south Scandinavian Neolithic. In K. Brink, S. Hydén, K. Jennbert, L. Larsson, & D. Olausson (Eds.), *Neolithic Diversities. Perspectices from a Conference in Lund, Sweden* (pp. 58–65). Lund: Acta Archaeologica Lundensia Series in 8, No 65, Lund University.

Iversen, R., Philippsen, B., & Persson, P. (2021). Reconsidering the Pitted Ware chronology. *Praehistische Zeitschrift*, *96*, 1–45.

Iversen, T. (1937). *Utviklingen av Fiske og Fiskemetoder i Norge*. Bergen: John Griegs Boktrykkeri.

Janzon, G. O. (1974). *Gotlands Mellanneolitiske Gravar*. Stockholm: Acta Universitatis Stockholmiensis. Almqvist & Wiksell.

Jennbert, K. (1984). *Den produktiva gåvan. Tradition och innovation i Sydskandinavien för omkring 5300 år sedan*. Lund: Acta Archaeologica Lundensia in 4, No. 6.

Jennbert, K. (2014). The seashore – Beyond monumentality. The case of Pitted Ware coastal sites in southern Sweden. In M. Furholt, M. Hinz, D. Mischka, G. Noble, & D. Olausson (Eds.), *Landscapes, histories and societies in the Northern European Neolithic* (pp. 235–243). Kiel: Frühe Monumentalität und Soziale Differenzierung 4, Institut für Ur- und Frühgeschichte der CAU Kiel.

Jonsson, L. (1988). The vertebrate faunal remains from the Late Atlantic settlement Skateholm in Scania, South Sweden. In L. Larsson (Ed.), *The Skateholm Project I. Man and Environment* (pp. 56–88). Lund: Kungl. Humanistiska Vetenskapssamfundet i Lund.

Jonsson, L. (2002). *Animal bones from the Middle Neolithic site Hakeröd in Bohuslän, Sweden*. Göteborg: ANL-Rapport 2002:1, Institutionen för Arkeologi, Göteborgs universitet.

Jonsson, L. (2005). Bogas – Boops boops (L. 1758) from the Biscay to the North Sea in 2500 BC and 1980 AD. *Munibe* (*Anthropologia-Arkeologia*), *57*, 441–444.

Jonsson, L. (2007). Djurbenen från Sandhem. Tidigare undersökningar av djurben från kökkenmöddingar i Västsverige. In M. Lönn & P. Claesson (Eds.), *Vistelser Vid Vatten. Gropkeramiska Platser Och Kokgropar Från Bronsålder Och Järnålder* (pp. 231–235). Göteborg: Riksantikvarieämbetet, Arkeologiska undersökningar, Skrifter nr. 69.

Joseph, J. (1998). A brief history of Tuna research. *Collected Volumes of Scientific Papers ICCAT*, *50*, 183–193.

Kadrow, S. (2015). The idea of the Eneolithic. In K. Kristiansen, L. Smejda, & J. Turek (Eds.), *Paradigm found. Archaeological theory present, past and future* (pp. 248–262). Oxford: Oxbow Books.

Kadrow, S. (2016). Exchange of people, ideas and things between Cucuteni-Trypillian complex and areas of South-Eastern Poland. In C. Preoteasa & C.-D. Nicola (Eds.), *Cucuteni culture within the European Neo-Eneolithic context* (pp. 649–677). Piatra-Neamt: Bibliotheca Memoriae Antiquitatis XXXVII.

Kadrow, S. (2017). The Danubian world and the dawn of metal ages. In P. Wlodarczak (Ed.), *The past societies. Polish lands from the first evidence of human presence to the Early Middle Ages* (pp. 63–106). Warsaw: Institute of Archaeology and Ethnology. Polish Academy of Science.

Kalland, A. (2014). *Hval og Hvalfangst på Vestlandet 1600–1910*. Oslo: Novus Forlag, Instittet for Sammenlignende Kulturforskning.

Kaplan, S. (1953). Lewis Temple and the hunting of the whale. *The New England Quarterly*, *26*, 78–88.

Karsten, P., & Knarrström, B. (2003). *The Tågerup excavation*. Lund: National Heritage Boad.

Kelly, R. L. (2013). *The lifeways of hunter-gatherers. The foraging spectrum*. Cambridge: Cambridge University Press.

Klassen, L. (2001). Decoding the Riesebusch-copper: Lead-isotope analysis applied to Early Neolithic copper finds from South Scandinavia. *Praehistoriche Zeitschrift*, *76*, 55–73.

Klassen, L. (2014). *Along the road. Aspects of Causewayed enclosures in South Scandinavia and beyond*. Aarhus: Aarhus University Press.

Klassen, L., Cassen, S., & Pétrequin, P. (2012). Alpine axes and early metallurgy. In P. Pétrequin, S. Cassen, M. Errera, L. Klassen, & A. Sheridan (Eds.), *Jade. Grandes Haches Alpines Du Néolithique Européen. Ve et IVe Millénaires Av. J.-C. Tome II* (pp. 1280–1308). Besançon: Presses Universitaires de Franche-Comté.

Klimscha, F. (2007). Die Verbreitung und Datierung kupferzeitlicher Silexbeile in Südosteuropa. *Germania*, *85*, 1–31.

Koch, E. (1998). *Neolithic Bog pots from Zealand, Møn, Lolland and Falster*. Copenhagen: Det Kongelige Nordiske Oldskriftselskab.

Korošec, P., & Korošec, J. (1969). *Fundgut der Pfahlbausiedlungen bei Ig am Laibacher Moor*. Ljubljana: Narodni Muzej.

Kostyleva, E., & Macane, A. (2018). Fishing implements of the Volosovo culture ritual "hoards" from Sakhtysh II (Central Russia). In *Subsistence Strategies in the Stone Age, Direct and Indirect Evidence of Fishing and Gathering* (pp. 144–148). St. Petersburg: Russian Academy of Science, Institute for the History of Material Culture.

Krištofić, V. (2016). Alatke od roga s nalazišta Jakovo – Kormadin iz zbirke Arheološkog muzeja u Zagrebu. *VAMZ*, *3*, 29–57.

Langen, J. (1959). *Norges Fiskerier: Fisker og Fiske i Sjøen*. Oslo: Fabritius og Sønner Forlag.

Larsen, M. F. (2014). Ressursutnyttelse ved kysten. In N. Kolle (Ed.), *Norges Fiskeri- Og Kysthistorie Bind I. Fangstmenn, Fiskerbønder Og Værfolk. Fram Til 1720* (pp. 141–161). Bergen: Fagbokforlaget.

Larsson, Å. M. (2009). *Breaking and making bodies and pots. Material and ritual practices in Sweden in the third millennium BC*. Uppsala: Department of Archaeology and Ancient History, AUN 40.

Larsson, M. (2015). Agency, creolization and the transformation of tradition in the constitution of the earliest Neolithic in southern Scandinavia. In K. Brink, S. Hydén, K. Jennbert, L. Larsson, & D. Olausson (Eds.), *Neolithic Diversities. Perspectives from a Conference in Lund, Sweden* (pp. 75–79). Lund: Acta Archaeologica Lundensia Series in 8, No 65, Lund University.

Lindquist, O. (1994a). *Whales, Dolphins and Porpoises in the Economy and Culture of Peasant Fishermen of Norway, Orkney, Shetland, Faroe Islands and Iceland, ca. 900–1900 AD., and Norse Greenland, ca. 1000–1500A.D.* (Vol. I). (PhD thesis). Faculty of Arts, University of St. Andrew, St. Andrews.

Lindquist, O. (1994b). Whales, Dolphins and Porpoises in the Economy and Culture of Peasant Fishermen of Norway, Orkney, Shetland, Faroe Islands and Iceland, ca. 900–1900 AD., and Norse Greenland, ca. 1000–1500A.D. (Vol. II PT I). (PhD thesis). Faculty of Arts, University of St. Andrew, St. Andrews.

Losey, R. J., & Yang, D. Y. (2007). Opportunistic whale hunting on the Souhtern Northwest Coast: Ancient DNA, artifcat, and ethnographic evidence. *American Archaeology*, *72*, 657–676.

Lübke, H., Lüth, F., & Terberger, T. (2009). Fishers or farmers? The archaeology of the Ostorf cemetery and related Neolithic finds in the light of new data. *Bericht der Romisch-Germanischen Kommission*, *88*, 307–338.

Macāne, A., Nordqvist, K., & Kostyleva, E. (2019). Marmot incisors and bear tooth pendants in Volosovo hunter-gatherer burials. New radiocarbon and stable isotope data from the Sakhtysh complex, Upper-Volga region. *Journal of Archaeological Science Reports*, *26*, 1–12.

MacKenzie, B. R., & Mariani, P. (2012). Spawning of Bluefin Tuna in the Black sea: Historical evidence, environmental constraints and population plasticity. *PLoS One*, *7*, 1–18.

MacKenzie, B. R., & Myers, R. A. (2007). The development of the northern European fishery for north Atlantic bluefin tuna Thunnus thynnus during 1900–1950. *Fishery Research*, *87*, 229–239.

Mallory, J. P. (1991). *In Search of the Indo-Europeans*. London: Thames and Hudson.

Malmer, M. P. (1975). *Stridsyxekulturen i Sverige och Norge*. Lund: Liber Läromedel.

Manning, K., Timpson, A., Colledge, S., Crema, E., Edinborough, K., Kerig, T., & Shennan, S. (2014). The chronology of culture: A comparative assessment of European Neolithic dating approaches. *Antiquity*, *88*, 1065–1080.

Mansrud, A., & Berg-Hansen, I. M. (2021). Animist ontologies in the third millennium BCE? Hunter-gatherer persistency and human–animal relations in Southern Norway: The Alveberget case. *Open Archaeology*, *7*, 868–888.

Margarit, M., Andreescu, R.-R., Modoveanu, K., Mirea, P., & Torcica, I. (2022). Assembling raw materials, techniques and artifacts: Antler industry from the chalcolithic settlement of Vitănești-Măgurice (Romania). *Archaeologica Bulgaria*, *1*, 25–56.

Marston, J. M. (2021). Archaeological approaches to agricultural economies. *Journal of Archaeological Research*, *29*, 327–385.

McLauchlin, J., Little, C. L., Grant, K. A., & Mithani, V. (2006). Scombrotoxic fish poisoning. *Journal of Public Health*, *28*, 61–62.

Midgaard, L., & Tande, T. A. (1953). *Bygdebok for Sannidal og Skåtøy, Bind III*. Kragerø: Naper.

Migal, W. (2006). The macrolithic flint blades of the neolithic times in Poland. In A. Jan & K. Knutsson (Eds.), *Skilled production and social reproduction aspects of traditional stone-tool technologies* (pp. 387–398). Uppsala: SAU Stone Studies 2. Societas Archaeologica Upsaliensis & The Department of Archaeology and Ancient History, Uppsala University.

Mikkelsen, E. (1984). Neolitiseringen i Øst-Norge. *Universitetets Oldsaksamlingen Årbok*, *1982/1983*, 87–128.

Mjærum, A. (2020). The emergence of mixed farming in eastern Norway. *Agricultical History Review*, *68*, 1–21.

Moberg, C. A., & Kaelas, L. (1966). Några av många. Om stenåldersboplatser i Nordhalland, *FYND*, *1966*, 36–44.

Müller, J. (2011). Early pottery in the North – A southern perspective. *Bericht der Romisch-Germanischen Kommission*, *89*, 287–299.

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. Smedja, & J. Turek (Eds.), *Paradigm found. Archaeological theory: present, past and future. essays in honour of Evžen Neustupný* (pp. 200–214). Oxford: Oxbow Books.

Munkenberg, B.-A. (2007). De gropkeramiska boplatsernas miljö. In M. Lönn & P. Claesson (Eds.), *Vistelser Vid Vatten. Gropkeramiska Platser Och Kokgropar Från Bronsålder Och Järnålder* (pp. 105–148). Göteborg: Riksantikvarieämbetet, Arkeologiska Undersökningar, Skrifter nr. 69.

Munro, R. (1890). *The Lake-Dwellings of Europe*. London, Paris and Melbourne: Cassell & Company Limited.

Næsheim, T. S. (1978). *Stavanger i det 19. og 20. Århundre*. Stavanger: Dreyer.

Di Natale, A. (2012a). An iconography of tuna traps. Essential information for the understanding of the technological evolution of this ancient Fishery. *Collected Volumes of Scientific Papers ICCAT*, *67*, 33–74.

Di Natale, A. (2012b). New data on the historical distribution of Bluefin tuna (Thunnus thynnus, L.) in the Arctic Ocean. *Collected Volumes of Scientific Papers ICCAT*, *68*, 102–114.

Nicodemus, A. J. (2014). *Bronze age economies of the Carpathian basin: Trade, craft production, and agro-pastoral intensification*. (Doctoral dissertation). University of Michigan, Michigan.

Nielsen, E. (2016). Neolithic copper artefacts from the Canton of Lucerne (Central Switzerland). *Archäologisches Korrespondenzblatt*, *46*, 149–164.

Nielsen, P. O. (1977). Die Flintbeile Der Frühen Trichterbecherkultur in Dänemark. *Acta Archaeologica.*, *48*, 61–138.

Nielsen, P. O. (1979). De tyknakkede øksers kronologi. *Aarbøger for Nordisk Oldkyndighed og Historie*, *1977*, 5–75.

Nielsen, S. V. (2017a). Evidence of excellence: Re-assessing the status of Neolithic long-blades in Scandinavia. *Bulgarian e-Journal of Archaeology*, *7*, 117–132.
Nielsen, S. V. (2017b). Long blades and phantom cores: A case of long- distance stone tool refitting (Southern Norway). *Lithic Technology*, *42*, 1–12.
Nielsen, S. V. (2020a). *Rapport Arkeologisk Utgravning. Myrfunn fra Jortveit. Rapport 1 av 3. Jortveit, 172/2, Grimstad, Agder*. Oslo: Upublisert rapport/Unpublished report, Arkeologisk seksjon, Kulturhistorisk Museum, Universitetet i Oslo.
Nielsen, S. V. (2020b). *Rapport Arkeologisk Utgravning. Myrfunn fra Jortveit. Rapport 2 av 3. Jortveit, 172/2, Grimstad, Agder*. Oslo: Upublisert rapport/Unpublished report, Arkeologisk seksjon, Kulturhistorisk Museum, Universitetet i Oslo.
Nielsen, S. V. (2020c). *Rapport Arkeologisk Utgravning. Myrfunn fra Jortveit. Rapport 3 av 3. Jortveit, 172/2, Grimstad, Agder*. Oslo: Upublisert rapport/Unpublished report, Arkeologisk seksjon, Kulturhistorisk Museum, Universitetet i Oslo.
Nielsen, S. V. (2021a). A late mesolithic forager dispersal caused pre-agricultural demographic transition in Norway. *Oxford Journal of Archaeology*, *40*, 153–175.
Nielsen, S. V. (2021b). Early farming in Southeastern Norway: New evidence and interpretations. *Journal of Neolithic Archaeology*, *23*, 1–31.
Nielsen, S. V., & Åkerstrøm, J. (2016). Yngre steinalders flint- og steinøkser fra Aust-Agder fylke. *Aust-Agder Arv*, 3–15.
Nielsen, S. V., Åkerstrøm, J., Stokke, J.-S. F., & Eskeland, K. F. (2016). Quartz utilization along the coast of Southern Norway: Results from a Stone Age Survey in East Agder. In H. B. Bjerck, H. M. Breivik, S. Fretheim, I. A. Piana, B. Skar, A. M. Tivoli, & A. F. J. Zangrando (Eds.), *Marine Ventures: Archaeological Perspectives on Human-Sea Relations. Proceedings from the Marine Ventures International. Symposium in Trondheim 2013* (pp. 367–382). Sheffield: Equinox Publishing.
Nielsen, S. V., & Persson, P. (2020). The Jortveit farm wetland: A Neolithic fishing site on the Skagerrak coast, Norway. *Journal of Wetland Archaeology*, *20*, 1–24.
Nielsen, S. V., Persson, P., & Solheim, S. (2019). De-Neolithisation in southern Norway inferred from statistical modelling of radiocarbon dates. *Journal of Anthropological Archaeology*, *53*, 82–91.
Nordgaard, O. (1912). Fiskenavnene i Snorres Edda. *Maal og minne*, *1912*, 54–66.
Nordqvist, B., Jonsson, L., & Johansson, G. (2009). *En Neolitisk Kökkenmödding och en Omgivande Unik Boplats*. Göteborg: UV Väst Rapport 2009:12, Riksantikvarieämbetet.
Nørgaard, H. W., Pernicka, E., & Vandkilde, H. (2021). Shifting networks and mixing metals: Changing metal trade routes to Scandinavia correlate with Neolithic and Bronze Age transformations. *PLoS ONE*, *16*, 1–42.
Nøttestad, L., Boge, E., & Ferter, K. (2020). The comeback of Atlantic bluefin tuna (Thunnus thynnus) to Norwegian waters. *Fishery Research*, *231*, 1–7.
Nowak, M. (2017). Ubiquitous settlers, consequent farmers, and monument builders. In P. Wlodarczak (Ed.), *The past societies. Polish lands from the first evidence of human presence to the Early Middle Ages* (pp. 125–170). Warsaw: Polish Academy of Science.
Nowak, M. (2021). Different paths of Neolithisation of the North-Eastern part of Central Europe. *Open Archaeology*, *7*, 1582–1601.
Nummedal, A., & Bjørn, A. (1930). Boplassfund fra yngre stenalder i Aust-Agder. *Universitetet Oldsaksamlingens Årbok*, *3*, 21–109.
Olsen, B. (1994). *Bosetning og Samfunn i Finnmarks forhistorie*. Tromsø: Universitetsforlaget.
Olsen, H. (1976). *Skipshelleren. Osteologisk materiale*. Bergen: Zoologisk Museum. Universitetet i Bergen.
Østmo, E. (1980). Boplasskronologi på Skagerakkysten. *Festskrift Til Sverre Marstrander På 70-Årsdagen* (pp. 87–94). Oslo: Universitetets Oldsaksamlings Skrifter Nr. 3, Universitetets Oldsaksamling Oslo.
Østmo, E. (1982). Megalittgraven på Skjeltorp i Skjeberg. *Viking*, *46*, 5–35.
Østmo, E. (1988). *Etableringen av Jordbruket i Østfold*. Oslo: Universitetets Oldsaksamlingens Skrifter Ny Rekke Nr. 10, Universitetet i Oslo.
Østmo, E. (1998). Da jordbruket kom til Norge. Funn fra TN A-fasen i Østfold. In E. Østmo (Ed.), *Fra Østfolds Oldtid. Foredrag Ved 25-Årsjubileet for Universitetets Arkeologiske Stasjon Isegran* (pp. 83–108). Oslo: Universitetets Oldsaksamlings Skrifter, Ny rekke, Nr. 21.
Østmo, E. (2007). The Northern periphery of the TRB graves and ritual deposits in Norway. *Acta Archaeologica*, *78*, 111–142.
Østmo, E. (2008). *Auve. En fangstboplass fra yngre steinalder på Vesterøya i Sandefjord*. Oslo: Norske Oldfunn XXVIII, Kulturhistorisk Museum.
Østmo, E. (2010). The cord stamp in Neolithic Scandinavia. *Acta Archaeologica*, *81*, 44–71.
Østmo, E., & Skogstrand, L. (2006). Nye funn av traktbegerkeramikk fra Oslofjorden. Børsebake og Vøyenenga. *Viking*, *LXIX*, 69–90.
Papac, L., Ernée, M., Dobeš, M., Langová, M., Rohrlach, A. B., Aron, F., … Haak, W. (2021). Dynamic changes in genomic and social structures in third millennium BCE central Europe. *Science Advances*, *7*, 1–17.
Perlès, C. (2016). Food and ornaments: Diachronic changes in the exploitation of littoral resources at Franchthi Cave (Argolid, Greece) during the upper palaeolithic and the mesolithic (39,000-7000 cal BC). *Quaternary International*, *407*, 45–58.
Persson, P. (2005). *Provundersökningar i maj 2004 på Hakerödsboplatsen, Fornl. nr: 443, Kville socken, Bohuslän*. Göteborg: Gotarc Series D: Arkeologiska Rapporter, Kust Till Kust Projektet.

Petrequin, P. (1993). North wind, south wind. Neolithic technical choices in the Jura mountains, 3700-2400 BC. In P. Lemonnier (Ed.), *Technological choices. Transformations in material cultures since the Neolithic* (pp. 36–76). London: Routledge.

Philippsen, B. (2013). The freshwater reservoir effect in radiocarbon dating. *Heritage Science*, *1*, 1–19.

Pickard, C., & Bonsall, C. (2004). Deep-sea fishing in the European mesolithic: Fact or fantasy? *European Journal of Archaeology*, *7*, 273–290.

Piezonka, H., Kostyleva, E., Zhilin, M. G., Dobrovolskaya, M., & Terberger, T. (2013). Flesh or fish? First results of archaeometric research of prehistoric burials from Sakhtysh IIa, Upper Volga region, Russia. *Documentae Praehistorica*, *40*, 57–73.

Prescott, C. (2009). History in prehistory – The later Neolithic/Early Metal Age, Norway. In H. Glørstad & C. Prescott (Eds.), *Neolithisation as of History Mattered. Processes of Neolithisation in North-Western Europe* (pp. 193–215). Lindome: Bricoleur Press.

Prescott, C. (2020). Interpreting complex diachronic "Neolithic"-period data in Norway. In K. J. Gron, L. Sørensen, & P. Rowley-Conwy (Eds.), *Farmers at the Frontier. A Pan-Eruopean Perspective on Neolithisation* (pp. 381–400). Oxford & Philadelphia: Oxbow Books.

Price, T. D., & Gebauer, A. B. (2017). The emergence of social inequality in the context of early Neolithic Northern Europe. In S. Hansen & J. Müller (Eds.), *Rebellion and inequality in archaeology* (pp. 135–152). Bonn: Universitätsforschungen zur Prähistorischen Archäologie, Band 308.

Price, T. D., Klassen, L., & Sjögren, K.-G. (2021). Pitted ware culture: Isotopic evidence for contact between Sweden and Denmark across the Kattegat in the Middle Neolithic, ca. 3000 BC. *Journal of Anthropological Archaeology*, *61*, 101254.

Raetzel-Fabian, D. (2002). Absolute chronology of cultural development in the Neolithic Wartberg culture in Germany. *Journal of Neolitic Archaeology*, *4*, 1–11.

Rasmussen, L. W. (1984). Kainsbakke A47. A settlement structure from the pitted ware culture. *Journal of Danish Archaeology*, *3*, 83–98.

Rassmann, K., & Schafferer, G. (2012). Demography, social identities, and the architecture of megalithic graves in the South-Western Baltic area. In M. Hinz & J. Müller (Eds.), *Siedlung, Grabenwerk, Großsteingrab. Studien Zu Gesellschaft, Wirtschaft Und Umwelt Der Trichterbechergruppen Im Nördlichen Mitteleuropa* (pp. 107–120). Bonn: Dr. Rudolf Habelt GmbH.

Rathke, J. (1907). *Afhandling om de Norske Fiskerier og Beretninger om Reiser i Aarene 1795–1802 For at Studere Fiskeriforhold M. V.* Bergen: A/S John Griegs Boktrykkeri.

Reimer, P. J., Austin, W. E., Bard, E., Bayliss, A., Blackwell, P. G., Bronk Ramsey, C., … Talamo, S. (2020). The IntCal20 northern hemisphere radiocarbon age calibration curve (0–55 cal kBP). *Radiocarbon*, 62, 725–757.

Reinerth, H. (1929). *Das Federseemoor Als Siedlungsland Des Vorzeitmenschen*. Augsberg: Verlegt Bei Benno Filser.

Reitan, G., & Sundström, L. (2018). *The Stone Age Coastal Settlement in Aust-Agder, Southeast Norway. Archaeological Excavations along the new E18 Tvedestrand-Arendal*. Oslo: Cappelen Akademisk Forlag.

Reitan, G., Sundström, L., & Stokke, J.-S. F. (2018). Grains of truth. Neolithic farming on Mesolithic sites. New insights into early agriculture in Southeast Norway. In G. Reitan & L. Sundström (Eds.), *The stone age coastal settlement in Aust-Agder, Southeast Norway. Archaeological Excavations along the New E18 Tvedestrand-Arendal* (pp. 521–539). Oslo: Cappelen Damm Akademisk.

Riddervold, A., & Heuch, H. (1999). *Rakefisk. Tradisjoner – Rakemetoder – Serveringsforslag og Oppskrifter – Modningsprosesser*. Oslo: Teknologisk forlag.

Ritchie, K. (2010). *The Ertebølle fisheries of Denmark 5400–4000 B.C.* (Doctoral dissertation). University of Wisconsin, Madison.

Ritchie, K., Wouters, W., Mirtskhulava, G., Jokhadze, S., Zhvania, D., Abuladze, J., & Hansen, S. (2021). Neolithic fishing in the South Caucasus as seen from Aruchlo I, Georgia. *Archaeolical Research in Asia*, *25*, 1–9.

Rivollat, M., Jeong, C., Schiffels, S., Küçükkalıpçı, İ., Pemonge, M. H., Rohrlach, A. B., … Haak, W. (2020). Ancient genome-wide DNA from France highlights the complexity of interactions between Mesolithic hunter-gatherers and Neolithic farmers. *Science Advances*, *6*, 1–16.

Roberts, B., Marić, M., & Cvetković, J. K. (2021). The Vinca culture: An overview. In M. Radivojević, B. W. Roberts, M. Marić, J. K. Cvetković, & T. Rehren (Eds.), *The rise of metallurgy in Eurasia: Evolution, organisation and consumption of Early metal in the Balkans* (pp. 38–46). Oxford: Archaeopress.

Rød Olavesen, A. (1985). Fra arbeidslivet. In A. Jahnsen & S. G. Eliassen (Eds.), *Vestfold Og Østfold i Nær Fortid* (pp. 228–246). Oslo: Det Norske Samlaget.

Röder, B., & Huber, R. (2007). *Archäologie In Steinhausen "Sannweid"* (*Kanton Zug*). Basel: Antiqua 41, Archäologie Schweis.

Røise, H. (1962). *Fiskene i Farger*. Oslo: Aschehoug.

Rosvold, J., Andersen, R., Linnell, J. D., & Hufthammer, A. K. (2013). Cervids in a dynamic northern landscape: Holocene changes in the relative abundance of moose and red deer at the limits of their distributions. *The Holocene*, *23*, 1143–1150.

Rowley-Conwy, P. (2011). Westward Ho!: The spread of agriculture from central Europe to the Atlantic. *Current Anthropology*, *52*, 431–451.

Rowley-Conwy, P., Gron, K. J., Bishop, R. R., Dunne, J., Evershed, R. P., Longford, C., … Treasure, E. (2020). The earliest farming in Britain: Towards a new synthesis. In K. J. Gron, L. Sørensen, & P. Rowley-Conwy (Eds.), *Farmers at the Frontier. A Pan-Eruopean Perspective on Neolithisation* (401–424). Oxford & Philadelphia: Oxbow Books.

Rychner, V. (1979a). *Auvernier 1. L'Age du Brone Final A Auvernier. Typologie Et Chronologie Des Anciennes Collections Conservées En Suisse*. Lausanne: Cahiers D'Archaeologie Romande.

Rychner, V. (1979b). *Auvernier 2. L'Age Du Bronze Final A Auvernier. Typologie Et Chronologie Des Anciennes Collections Conservées En Suisse*. Lausanne: Cahiers D'Archaeologie Romande.

Särlvik, I. (1976). *Fornlämning 72 och 116, stenåldersboplats, Gröninge, Tölö sn, Halland*. Vol. 9. Stockholm: Riksantikvarieämbetet Rapport 1976 B.

Schatte, T. (2013). Tüllenspitzen aus Knochen und Geweih. *Mitteilungen der Berliner Gesellschaft fur Anthropologie, Ethnologie und Urgeschichte*, *34*, 91–110.

Schenk, T. (2014). Hunter-gatherers with funnel beakers: Experimental implications for the adoption of pottery in early Neolithic southern Norway. In M. Furholt, M. Hinz, D. Mischka, G. Noble, & D. Olausson (Eds.), *Landscapes, Histories and Societies in the Northern European Neolithic* (pp. 275–287). Kiel: Frühe Monumentalität und Soziale Differenzierung 4, Institut für Ur-und Frühgeschichte der CAU Kiel.

Schibler, J., Jacomet, S., Hüster-Plogmann, H., & Brombacher, C. (1997). Economic crash in the 37th and 36th centuries cal. BC in Neolithic lake shore sites in Switzerland. *Anthropozoologica*, *25*, 553–570.

Schlenker, B. (1994). Knochen- und Geweihgerät in der Jungsteinzeit. *Archäologische Informationen aus Baden-württemb*, *27*, 41–56.

Schlichtherle, H. (2004). Große Häuser – kleine Häuser Archäologische Befunde zum Siedlungswandel am neolithischen Federsee. *Ökonomicher Und Ökologischer Wandel Am Vorgeschichtlichen Federsee: Archäeologische Und Naturwissenschaftliche Untersuchungen* (pp. 13–56). Freiburg: Hemmenhofener Skripte 5.

Schønwetter, A. (1988). Litt om størjefiske. In F. Jensen (Ed.), *Nevlungen – Serr'u…* (pp. 90–92). Nevlunghavn: F. Jensen.

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

Silva, F., & Vander Linden, M. (2017). Amplitude of travelling front as inferred from 14C predicts levels of genetic admixture among European early farmers. *Scientific Reports*, *7*, 31–34.

Sjögren, K.-G. (2003). Megaliths, settlement and subsistence in Bohuslän, Sweden. In G. Burenhult & B. Westergaard (Eds.), *Stones and bones: Formal disposal of the dead in Atlantic Europe during the Mesolithic-Neolithic Interface 6000–3000 Bc* (pp. 167–176). Oxford: BAR International Series 1201.

Sjögren, K.-G. (2012). Neolitisering i Västsverige – En översikt över källäget. In F. Kaul & L. Sørensen (Eds.), *Agrarsamfundenes Ekspansion i Nord* (pp. 73–86). København: Nordlige Verdener. Nationalmuseet.

Sjögren, K.-G. (2017). Modeling middle Neolithic funnel beaker diet on Falbygden, Sweden. *Journal of Archaeological Science Reports*, *12*, 295–306.

Sjögren, K.-G., & Ahlström, T. (2016). Early mesolithic burials from Bohuslän, western Sweden. In J. M. Grünberg, B. Gramsch, L. Larsson, J. Orschiedt, & H. Meller (Eds.), *Mesolithic burials – Rites, symbols and social organisation of erly postglacial communities* (pp. 125–143). Halle: Tagungen des Landesmuseums für Vorgeschichte Halle Band 13/1.

Skaarup, J. (1973). Hesseløks stenalderbosættelser. *Fra Holberg Amt*, *66*, 15–28.

Solheim, S. (2020). Mesolithic coastal landscapes. Demography, settlement patterns and subsistence economy in south-eastern Norway. In A. Schülke (Ed.), *Coastal Landscapes of the Mesolithic. Human Engagement with the Coast from the Atlantic to the Baltic Sea* (pp. 44–74). London and New York: Routledge.

Solheim, S. (2021). Timing the emergence and development of arable farming in Southeastern Norway by using summed probability distribution of radiocarbon dates and a Bayesian age model. *Radiocarbon*, *63*, 1503–1524.

Sørensen, L. (2014). From hunter to farmer. *Acta Archaeologica*, *85*, 1–305.

Sørensen, L., & Karg, S. (2014). The expansion of agrarian societies towards the north – New evidence for agriculture during the Mesolithic/Neolithic transition in Southern Scandinavia. *Journal of Archaeological Science*, *51*, 98–114.

Stafford, M. (1999). *From forager to farmer in flint. A lithic analysis of the prehistoric transition to agriculture in southern scandinavia*. Aarhus: Aarhus University Press.

Steinsnes, S. (1956). Når kvalen rek til lands. *Årb. Karmsund. Haugesun Museum. Årshefte*, *1951–1955*, 68–82.

Stewart, C. (2007). Creolization: History, ethnography, theory. In C. Stewart (Ed.), *Creolization: History, ethnography, theory* (pp. 1–25). London: Routledge.

Strinnholm, A. (2001). *Bland säljägare och fårfarmare. Struktur och förändring i Västsveriges mellanneolitikum*. Göteborg: Coast to Coast-books No. 4.

Strøm, H. (1762). *Physisk og Oeconomisk Beskrivelse over Fogderiet Søndmør beliggende i Bergen Stift i Norge. Første Part*. Sorøe: Factimilia Topographica Vol. 5, Børsum.

Sztanes, D.-M., & Beldiman, C. (2014). The Ariusd (Erosd) – Cucuteni Culture: Osseous materials artefacts. In C. Preoteasa & C.-D. Nicola (Eds.), *L'Impact anthropique sur l'environnement Durant Le Néo-Énéolithique Du Sud-Est De L'Europe* (pp. 239–282). Piatra-Neamt: Bibliotheca Memoriae Antiquitatis XXXI.

Taffinder, J. (1998). *The allure of the exotic. The social use of non-local raw materials during the stone age in Sweden*. Uppsala: Aun 25, Uppsala University.

Tangen, M. (2008). The Norwegian fishery for Atlantic Bluefin Tuna. *Collected Volume of Scientific Papers ICCAT*, *63*, 79–93.

Tasić, N., Marić, M., Bronk Ramsey, C., Kromer, B., Barclay, A., Bayliss, A., … Whittle, A. (2015). Vinča-Belo Brdo, Serbia: The times of a tell. *Germania*, *93*, 1–75.

Telegin, D. Y. (1986). *Dereivka: A settlement anc cemetary of the copper age horse keepers on the middle Dnieper*. Oxford: BAR International Series 287.

Telegin, D. Y., Lillie, M., Potekhina, I. D., & Kovaliukh, M. M. (2015). Settlement and economy in Neolithic Ukraine: A new chronology. *Antiquity*, *77*, 456–470.

Telegin, D. Y., Potekhina, I. D., Lillie, M., & Kovaliukh, M. M. (2002). The chronology of the Mariupol-type cemeteries of Ukraine re-visited. *Antiquity*, *76*, 356–363.

Torke, W. (1990). Abslucβbericht zu den Ausgrabungen in der "Siedlung Forschner" und Ergebnisse der Bauholzuntersuchung. *Bericht der Römisch-Germanischen Kommission*, *71*, 52–57.

Torke, W. (1993). Die fischerei am prähistorischen Federsee. *Archäologisches Korrespondenzblatt*, *23*, 49–66.

Torke, W. (2016). Die Fischreste aus der «siedlung Forschner» und die Fischreste am Prähistorischen Federsee. *Siedlungsarchäologie Im Alpenvorland XIII* (pp. 285–309). Darmstadt: Forschungen und berichte zur vor- und frühgeschichte in Baden-Württemberg, Konrad Theiss Verlag.

Tsybriy, A. V., Tsybriy, V. V., & Kiyashko, V. Y. (2017). Bone and horn harpoons from the settlement-site of Razdorskoye-I. *Archaeological News*, *23*, 106–114.

Vanhanen, S., Gustafsson, S., Ranheden, H., Björck, N., Kemell, M., & Heyd, V. (2019). Maritime hunter-gatherers adopt cultivation at the farming extreme of Northern Europe 5000 years ago. *Scientific Reports*, *9*, 4756.

Velušček, A. (2004). Past and present lake-dwelling studies in Slovenia. Ljubljansko barje (the Ljubljana Marsh). In F. Menotti (Ed.), *Living on the Lake in Prehistoric Europe. 150 years of lake-dwelling research* (pp. 69–82). London and New York: Routledge.

Vitezović, S. (2011). The Neolithic bone industry from Drenovac, Serbia. In J. Baron & B. Kufel-Diakowska (Eds.), *Written in bones. Studies on technological and social contets of past faual Skeletal Remains* (pp. 117–136). Wroclaw: Uniwrsytet Wroclawski, Instityt Archaeologii.

Vitezović, S. (2013). The Vinča culture bone industry from Divostin. *Proceedings of the National Museum – Belgrade Recl. Du Musée Natl. A Belgrade*, *21*, 109–127.

Vitezović, S. (2017). Antler exploitation and management in the Vinča culture: An overview of evidence from Serbia. *Quaternary Internatinal*, *450*, 209–223.

Vitezović, S. (2018). Bone industry in the Eneolithic period in the South-East Europe. In D. Antonović (Ed.), *Back to the Past: Copper Age in Northern Croatia* (pp. 161–185). Zagreb: Arheološki Muzej Zagreb, Filozofski Fakultet Sveučilišta u Zagrebu, Arheološki Muzej Osijek.

Vitezović, S. (2020). Technological changes and innovations in the osseous industries in the early and late Neolithic in the Balkans. In M. Spataro & M. Furholt (Eds.), *Detecting and Explaining Technological Innovation in Prehistory* (pp. 151–176). Leiden: Sidestone Press.

Whittle, A., Bayliss, A., Barclay, A., Gaydarska, B., Bánffy, E., Boric, D., … VanderLinden, M. (2016). A Vinca potscape: Formal chronological models for the use and development of Vinca ceramics in South-East Europe. *Documenta Praehistorica*, *43*, 1–60.

Windler, A., Thiele, R., & Müller, J. (2013). Increasing inequality in Chalcolithic Southeast Europe: The case of Durankulak. *Journal of Archaeological Science*, *40*, 204–210.

Wininger, J. (1992). Beinerne Doppelspitzen aus dem Bielersee. Ihre Funktion and Geschichte. *Jahrbuch der Schweizerischen Gesellschaft Für Ur- und Frühgeschichte*, *75*, 65–99.

Winterhalder, B., & Kennett, D. (2006). Behavioral ecology and the transition from hunting and gathering to agriculture. In D. J. Kennett & B. Winterhalder (Eds.), *Behavioral ecology and the transition to agriculture* (pp. 1–21). California: University of California Press.

Yesner, D. R. (1980). Maritime hunter-gatherers: Ecology and prehistory. *Current Anthropology*, *21*, 727–750.

Zalai-Gaál, I. (2004). Die geweihharpunen und harpunenfischerei im Spätneolithikum des Karpatenbeckens. *Prahistorische Zeitschrift*, *79*, 133–144.

Zápotocký, M. (1992). *Streitäxte des mitteleuropäischen Äneolithikums*. Weinheim: VCH, Acta Humaniora.