Primitive

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Primitive
tider

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Fagfellevurderte artikler

Ferd og frakt over fjell og vidde	7
Kjetil Loftsgarden	
Mistet på sjøen? En nyoppdaget fiskekrok fra steinalderen i Søgne, Vest-Agder.	25
Elling Utvik Wammer, Anja Mansrud, Pål Nymoen og Frode Kvalø.	.
Variasjon i praksis?	45
Sammenføyningsteknikk – og materiale i nordnorske jernalderbåter.	
Thomas Lund	
Pløyelagsfunn i skjæringspunktet mellom forskningspotensial og forvaltningsprioriteringer: Fokus og holdninger i diskusjonen om privat metallsøking i Norge	63
Caroline Fredriksen	
Metallsøkerfunn som grunnlag for kunnskap og vern.	81
En case-studie fra Sunndal – et knutepunkt i jernalder og middelalder.	
Kristoffer Dahle, Carl Fredrik Vemmestad og Jarle Stavik	
The Fimbulwinter theory and the 6th century crisis in the light of Norwegian archaeology: Towards a human-environmental approach.	101
Ingar M. Gundersen	
Feltkurs som læringsform.	121
50 år med arkeologisk feltutdanning ved Universitetet i Oslo.	
Axel Mjærum og Steinar Solheim	
Rapporter	
Practical experiences with cross-disciplinary research – the case of Saving Oseberg.	143
Susan Braovac	
Anmeldelser	
Gustaf Trotzig: Arkeologins fotografier. Några milstolpar. KVHAA Handlingar Antikvariska serien 56. Mölndal 2018. 328 s.	149
Einar Østmo	

Ljungqvist, Fredrik Charpentier 2017. Klimatet och människan under 12 000 år. Dialogos. Stockholm.	153
Eivind Heldaas Seland	
Oma, K.A. (2018). The sheep people. The ontology of making lives, building homes and forging herds in early Bronze Age Norway. Equinox Publishing Ltd, Sheffield, UK; Bristol, CT.	157
David G. Anderson	
Bender Jørgensen, Lise, Soafer Joanna og Marie Louise Stig Sørensen (eds.) 2018 Creativity in the Bronze Age. Understanding Innovation in Pottery, Textile, and Metalwork Production. Cambridge University Press..	159
Nils Anfinset	
Dufeu, Val (2018): Fish Trade in Medieval North Atlantic Societies - An Interdisciplinary Approach to Human Ecodynamics, Amsterdam.	163
Hans Christian Küchelmann	
Morgengry over vikingenes tid	169
Anmeldelse av utstillingen VÍKINGR, Kulturhistorisk Museum, Universitetet i Oslo	
Brita Brenna	

The Fimbulwinter theory and the 6th century crisis in the light of Norwegian archaeology: Towards a human-environmental approach

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The Fimbulwinter theory, as outlined by Bo Gräslund and Neil Price (Gräslund 2007; Gräslund and Price 2012; Price and Gräslund 2015), has gained considerable attention in Scandinavian archaeology in recent years. Basically, the theory suggests that widespread climate cooling, caused by distant major volcanic eruptions in AD 536/540, resulted in crop failure, famine, plague, social unrest and population decline, subsequently opening up for major socio-political change. The theory has influenced several recent studies, emphasizing the climate factor as a catalyst or prime mover for the major changes in the archaeological record around the middle of the 1st millennium AD (Zachrisson 2011; Löwenborg 2012; Arrhenius 2013; Bondeson and Bondesson 2014; Tvauri 2014; Stamnes 2016; Solheim and Iversen 2019). The theory has, in Norwegian archaeology, been particularly advocated by Frode Iversen (2013, 2016), who argues for considerable socio-political upheaval and societal reorganisation.

The Fimbulwinter theory draws heavily upon an increasing number of high-resolution climate proxies, primarily derived from tree-ring chronologies and ice core data (Baillie 2008; Larsen *et al.* 2008; Sigl *et al.* 2015; Büntgen *et al.* 2016; Toohey *et al.* 2016; Helama *et al.* 2018; Newfield 2018). However, as John Moreland (2018) points out, the renewed interest in climatological explanations for

historical transformations carries with it a certain deterministic and positivistic perspective, downplaying the importance of long-term trajectories when studying cultural change. The refinement of the geoscientific datasets tends to camouflage the source-critical problems and interpretative process behind it. The precise dating of past environmental events, an apparent “objectivity-through-precision”, influences our understanding of contemporary historical events, creating a certain risk of confusing concurrency with correlation (Moreland 2018:99). The predictive authority of the geosciences opens up for what Mike Hulme (2011:249) calls an “epistemological slippage”, in which interpretations and conclusions are transferred from one academic domain to the other without appropriate theoretical or analytical justification.

There is, nevertheless, a general agreement among geoscientists that an exceptional 6th century climate cooling did happen, surpassing anything we know of from the past two millennia when it comes to durability, extent and magnitude. The 5th to 7th centuries also represent an important transitional period in Scandinavian archaeology. Major cultural and material changes can be observed in a wide range of spheres, such as settlement patterns, warfare, ritual deposits, ornamental styles, burial customs, food practice and social organization (Axboe

2001; Solberg 2003:178-211; Nielsen 2006; Göthberg 2007; Herschend 2009; Hedeager 2011; Zachrisson 2011; Löwenborg 2012; Iversen 2013; Fredriksen *et al.* 2014; Ystgaard 2014; Bukkemoen 2016; Gundersen 2016a; Rødsrud 2016; Røstad 2016; Gjerpe 2017). Many of the changes are poorly dated, causing a risk of circular reasoning when fixed upon precisely dated events (Johansen 1972; Baillie 1991). Many of them are, nonetheless, closely associated with the 6th century in particular, and serve to define the very transition from the Early to the Late Iron Age, suggesting strong common impulses. It is, in this perspective, apposite to discuss whether the changes might be related to the climate downturn, without turning to deterministic and monocausal explanations.

In Norwegian archaeology the idea of a 6th century crisis is, however, not a new one – it is part of a scholarly discourse going all the way back to the pioneering works of Haakon Shetelig (1912). A corresponding debate also exists in Swedish archaeology (cf. Näsman 1988a; 2012). By using a research historical approach, I wish to demonstrate how two main interpretative frameworks can be outlined: material change as a reflection of crisis, and material change as an expression of cultural innovation. Clearly influencing the current discourse, this opposition to some extent camouflages the scientific potential of the middle ground. There is, as Frands Herschend (2009:288 and note 234) puts it, no actual contradiction between the two. Research must be put into developing a multicausal framework, in which the destructive potential of environmental hazards is recognised, not as a determining force, but as one of several contributing factors to social, cultural, and economic change. What is important is how local and regional cultural particularities precondition the impact of environmental change, and finally how environmental change interacts with ongoing socio-cultural processes. In this way, a coherent approach can be developed, which takes into account the complex interaction of human-environmental systems.

The AD 536/540 event

Contemporary Mediterranean sources tell of a long-lasting darkening of the sun occurring in the mid-530s, followed by famine and The Justinian Plague. According to geoscientists Richard Stothers and Michael Rampino (1983) the darkening of the sun was caused by a volcanic induced atmospheric veiling. Their theory sparked off an enduring debate among classical scholars concerning the societal impact of the eruption in the Mediterranean world, for some marking the end of Antiquity (Arjava 2005:74; Moreland 2018:97).

An increasing number of climate proxies seems to strengthen the view that a Northern Hemisphere cooling took place in the 6th century, due to a double eruption around AD 536 and 540, with suggested severe consequences for agriculture (Baillie 1994; 2008; Larsen *et al.* 2008; Sigl *et al.* 2015; Toohey *et al.* 2016; Helama *et al.* 2018). Of particular importance are tree-ring chronologies and layers of sulphuric acid in the Greenlandic ice, which confirm major near equatorial and Northern Hemisphere volcanic eruptions. The mean European summer temperatures has been calculated to have dropped by 1.6-2.5 °C, depending on the reconstruction method used. Ulf Büntgen *et al.* (2016) suggest that a third eruption in AD 547, in combination with a solar minimum, might have caused a prolonged cooling lasting well into the mid-7th century, often called “the Late Antique Little Ice Age”. The theory has, however, received some criticism, as the tree-ring evidence is not conclusive on this point (Helama *et al.* 2017). Regional characteristics are evident in the tree-ring records, which might reflect temporal and spatial variations in the climate responses (Newfield 2018). The mean summer temperature decrease seems to have been less profound in parts of Scandinavia than in central and southern Europe, and it embraces considerable year-to-year variability. The consequences for agriculture might still have been severe, as even a slight temperature decrease in agricultural marginal areas would represent a fairly large

portion of the annual heat budget (Stamnes 2016; Toohey *et al.* 2016:8-9). Samuli Helama *et al.* (2018) stress the importance of the dust veil for reduced photosynthesis, which would affect terrestrial growth independent of the temperature effect, which they consider a subordinate factor.

The Justinian Plague is often compared to the Black Death of the 14th century, both caused by the bacteria *Yersinia Pestis* (Little 2007). *Yersinia Pestis* has been identified in 6th century graves in northern France and southern Germany, thus proving the spread of the disease beyond the Alps (Drancourt *et al.* 2004; Harbeck *et al.* 2013; Wagner *et al.* 2014). Increased susceptibility to pandemics due to climate deterioration and food shortages has also been identified in other circumstances (Oppenheimer 2011; Ziegler 2014). Several archaeological studies have suggested that the disease spread all the way to the present day Scandinavian countries (Gräslund 1973; Helgen 1977; Seger 1982), an assumption that also constitutes an important part of the current Fimbulwinter theory (cf. Price and Gräslund 2015:114-118; Iversen 2016:44-48; Solheim and Iversen 2019). However, the hypothesis is more or less based on a general decline in the number of archaeological sites and burials during the 6th century, and a general assumption that a bubonic plague, like the Black Plague, would affect all corners of the Eurasian continent. It remains contested whether the plague ever reached far north, and it would therefore be premature to assign to it a major explanatory force until aDNA analysis has been conducted on 6th century Scandinavian skeletal remains.

Nonetheless, there is a convincing amount of geoscientific data supporting the idea of 6th century volcanic activity inducing Northern Hemisphere climate cooling. The exact impact of this climate event on Iron Age societies, while undoubtedly severe, is a matter of debate. Spatial and temporal climate variability throughout the Northern Hemisphere, in particular Scandinavia, might very well have caused contrasting consequences at different locations. This is not to say that a dramatic climate event

would be without consequences, but rather that one should be careful about assuming a dramatic general depopulation and societal collapse throughout Scandinavia, as suggested by Price and Gräslund (2015:127). ‘Collapse’ has been defined in several ways in archaeological disaster research (cf. Middleton 2017), but might best be explained in terms of a complete disintegration of societal structure (cf. Driessen 2017). In order to understand the consequences of environmental change on human societies, we need to turn to archaeology, and, in this case, the archaeological discourse on the 6th century transition.

The 6th century transition in Norwegian archaeology

The discourse on the 6th century transition in Norwegian archaeology can roughly be divided into two interpretative frameworks: crisis or a change of practice. The divide is not always that clear, as there is general agreement on the profound character of the 6th century transition, and, as such, on a change of practice. The disagreement is more on the concept of crisis itself, whether it is detectable in the archaeological record or not. However, crises are rarely defined, if at all. I find it nonetheless interesting that Anton Wilhelm Brøgger (1940), the first to suggest a mid-1st millennium crisis in Norwegian archaeology, made several references to warfare, Hitler, and the contemporary international situation in the same text. His paper, published just months after the onset of the Second World War, and one month before the German invasion of Norway, might very well have been coloured by the seriousness in the international situation at the time. Such a view could be supported by Brøgger’s choice of words, like “crisis”, and by his emphasis on warfare as an engine for prehistoric social change. The term “crisis” is often associated with social unrest and warfare, but it can also be used to represent a dramatic end of something, such as the end of an era (Koselleck 2006). A crisis, then, can simply represent a radical transformation. In similar terms, discussion of the 6th century transition

in Norwegian archaeology is about the character of change, whether it represents a continuation of Early Iron Age dynamics, or something altogether different. In the following, I wish to recount the main arguments brought forward in the 20th century discourse, in order to disentangle the premises shaping our understanding of the 6th century transition, for I believe they are bogging down the current debate by dragging it into well-established academic trenches.

Early notions of a 6th century hiatus

The 5th to 8th centuries were early recognized by Gabriel Gustafson (1906:67-96) as an important transitional period in Scandinavian prehistory, as it included several changes in craft and design that would later come to define Viking Age (AD 800-1050) material culture. This was understood as particularly significant for the latter half of this period, which more or less coincides with the current definition of the Merovingian Period. Typological and chronological studies revealed major changes in ceramics, weapons, burial customs and ornamental style (Shetelig 1912; Grieg 1918; 1920; 1923; Brøgger 1925; Bøe 1931; Gjessing 1934; Hougen 1936) which are still considered important characteristics (e.g. Røstad 2018:74). The observations eventually led Shetelig (1925) to introduce the concept of a "Merovingian Period" (AD 550-800)¹ to Norwegian archaeology, which would later come to define the very transition from the Early to the Late Iron Age (Slomann 1956:64).

A characteristic feature of the Merovingian Period was the somewhat duplex nature of the archaeological material – characterized by local and regional distinctiveness on the one side, and continental, Anglo-Saxon and eastern Scandinavian impulses on the other (Brøgger 1917; Grieg 1923; Shetelig 1925; Gjessing 1934; Hougen 1936). Furthermore, a significant lack of finds stood in contrast to the rich archaeological

complexes of the preceding period (Gudesen 1980:12). This was particularly striking in western Norway. However, the 6th century Åker-complex around Lake Mjøsa, and several monumental burial mounds, led Brøgger (1917) and others (Grieg 1918; Shetelig 1925; Gjessing 1934) to argue for an early state formation in eastern Norway, notably under the influence of the Vendel dynasties in middle Sweden. Accordingly, the scarcity of finds in the west could be explained by referring to shifting power balances.

The 4th-5th century socio-political upheaval in Europe was understood as pivotal for the shifting power balances and new distribution patterns in Scandinavia (Gustafson 1906; Brøgger 1917; Grieg 1918; Gjessing 1934; Hougen 1936). However, Shetelig (1925:173-177) pointed out that the cultural changes in the early Merovingian Period not only represented a major development in Iron Age societies, but also a fundamental break with previous custom. His overall interpretative framework was nevertheless one of cultural and societal continuity. This notion was, according to Lars Erik Gjerpe (2014, 2017:36-45) and Lars Pilø (2005:9-63), a characteristic feature for Norwegian archaeology in the interwar period and grew out of the 19th century struggle in Norway for political and cultural independence (see also Amundsen and Fredriksen 2014:83; Grønnesby and Heen-Pettersen 2015:171-174). It developed into a distinct retrogressive method that sought to reconstruct prehistoric cultural traits out of known historical conditions, resulting in ideas of structural continuity from modern and medieval farms all the way back to the initial phases of colonization and cultivation. The new cultural traits at the beginning of the Merovingian Period were, by Shetelig (1925:173-177), understood as a matter of new impulses and a change of practice. The lacuna in the archaeological record, in particular in

¹ The transition was by Shetelig (1925:173) set to AD 600, but is now more commonly set around the middle 6th century (for a discussion, see Mikkelsen 1973).

western Norway, was not understood as a sign of crisis per se, but first and foremost as a reflection of shifting power balances and the emergence of stronger dynasties in eastern Norway.

Shetelig's (1925) assessment of the early Merovingian Period relates to the contemporary discussion concerning the introduction and development of Norse culture. Gustafson (1906:59) argued that civilisation began with the Iron Age, while the Stone Age and Bronze Age were described as "foreign". This notion can also be seen in Shetelig's (cf. 1925:119-120) writings. "Civilisation" is understood as something that

emerges during the first centuries AD under the influence of the expanding Roman Empire, in other words when Iron Age culture in a proper sense was established. Shetelig (1925:120) identified a fundamental break at the transition from the Pre-Roman to Roman Iron Age, which was of greater importance for the societal development in prehistory than the introduction of iron itself. Social and cultural continuity was, in essence, more of a defining aspect for the 1st millennium AD than prehistory in general. This notion was probably also defining for how the Merovingian Period was assessed.

Figure 1: Early theories of a 6th century crisis were, by and large, based on evidence for large scale settlement abandonment in southern and southwestern Norway. The picture were taken during the 1946-1949 excavations of the Iron Age farm at Sosteli in Agder, and shows the remains of one of the main farm buildings. The excavations were important for the development of settlement archaeology in Norway, and suggested that the farm had been deserted at the end of the Migration Period. However, later revisions of archive data gave contrasting results, indicating that the farm might have been in use all the way up to the 10th century (Jessen and Stylegar 2012). Photo: Unknown, Museum of Cultural History.

The emergence of crisis

Shetelig's (1925) hypothesis of a fundamental break with Early Iron Age custom nevertheless contested the idea of cultural stability and continuity. His observations pointed in the direction of the more crisis-oriented theories that were to follow, in part putting forward migratory, ecologic, or epidemiologic explanations (Brøgger 1940; Petersen 1954; Slomann 1956; Møllerop 1958; Helgen 1977; Myhre 1979; Løken 1988).

The gradual shift in scope and interpretation was influenced by the increasing number of settlement studies during the first half of 20th century. The southern and southwestern part of the country, in particular, generated considerable evidence for settlement and agricultural expansion in the 4th and 5th centuries, followed by signs of abandonment and decline in the 6th and 7th centuries (cf. Myhre 1979, 1980, 1982; Kallhovd and Stylegar 2014). Importantly, few traces of settlement continuity were identified. Other parts of the country were less thoroughly investigated. Few, if any, Migration and Merovingian Period house remains had been documented in eastern Norway and the settlement development of the region remained unclear (Gjerpe 2016:40, 2017:31). All in all, the notion of crisis was, primarily, based on settlement data from southern Norway.

However, it should be stressed that the idea of crisis was not understood in terms of collapse of Iron Age societies. On the contrary, it was assessed as an extremity putting the existing society under immense pressure. Wencke Slomann (1956), for instance, recognised a major break in material culture in the transition to the Merovingian Period, emphasizing a significant decline in number of finds and settlement sites. However, abandoned farmsteads were not understood in terms of depopulation per se, but as a contraction of peoples and farms towards the traditional main settlement areas. Although a break in material culture was identifiable, the basic notion was nevertheless of societal continuity.

An agricultural crisis?

Several studies highlighted the Migration period settlement expansion, believing that it led to overpopulation and subsequently to migration and the abandonment of non-favourable lands (Brøgger 1940; Petersen 1954). Farming was assessed as extensive in character and based on husbandry, which would eventually lead to overexploitation of the limited amount of cultivable land. Consequently, this would result in a shift to intensive farming techniques based on crop production. Still, the even distribution of abandoned farms in southwest Norway, located in both central and marginal agricultural areas, led some scholars to suggest that the Justinian Plague had to have been the main, or at least a contributing, cause to the decline (Møllerop 1958; Magnus and Myhre 1976; Helgen 1977; Gudesen 1980).

Soil deterioration could still be an important factor, as fertilizing was believed to have been limited (Magnus and Myhre 1976:403-406). However, later studies showed the importance of intensive cultivation techniques as early as the first centuries AD, involving systems of infield, outfield, and mixed farming (Myhre 1979, 1980, 1982). According to these studies, the extent of the 6th century crisis could not be attributed to a limited farming strategy based on husbandry. However, as later excavations at Forsandmoen in southwest Norway would prove, intensive farming might also have contributed to society's vulnerability (Løken 1988). The excavations gave evidence of soil deterioration due to long term overexploitation.

Agricultural decline was not that evident in eastern Norway. On the contrary, Bjørn Hougen (1947) identified a significant Merovingian Period agricultural expansion at summer farms in the lower mountain areas, which testified to the continuous importance of extensive farming and husbandry. The expansion was nonetheless understood as a response to the agricultural crisis suggested by Brøgger (1940). A later study of a few selected sites gave evidence for agricultural intensification around AD 200-400, followed

by decline and final abandonment around AD 800 (Pedersen 1990), thus in part mirroring the results from southwest Norway.

Because of the low number of settlement excavations, the pattern remained unclear in eastern Norway until the 1980s, when machine-assisted topsoil stripping was introduced (Østmo 1991; Gjerpe 2016). Recent excavations testify to the early existence of mixed farming, involving systematic use of fertilizers, plaggen soil, and fallowing (Mjærum 2012; Gjerpe 2013; Gundersen 2016b). These excavations also support the notion of an agricultural decline around the middle of the 1st millennium AD, but the evidence seems to

reveal a gradual and complex process that cannot be attributed to the AD 536/540 event alone (Gjerpe 2013; Gundersen 2016a).

Temporal and spatial variability

The concept of crisis was problematic for a few, but important, reasons. First of all, early studies of the 6th century transition were characterized by somewhat limited archaeological data. Most studies in the interwar period were concerned with collected artefacts. Few studies incorporated a wide range of archaeological features, and this led to simplified and generalized interpretations (Gude 1980:14). Furthermore, the idea of

Figure 2: Excavations in the Gudbrandsdalen valley have revealed a complex interaction between social and environmental factors, in which the Fimbulwinter might have been one of several important factors for a 6th century agricultural decline. The pictured section cuts through 3000 years of alternating sequences of flooding, agriculture and settlement traces. Although the Fimbulwinter might have been instrumental for several abandoned sites, it probably represents the culmination of a process lasting several centuries, causing increasing difficulties in maintaining agriculture in marginal areas. Photo: Mari Malmer, Museum of Cultural History

settlement decline was based on studies with limited geographical scope. The results from southern Norway could not be supported by similar studies in other parts of the country. On the contrary, the idea of a 6th century crisis was not that obvious in eastern Norway (cf. Gudesen 1980:141-143). Different parts of eastern Norway displayed, according to Hans Gude Gudesen (1980), different cultural patterns, involving varying reflections of continuity and crisis.

Growing archaeological datasets, regional studies, new methods and the recognition of considerable complexity in the archaeological record resulted in several critical reviews from the 1970s (Johansen 1972; Mikkelsen 1973; Gudesen 1980). Accordingly, the notion of crisis rested on a stacking of significant archaeological features on suitable dates in prehistory, thus causing a circular reasoning (Johansen 1972). Egil Mikkelsen (1973) suggested, due to the regionality of the archaeological record, that the transition between the Early and Late Iron Age should be set at AD 550 in eastern Norway, AD 575 in central and northern Norway and AD 600 in western Norway.

The 6th century crisis could seem to be more of a regional crisis in southern and western Norway (Helgen 1977; Løken 1988), while other parts of the country seemed less prone to overexploitation (Myhre 2002:170-179). This could in particular be the case of northern Norway, where the 6th century reflected little evidence for crisis or stagnation (Vinsrygg 1979; Jørgensen 1988). In other words, the notion of a 6th century crisis was easily challenged by regional studies, displaying considerable spatial and temporal variability (a similar conclusion could also be reached at a Scandinavian level, cf. Näsman 1988a; 1988b). The argument is hard to dismiss, and remains pivotal for the critique against the Fimbulwinter theory.

The end of crisis?

The growing awareness of the complexity in the archaeological record called for explanations

that involved a wide range of factors, such as plague, social unrest, warfare, soil deterioration, economic decline, trade disruption – and climate change (Magnus and Myhre 1976; Gudesen 1980; Myhre 2002). These factors might have had different impacts on both regional and local scales, depending on the societal character of different areas.

The major societal changes of the 6th century were assigned to the emergence of new powerful elites and political reorganization, followed by a transformation of the cultural landscape. Accordingly, the lack of Merovingian Period settlements was seen not as being the result of depopulation, but of new societal and agricultural strategies (Skre 1998:216; Myhre 2002:180-213). Later excavations of Merovingian Period farmsteads seem to support the idea of changing settlement patterns (Pilø 2005; Martens 2007; Lund 2008; Jessen and Stylegar 2012; Bjørdal 2016). Marginal and smaller farms appear to have been abandoned, while Late Iron Age farms are located closer to historical settlements.

Bjørn Myhre (2002:170-189, 2015:249-250) recognized the 6th century as a major transitional period, but concluded that the evidence for a crisis was scarce and incoherent. Agricultural crisis was certainly a factor in some areas, but could not be attributed to the country as a whole. On the contrary, the temporal and spatial complexity of the archaeological record suggested a gradual and asynchronous development, rather than single causes and events. The simultaneous emergence of monumental burial mounds and relative low number of other graves reflected, according to Myhre (2002:182-189), profound changes in social status and judicial rights. Graves were seen as the privilege of free peasants, whereby low numbers of, or absence of, graves close to farms would indicate the presence of tenants or thralls (see also Skre 1998:44-56, 198-212). In this, he saw patterns of increasing social and economic differentiation in society, including larger and fewer political entities, which made possible a fundamental restructuring of settlement patterns and subsistence strategies. He concluded: “The idea of a 6th century crisis is about to become

research history” (Myhre 2002:179, authors translation).

The Fimbulwinter theory and current debate

Myhre’s narrative has been criticized for being somewhat neo-evolutionary, with continuity from different societal “stages” of structural complexity being considered fundamental for the prehistoric development (Grønnesby and Heen-Pettersen 2015:172-173). Patterns of discontinuity were understood as changes of practice and as organisational and political reorganisation, due to changing impulses and circumstances. Consequently, environmental factors, crisis, and hazards were endowed with little explanatory force by Myhre. The lack of environmental perspectives might, in retrospect, seem premature, considering the increasing geoscientific evidence for a severe 6th century climate cooling.

The proposed connection between the AD 536/540 events and changes in the Scandinavian archaeological record was initially put forward by Klavs Randsborg (1997). A few years later Morten Axboe (1999; 2001) analysed the numerous gold hoards in the early 6th century in light of tree-ring chronologies and the Norse myths of the *Fimbulwinter* and *Ragnarok*.² He interpreted the gold hoards as sacrificial investments in times of crisis and social distress, but rejected ideas of societal collapse per se. Axboe’s (1999; 2001) interpretations and his reference to Norse myths were picked up by Gräslund (2007), who also brought the Finnish epic poem *Kalevala* into consideration. Gräslund (2007) argued that substantial archaeological and paleo-botanical evidence pointed in the direction of reforestation, settlement and agricultural decline. The continuous increase in

geoscientific evidence for a 6th century climate cooling strengthened his argument (Baillie 1994; 2008; Larsen *et al.* 2008), and the Fimbulwinter theory was developed further in cooperation with Price (Gräslund and Price 2012; Price and Gräslund 2015). All this new evidence pointed to low margins of agricultural resilience leading to widespread crop failure. A declining number of settlement sites and paleo-botanical evidence for reforestation led these scholars to suggest a halving of the population in the area covered by present-day Norway, Sweden and probably Finland, generating considerable socio-cultural impact.

Just another “Great Disaster theory”?

The Fimbulwinter theory has revived interest in earlier debates on the 6th century transition. The critique is familiar, stressing the importance of spatial and temporal variability as opposed to notions of sudden socio-cultural change. According to Herschend (2009:403), the main reasons and driving forces behind societal change must be analysed within a social and economic framework (see also Herschend 1980; 1988). Herschend (2009:389-411) sees increasing stagnation, social crisis and unrest up towards the 6th century resulting in internal strife among the ruling elite and great need of reform. The causes are, by and large, sought in a collapsing world economy, caused by the demise of the Roman Empire. As such, the theory mirrors early assessments of the 6th century transition, as one of continuity and influenced by geo-political events (cf. Gustafson 1906; Brøgger 1917). Herschend (2009) interprets these developments as being linked to changes in warfare and social organization, resulting in new dynastical and regional structures, a synthesis that

² Price and Gräslund (2015:119) designated Axboe as “a lone voice on this subject in the North” until Gräslund published his hypothesis in 2007, but this is obviously not correct. Besides Randsborg, Karen Høilund Nielsen (2005; 2006) also discussed the possible impact of the AD 536/540 events on Scandinavian societies. Michael Baillie (1999), seemingly independent of Axboe, also suggested a connection between Ragnarok and the AD 536/540 events.

fits in well with Myhre's (2002; 2015) assessment of the Norwegian archaeological record.

Ulf Näsman (2012) more or less denounces the climate crisis perspective as inadequate for explaining the character and complexity of socio-cultural change in 6th century Scandinavia. Näsman, in this particular case, is commenting on the work of Daniel Löwenborg (2012), but his views can easily be read as a critique of the climate narrative as a whole (cf. Price and Gräslund 2015:118-119). According to Löwenborg (2012), the climate crisis was used by the elite as a catalyst for social stratification, by exploiting the shock and social unrest caused by famine and decline. Fundamental for Näsman's (2012) critique are the many source-critical problems associated with pollen data and chronology, and finally the difficulties in assessing settlement and societal (dis)continuity from fragmented and spatially distributed archaeological data. Näsman (2012:6) explicitly states that he sees no reason to revise previous conclusions (with reference to Näsman 1988a; 1988b), consequently situating the current debate along well-established entrenched positions.

The socio-political transformation, as described by both Myhre (2002; 2015) and Herschend (2009), had built up during the Migration Period, thus reflecting a significant but still long term development. Moreover, Moreland (2018) makes a strong point in demonstrating the deterministic perspectives prominent in several publications, but it might be unjustified to dismiss the Fimbulwinter theory on such grounds completely. Price and Gräslund (2015:119) argue for a considerable socio-cultural impact, but reject the notion of the climate event as total explanatory factor. There is, among archaeologists, no disagreement on the climate event itself. The debate is on the significance attributed to it, once more revolving around the old dichotomy between crisis and a change of practice. Hence, the debate echoes earlier discourses on the 6th century transition. Although earlier critics of crisis theories stressed regional and temporal complexity, there was

never any real disagreement on the profound character of the 6th century transition. The debate concerned how it should be understood.

Although Herschend (2009) and Myhre (2002) offer grand narratives, emphasizing the socio-political and economic dynamics behind cultural change in Iron Age Scandinavia, they nevertheless fall somewhat short in explaining why exactly the 6th century stands out as a pivotal moment in this picture. Despite assigning the climate some importance (Myhre 2002:13; Herschend 2009:288 and note 234), neither of them attributes to environmental factors any real instrumental value for Iron Age societies. Price and Gräslund (2015:119) maintain that the character and speed of change does indicate some kind of reinforcing factor, accelerating the situation across political and cultural boundaries. On the other hand, they do not offer any analytical framework for how the climate impact on prehistoric societies should be understood – what it is that conditions human vulnerability and responses to a perceived crisis. Moreland's (2018) critique is, consequently, understandable, as the mechanisms of social change and adaptation are poorly understood. By and large we are talking about major events in the archaeological and geoscientific record taking place concurrently, resulting in somewhat deterministic explanations that climate change must have been the main cause. There is a certain risk that our modern concerns with the impact of climate change today tempt us to exaggerate the influence of climate change on past societies, as the climate factor alone seems quite inadequate as an explanation of temporal and spatial variability. And as we have seen, the concept of crisis may not apply to all of Scandinavia. Instead of debating whether the climate downturn had an effect, we need to start discussing how it affected Iron Age societies, and why. In other words, why do different groups and areas seem to display different attributes of vulnerability and resilience to hazards? What is needed is a multicausal approach, recognizing both the long-term societal trajectories and the destructive potential of hazards for social change.

Long term trajectories in Norwegian archaeology

Changes in ceramics, warfare, dress, and settlement patterns still constitute important characteristics of the 6th century transition (eg. Røstad 2018:74). In the following, I will emphasize some recent studies within these fields of research, in order to highlight the process and character of change. Several in-depth studies support the notion of long-term dynamics, originating in the 3rd to 5th centuries, but reaching a peak in the 6th century. The 6th century stands out as an important transitional period, but the character of change cannot be attributed to climate change in itself. On the contrary, the climate downturn seems to have fuelled up, perhaps even enhanced, the process of change. As such, environmental factors can be understood as influential, but not necessarily decisive, for the course of human action.

Of the four above-mentioned categories, ceramics is often considered evocative, as it does not simply change, but more or less disappears from the archaeological record. Nonetheless, two recent studies highlight the long-term processes at play (Fredriksen *et al.* 2014; Rødsrud 2016). In western Norway, important changes in pottery use and production is evident during the 4th and 5th centuries, including an end to household production. In eastern Norway, a limited number of ceramics continue to show up in archaeological contexts throughout the 6th century. The gradual demise in pottery use and production coincides with overall changes in food technology. Cooking pits, for instance, are extensively used in the Early Iron Age, peaking around the 3rd to 5th centuries, with sporadic use in the Late Iron Age (Gustafson 2005; Bukkemoen 2016; Ødegaard 2019). A quantitative study of cooking pits in eastern Norway displays clear traits of regionality (Gundersen *et al.* in press). The use of cooking pits peaks and declines centuries earlier in the coastal region, compared to the major inland valleys. In a parallel process, new types of kitchen utensils and vessels come into use, signifying a move from large open-air rituals and gatherings to indoor feasts associated with

the hall and the warrior aristocracy (Bukkemoen 2016).

Changes within warfare and weaponry stress the profound character of the societal development at the time. Iron Age weapon graves from central Norway testify to changing tactics, from organised and collective fighting styles in the Early Iron Age, towards individualised practices in the Late Iron Age. Ingrid Ystgaard (2014) interprets the changes as expressions of changing loyalties and the increasing professionalization of warfare, favouring more aggressive tactics. Increasing accumulation of wealth among privileged families during the Roman Iron Age, and the subsequent turbulence of Migration Period Europe, seem to pave the way for new leadership ideals, in which territorial control is replaced by hegemonic control (see also Herschend 2009). A system of dependencies, developed and sustained by a warrior aristocracy, prevails throughout the turbulent 5th and 6th centuries, to be consolidated as a defining structure of Late Iron Age society (Ystgaard 2014:305).

Similar conclusions can be reached from Ingunn Marit Røstad's (2016; 2018) recent study of Migration Period and Merovingian Period brooches and costumes. While the composition and symbology of the female dress displays local and regional identities, the warrior-graves reflect affiliation to an overarching multi-ethnic warrior identity, thus mirroring the reshaping of Germanic identity in Post-Antiquity (cf. Hedeager 2011). Regional affiliations are also expressed in the graves of the elite. Røstad (2016:410-423) interprets their symbolism as a political strategy to create a common identity for a mixed retinue, in which the leading families functioned as cultural markers and bearers of collective memory and tradition.

Distributional patterns change during the Migration Period, probably reflecting socio-political processes, eventually culminating in the emergence of fewer and more defined regions in the mid-6th century. Røstad (2018) points out that the jewellery and dress display few signs of continuity, including new styles and techniques.

However, detailed studies reveal a continuation of tradition and symbolism. For instance, brooches were worn in the same manner. Although style is changing, the symbolic language remained consistent. Røstad's (2018:101) synthesis is, in other words, one of both crisis and continuity, in which new ruling families are (re)established after times of crisis and societal upheaval. That is, changes and replacements within the elite are camouflaged behind an attempt to maintain ancient traditions.

However, analysis of ceramics, weaponry, and brooches is primarily dependent on old finds, from more or less well-documented contexts. Newer settlement data, mostly collected through machine-assisted topsoil stripping, constitute an important and relatively fresh contribution to the debate. For instance, in the Uppland area of central Sweden, evidence for large scale abandonment at the end of the Migration Period (Göthberg 2007) has been focal for much of the debate. Both Löwenborg (2012) and Torun Zachrisson (2011, 2017) argue for a redefinition of property rights in the aftermath of the AD 536/540 events, which resulted in the accumulation of land within a small number of powerful families. Iversen (2013; 2016) reaches a similar conclusion when assessing the overall settlement data from Southern and eastern Norway (although criticized for a distinct retrogressive framework, see Amundsen and Fredriksen 2014:83; Gjerpe 2014, 2017:45-47). He suggests that depopulation led to large-scale division of farmland into smaller production units, as a result of a lack of labourers to maintain production levels on the larger estates. Surviving estates would, however, benefit from the crisis and give way to new dynastical structures in the Merovingian Period.

Gjerpe (2017:191-204, 222), in his recent assessment of the settlement data from eastern Norway, comes to a different conclusion. He emphasizes the complexity of the archaeological record and the importance of long-term perspectives, since important trajectories seem to start well before the 6th century. Important in this perspective is his assessment of the development

of permanent farmsteads, as opposed to the mobile and collective settlement structure of the Early Iron Age (see also Grønnesby and Heen-Petersen 2015). Apparently, increasing competition for cultivable lands culminates in a consolidation of farm boundaries and properties. This process is rooted in long-term socio-economic processes, leading up to settlement reorganisation during the 5th century. The process, while ongoing, seems to have accelerated during the 6th century, a change of pace attributed to the climate cooling and to subsequent societal upheaval (Gjerpe 2017:194-200). Spatial diversity in the archaeological record adds complexity to the overall picture. The Lake Mjøsa region, in particular, has traditionally been viewed in the light of stability and prosperity in the early Merovingian Period (Brøgger 1917; Shetelig 1925; Hagen 1950; Solberg 2003:198), which might be supported by recent settlement excavations (cf. Pilø 2005; Loktu and Hovd 2014; Bukkemoen 2016:124-126). Few signs of decline or abandonment have so far been identified, thus contradicting the general assumption of crisis and depopulation.

However, other parts of the country still testify to radical reorganisation, in particular southwestern Norway, where Late Iron Age graves seem to have been used as markers for property rights on abandoned Early Iron Age settlements (Dahl 2016). Viking Age (AD 800-1050) farmsteads are rarely found on the same site as Early Iron Age settlements, and there seems to be a change in settlement layout between the Early and the Late Iron Age (Björdal 2016). Only a few sites show continuity throughout the 6th century. The transition might, nonetheless, be less clear-cut than previously assumed (cf. Myhre 1979, 1980, 1982), as new settlement data suggest a gradual process of radical reorganization of the cultural landscape lasting well into the Viking Age.

To sum up, categories such as ceramics, food-technology, brooches, weapons, and settlements, all constitute important factors for understanding the 6th century transition, and testify to the profound character of social and cultural change at the time. However, the

associated long-term trajectories seem to contest the idea of the Fimbulwinter as a game-changer or socio-political “big bang” (cf. Iversen 2013). On the contrary, it might best be understood as

an enforcer or catalyst of ongoing processes. This means that, in order to understand the 6th century transition, Early Iron Age social and

DOMAINS	ROOT CAUSES	VARIABLES
Political robustness	Conflicts	Within group, between groups, migrations
	Networks	Distance, competitive/friendly, intermarriage
	Communication	Networks, technology
	Decision making	Household/tribal/state level, assemblies
	Demography	Population size, structure, health, disease load
	Ideology	Ties to land/places, belief systems guiding behaviour
	Knowledge	Tradition/innovation, oral/written, familiarity with hazards
Economic robustness	Trade	Distance, resources, necessities/luxury
	Resource allocation	Centralised authority
	Craft	Specialised, household
	Settlement structure	Scattered/clustered
	Ownership	Collective/private/centralised
Productivity robustness	Agricultural strategies	Specialised/diverse, intensive/extensive
	Land-use patterns	Erosion, degradation, salination, over-extension, deforestation
	Topography	Floods, landslides, marginal/productive
	Climate	Temperature, precipitation, annual variability, persistency, weather
	Access to resources	Terrestrial/wildlife composition, systematic/individual exploitation
	Storage	Capacity
	Pastoralism	Specialised/diverse, intensive/extensive, outfields

Table 1: Suggested variables affecting Iron Age societal vulnerability to disturbance, as outlined in Root Cause Analysis (see Oliver-Smith et al. 2017; Riede 2019; Torrence 2019).

economic structures and dynamics constitute a fundamental prerequisite.

Towards a human-environmental approach

The question, waiting to be answered, is nevertheless how we should understand spatial and temporal diversity in the archaeological record. Judging from the current state of research, long-term trajectories are decisive for understanding the character of change from the Early to the Late Iron Age, although they might be insufficient for explaining some characteristic features of the 6th century transition, in particular the pace of change and examples of large-scale settlement discontinuity. Herschend (2009:389-411) describes it as increasing stagnation leading up to a situation in great need of reform, culminating in almost revolutionary changes. On the other hand, profound societal transformations are not unavoidable consequences of stagnation. In that case, what might have triggered the process, and more precisely, why should environmental factors be taken into consideration?

Natural disasters, while usually being part of long-term environmental processes, are, through their impact on societies, social in character – they affect someone (Oliver-Smith 2002). Whether environmental processes or events, such as climate change, turn into disasters, depends on a variety of human and environmental factors, such as the type and magnitude of the event, levels of destruction, the character of the affected societies, the level of vulnerability or resilience to hazards, and the ability to adapt to changing circumstances. As such, disasters are to be understood as multidimensional phenomena, preconditioned by both human and environmental systems, affecting, and affected by, social, political, economic, and biological aspects.

The challenge, however, lies in conceptualising vulnerability in a prehistoric context, of which only fragments are preserved, documented, and available for analysis. Ideally, the totality of human systems needs to be researched, in part to

determine how different categories and domains contribute to societal vulnerability, but also in order to analyse which factors might trigger a disaster onset.

Root Cause Analysis might represent a way forward, in which the human-environmental preconditions for a climate crisis are disentangled and analysed (eg. Oliver-Smith *et al.* 2017). Numerous factors need to be taken into consideration within the political, domestic, and economic sphere, including resources and modes of production. In Table 1 a few suggestions are listed that might prove useful for such an approach, structured around political, economic, or productivity robustness. The list is, however, a work in progress, and not complete. Some of the variables concern several domains, while others need to be reconsidered, or perhaps separated to constitute a fourth category. The different factors are interrelated, as destruction within one domain would affect the rest. The table is, in other words, not a model, but a means to systemize possible variables affecting societal vulnerability.

A few variables are probably of greater long-term importance than the rest, in particular those concerning nutrition and basic commodities, such as agrarian productivity, land-use, resource allocation, storage, and outfield resources. A volcanic dust-veil, as suggested for the AD 536/540 events, would probably affect terrestrial growth, due to a combination of colder temperatures and reduced photosynthesis (Helama *et al.* 2018). For the Scandinavian countries, situated close to the northern liminal border for crop production, consequences could include crop failure, causing secondary effects like famine, reduced public health, and malnutrition. Such a scenario is supported by Arne Stamnes (2016) in his simulations of agrarian productivity in central Norway, which suggest major difficulties for crop production at a mean summer temperature decrease of just 1 °C. Epidemic ergotism might also have been a reinforcing factor, which affects grasslands and livestock as well (Bondeson and Bondesson 2014). The persistency of the climate cooling is

another important factor. A prolonged cooling would have had greater consequences than year-to-year temperature variation, but, as discussed early in the text, the direct climate impact remains a matter of some debate (cf. Büntgen *et al.* 2017; Helama *et al.* 2017; Newfield 2018).

Consequently, famine is a probable scenario, at least in parts of Scandinavia, but of unknown magnitude and duration. Furthermore, the degree of dependency on arable farming is somewhat unclear. Broad subsistence strategies are means to enhance cultural resilience to environmental change and crop failure. However, a large-scale environmental impact would probably generate both internal and inter-group conflicts, thus influencing through trade disruptions, warfare, or even migrations, societies less directly affected by natural disasters or catastrophic events. Throughout Scandinavia, different consequences are therefore to be expected, depending on the level of climate impact, available resources, the character of resource exploitation, and the robustness of political entities. As discussed by Axboe (2001), disturbing events might also have caused great psychological and eschatological consequences, even though the direct climatic impact on society might have been limited.

Concluding remarks

In this article, I have tried to discuss the Fimbulwinter theory in a research historical perspective, in order to disentangle the premises presented by both advocates and critics alike. By and large, the current debate follows the contours of previous discourses on the 6th century transition, at the risk of entrenching the arguments within two defined and established perspectives: material change as a reflection of crisis, and, secondly, material change as an expression of cultural innovation. Neither of these perspectives is satisfactory, as they both run the risk of downplaying either, in the first case, long-term socio-cultural dynamics or, in the second case, environmental factors. In other words, an environmental perspective is

inadequate as an analytical framework, since it is liable to provide simplified and deterministic interpretations of past societal change. The roots of environmental disasters must be studied from a social perspective, in which societal preconditions for vulnerability to hazards are analysed. Consequently, an integrated human-environmental approach must be developed, which takes into consideration the importance of both human and natural systems, and the interaction between them. There is, indeed, no contradiction between the two interpretative frameworks of crisis and a change of practice, as both perspectives are required for an in-depth understanding of the spatial and temporal complexity associated with the transition from the Early to the Late Iron Age. Considerable scientific potential might be obtained by employing a human-environmental approach, in which the 6th century transition is analysed at the interface of human and environmental systems, rather than within an explicit social or climatic interpretative framework.

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