PAST LANDSCAPES

The Dynamics of Interaction between Society, Landscape, and Culture

edited by
ANNETTE HAUG, LUTZ KÄPPEL, AND JOHANNES MÜLLER

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Preface

Past Landscapes: The Dynamics of Interaction between Society, Environment, and Culture

The development of societies, changes of climate and nature, and the history of cultures have been issues of research for a long time. Smooth transitions from one societal system to another as well as abrupt revolutions have been described and explained in great detail by sociologists and historians since the 19th century. Geologists and climatologists have been testing models of climate change by reconstructing past scenarios of natural conditions for the last few decades, and the history of human ideas and habits as important features of culture belongs to the core interests of the humanities in general.

The *interaction* between humans and nature in the past, however, has come into view as a systematic question only in more recent times. This interaction or rather interdependency of humans and nature constitutes a relationship in which one sustains the other and in which one even gives meaning to the other. It is just this meaningfulness in the relationship between humans and nature that is best represented by the term *landscapes*. Thus, the interdependency between *humans* and the *landscapes* they live in catches an essential condition of human life, in the present as well as in the past.

The volume *Past Landscapes* attempts to disentangle this interdependency in theoretical outlines as well as in exemplary case studies on historic sites. These investigations show that human living has always been deeply shaped by the surrounding landscapes and landscapes have always been significantly shaped by human living.

In the year 2005 at Kiel University, a group of scholars and scientists from both sides of the otherwise dividing line between humanities and natural sciences, including archaeologists, classicists, and natural scientists from different fields, decided to take up this important subject in an interdisciplinary manner. They formed discussion groups, designed common projects, and founded a graduate school, which became part of the German Excellence Initiative as the Kiel Graduate School on *Human Development in Landscapes* (GSHDL) in 2007. Since that time more than two hundred researchers – professors, PostDocs, and graduate students (seventy of them have completed their doctoral dissertations since then) – have been working together on questions of socio-environmental interaction from the Palaeolithic to the early modern period, from Scandinavia to Africa, from South America to Siberia.

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The present book is the first of two volumes that will provide an overview of the work of this extraordinary research community. The first volume presents paradigmatic papers covering pivotal issues of the overall research agenda. In the second volume, the (former) doctoral students – now alumni of the Graduate School – will present the main research results of their dissertations.

With the completion of this collected volume, we would like to thank those who have supported us in accomplishing our overall aims. On the one hand, the German Excellence Initiative made the comprehensive efforts of our interdisciplinary scientific work possible by their generous funding. On the other hand, Kiel University and its different institutions provided all possible support enabling us to develop our research network. In addition, we would like to thank Eileen Küçükkaraca for meticulous scientific editing work during the preparation of the present volume and Carsten Reckweg for editing the graphics and photos. To them and to all the unnamed supporters, we extend our warmest thanks.

This book is dedicated to the graduate students of Kiel GSHDL for their commitment and inspiration. Without them, our research on *Past Landscapes* would not have been such a great success.

Kiel, January 2018

Annette Haug
Lutz Käppel
Johannes Müller

Introduction

From Theories, Concepts and Practices on Human Development in Landscapes

Annette Haug and Johannes Müller

Past Landscapes presents some theoretical and practical attempts of scholars and scientists, who were and are active within the Kiel Graduate School "Human Development in Landscapes", to disentangle a wide scope of research efforts on past landscapes. Landscapes are understood as products of human-environmental interaction. At the same time, they are arenas in which societal and cultural activities as well as receptions of environments and human developments take place. Thus, environmental processes are interwoven into human constraints and advances. This book presents theories, concepts, approaches, and case studies dealing with human development in landscapes. On the one hand, it becomes evident that only an interdisciplinary approach can cover the manifold aspects of the topic. On the other hand, this also implies that the very different approaches cannot be reduced to a simplistic uniform definition of landscape (see Davidovic this volume). This shortcoming proves, nevertheless, to be an important strength. The umbrella term 'landscape' is a highly stimulating concept for a large variety of different approaches.

The first part of our book deals with a number of theories and concepts. **Johannes Müller** focuses on a pragmatic concept of landscapes and societies, which he translates into diverse aspects of human-environmental relations: economy, demography, climate and ecology, social organisation, productivity, ideology and innovation, and social space. He then shows how such diverse issues become relevant for different archaeological approaches (*e.g.* landscape archaeology, environmental archaeology, and social archaeology). **Antonia Davidovic** discusses the term landscape in its broad fuzziness. All uses of the landscape term combine physical features and symbolic aspects, but they differ with respect to the question if landscapes are conceived as given physical entities (containers) or as cultural products. Other possible implications are the spatial quality (the addressed scale), the processual character of landscapes, as well as their temporality, fluidity and relationality. As all of these aspects have many conflicting implications,

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she calls into question if the term can be used as an analytical concept. Theoretical considerations of **Vesa Arponen** and **Artur Ribeiro** set the frame for tackling rituals in past landscapes. Rituals are understood as a general anthropological practice in space. By discussing the underlying ideas of different – mainly sociological and philosophical – approaches, they provide theoretical tools for the analysis of a (pre-)historic phenomenon: monumentality.

The second part of our book deals with approaches to landscapes. **Annette Haug's** contribution refers to Lefebvre's categories of perceived, conceived and lived space. On this basis, she contrasts the built environment (lived space) and visual concepts (conceived space) of the early Greek poleis Athens, Corinth and Argos. It becomes clear that the conceived space is no mere reflexion of the lived space. Instead, the relation between lived, perceived and conceived space underlies constant changes. **Christian Horn** and **Gustav Wollentz** pursue questions concerning how memories, narratives, activities, habits and materially defined space (landscapes) are interrelated. By the comparison of two very different case studies – Scandinavian Bronze Age rock art and Bosnian war monuments – they show that it is human action, reflexion and communication, which lend meaning to material realities and spatial entities. **Wiebke Kirleis** approaches landscapes with the role that plants play as a formative constituent of human life, thus enabling them to be invoked as imprints and food identities in landscapes. Her reflection on the perception of plants is described in the use of wild/cultivated plants within Mesolithic to Bronze Age societies of Northern Europe. **Martin Furholt**, **Martin Hinz** and **Doris Mischka** reflect the creation and recreation of landscapes and the reproduction of social organizations. They conceive the megalithic long barrow of Flintbek (3500-3400 BCE) to be the result of a series of different and competing actions, which negotiate social belonging and social relations. **Gerhard Fouquet** and **Gabriel Zeilinger** address the role of scribality within the dynamic processes of city formation in Medieval Europe. Writing provides a means of dense, supra-individual communication, the possibility of self-administration and archiving but also a tool for the formation of urban networks. Thus, the contributions of Furholt/Hinz/Mischka and Fouquet/Zeilinger focus on two different media for the negotiation of power relations within social space: tombs and script.

The third part of our book introduces case studies for human development in landscapes. The role of past climates and human interactions is the main impetus of **Mara Weinelt's** research on the destabilization, modulation or even triggering of past societies. The description of Mid-Holocene climate changes in North Central Europe enables her to disentangle climate change and possible responses of Early Neolithic societies. Arguing with continuities and discontinuities in the location of Mesolithic and Neolithic sites in a region of the same area, **Martin Hinz** reconstructs "taskscapes" in daily practices and routines. Surprisingly, he could detect the importance of "hunting" for locational processes within the Neolithic. In contrast to Hinz, who argues mainly with spatial and economic data in his contribution, **Jutta Kneisel** is able to detect common use patterns of face urns across borders of Bronze and Iron Age societies in Europe. Their prevalent contextual use describes a general notion of transfer from one region to the other – the crossing of borders by trade and exchange that she observes in a very similar way during the Viking Age or the Hanseatic period. Even though **Oliver Nakoinz** analyses a different area and different societies in his contribution

concerning the Southwest German Iron Age, he also describes the dynamics based on a border transportation system, which furthers the role of the so-called "princely seats". In that sense, the role of short and long-distance trade for the constitution of landscapes and societies is comparable with Kneisel's approach. Dealing with early Anatolian state societies, **Walter Dörfler** reconstructs the environmental conditions of the Hittite Empire. Even if favourable environmental conditions might have triggered the flourishing of this first state society that was based on iron metallurgy, its breakdown cannot be linked to strong climatic shifts or events. **Ingmar Unkel** provides a similar interpretation on the role of palaeoenvironmental changes with respect to the transition from the Late Bronze Age to the Early Iron Age (ca. 1300-900 BCE) on the Greek Peloponnese. The palaeoenvironmental archives of Lake Stymphalia indicate a rather limited contribution of climate to this transition, while a more similar cold event recorded in the Stymphalian sediments coincides with the Late Antiquity Little Ice Age (500-700 AD). **Josef Wiesehöfer** combines different evidence on environmental landscape formation and the creation of an imperial landscape to a picture of the Iranian Achaemenid period, in which water management especially played an important role in economic processes, societal institutionalisation and its perception with an increasing urbanisation. While most of the case studies introduce one spatial level of an inquiry, **Ulrich Müller** and **Donat Wehner** are able to link three different spatial phenomena within the reconstruction of late medieval and pre-modern Europe. On a global scale, they discuss the settlement of Greenland and its nearly complete abandonment in the course of the 15th century. On a regional scale, the conflicts that emerged in connection with a pilgrimage site for unborn children and the change of confessions during the 16th century are highlighted for a small region near Oberbüren in Switzerland. Finally, on a local scale the difficulties in the life of a pastor of the North German parish of St. Catherine on the southern Eckernförde bay in the 17th century are investigated. In doing so, factualities and perceptions are set into a spatial-temporal frame of landscapes.

As intended by the GSHDL, the reader might follow our approach to delve into the multi-faceted theories, concepts and practices on past landscapes: from events, processes and structures in environmental and produced spaces to theories, concepts and practices concerning past societies.

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Landscape and the GSHDL 2007-2017

Ten Years of Research

Johannes Müller

Abstract

Based on the dynamic cooperation between the humanities, the natural sciences and the life sciences, the Graduate School "Human Development in Landscapes" (GSHDL) has contributed to setting new impulses concerning questions of the socio-environmental development of past societies and environments. In addition to numerous dissertations, which accomplished the specific implementation of the basic concept of the Graduate School through detailed studies, a new infrastructure has been established, which acts discursively in light of the previously developed triad of "environmental archaeology", "environmental history" and "environmental anthropology".

Introduction

"Human Development in Landscapes" is a rather general research topic that has played a role for some time in the field of classical studies and palaeo-environmental research at Kiel University. Both the reconstruction of environmental conditions of prehistoric and historic societies and the trans-disciplinary cooperation between the natural sciences and classical studies has a long tradition. In a research-history retrospect, this was already perceptible in 1665 when Kiel University was founded: one of the founding professors of the university, the doctor Johann Daniel Major (1634-1693), was not only the founder of the Botanical Garden in Kiel, in a more narrow sense the first botanical garden in Germany, but also one of the first excavators of Neolithic megalithic tombs and Bronze Age burial mounds in Northern Germany (Müller 2015a). In the field of classical studies, Peter Wilhelm

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Forchhammer was able to supplement the study of classical Greek texts with extensive landscape-geographical and even climatic studies. Additionally, as the founder of classical archaeology in Kiel, he also laid the foundation of today's collection of antiquities by establishing a museum for plaster casts of ancient works of art. Later, the archaeologist Gustav Schwantes (1881-1960) not only led decisive methodological discussions within the framework of continental archaeology but was also active as a botanist: some plant species are named after him. Cooperation between archaeology and the natural sciences, however, is of decisive scientific importance especially since the early 1960s for larger, European-wide pioneering projects concerning settlement archaeology by Georg Kossack, Bernhard Hänsel and Michael Müller-Wille, who combined scientific, archaeological, historical and geographical competences. For the first time in Central Europe, natural scientists were hired at an archaeological institute in Kiel.

Thus, it was not surprising that in light of the question on the relationship between society and environment and their history of reception, numerous scientists from cultural, social, natural and life sciences joined together in 2005 in order to establish initiatives on questions concerning human-environmental issues. Among others, a workshop was held at the Institute of Prehistoric and Protohistoric Archaeology, at which the developing potential in Kiel, e.g., not only in the field of molecular biology (aDNA) but also in social psychology, became apparent. Accordingly, it was a great opportunity to become active with the Graduate School "Human Development in Landscapes" together with other programmes within the framework of the Excellence Initiative. The 25 applicants of the successful application, which was submitted in 2006, represented different fields: ecology, pedology and geography (4), prehistoric and protohistoric archaeology (3), biology (2), landscape ecology and geoinformatics (1), material science (2), history (2), geophysics (2), social psychology (1), classical philology (1), dating and isotope research (1), petrology (1), psychology (2), pedagogics (1), legal medicine (1), and art history (1)[1]. The interdisciplinary nature of the new institution was represented, i.a., both by its speaker, Johannes Müller, who is from at an institute that belongs to both the Faculty of Arts and Humanities and the Faculty of Mathematics and Natural Sciences, and by its co-speakers Pieter M. Grootes (for the area of the natural sciences) and Lutz Käppel (for the area of the humanities). The latter has subsequently also been spokesman for the university priority research area SECC (Social, Environmental and Cultural Change), which was founded in connection with the Graduate School (Müller/Weinelt 2008). During the framework of the first phase of the Graduate School (2007-2012), a development was initiated with a body of junior professors in the fields of "environmental archaeology", "environmental history" and "environmental anthropology", which led to a deepening and readjustment of the original premises of practical scientific positions.

The various studies were realised by the PhD students, who were particularly supported during their research by the guidance of the scientific coordinator, Mara Weinelt, and an interdisciplinary teaching program. The extension application of the Graduate School was successful in 2012 with slightly different applicants and an extended concept so that the second phase of the Graduate School could continue to

1 All names of the Principal Investigators are listed in the first proposal (see footnote 4).

study human-environment relationships of the past in a reinforced context. In addition to historians (3), included among the applicants were geographers (3), prehistoric and protohistoric archaeologists (5), molecular biologists (2), pedagogues (1), classical philologists (1), human biologists (1), dating and isotope researchers (2), geoscientists (3), geologists (1), computer scientists (2) and for the first time also an economist (1)[2]. As new co-speakers, Cheryl Makarewicz (for the natural science fields) and Annette Haug (for the cultural science fields) joined the incumbent speaker. In praxis, newly created networks and laboratories have been utilised since 2012. As a central university institution, the Johanna Mestorf Academy for Socio-Environmental Research and Landscape Archaeology was also established, which coordinates both non-university and university research[3]. The work of the Graduate School (GSHDL) evolves within the framework of these structures and technical cooperation. Accordingly, from 2007-2017 numerous scientific discourses were advanced in dissertations and publications, based on the original and only slightly modified concept of socio-environmental research on past societies.

The basic idea

Scientifically the basic idea was and is *to gain an understanding of human development, for which one needs to detail the interactions between mankind and both its physical and perceived environment*[4].

Thus, the Graduate School 'Human Development in Landscapes' was and is focussed on an integrated research concept of the natural and cultural space. This implies that it does not just concern the interdisciplinary co-operation of the many scientific disciplines of the Natural and Social Sciences and Arts and Humanities participating in the School and its research focus. Instead, it daringly undertakes to use the study of 'reality' as a means to realise the universal attempt to consider human behaviour, with the whole of human activities, experiences, and understanding, within their spatial surroundings and their culturally modified, space-related living conditions.

The concept points toward the total complex of the natural, social, and cultural phenomena and processes in the comprehensive sense, at climatic and vegetation changes, at technical innovations, sustenance bases and settlement development, and at their social limitations and consequences, at the development of mentalities, communication, and social interaction.

The global theme of human developments in their cultural and natural environment is linked to the detection of cross-linkages between different factors: the influence of man

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2 All names of the Principal Investigators are listed in the second proposal (see footnote 4).

3 The directors are Claus von Carnap-Bornheim and Johannes Müller.

4 In this contribution to this volume, texts that originate from proposals of the GSHDL will be set in italics. The Principal Investigators from both proposals are (in alphabetical order): Oliver Auge, Hans-Rudolf Bork, Johannes Bröcker, Claus von Carnap-Bornheim, Klaus Dierßen, Manuela Dittmar, Rainer Duttmann, Anton Eisenhauer, Helmut Föll, Gerhard Fouquet, Hans-Jürgen Goetze, Pieter Grootes, Astrid Holzheid, Rainer Horn, Wolfgang Jaeger, Lutz Käppel, Lorenz Kienle, Wiebke Kirleis, Reinhard Koch, Olaf Köller, Ulrich Kuder, Cheryl Makarewicz, Rainer Mausfeld, Johannes Müller, Ulrich Müller, Almut Nebel, Oliver Nelle, Manfred Prenzel, Wolfgang Rabbel, Ralph Schneider, Stefan Schreiber, Bernd Simon, Bernhard Thalheim, Ingmar Unkel, Mara Weinelt, Nicole v. Wurmb-Schwark, Josef Wiesehöfer.

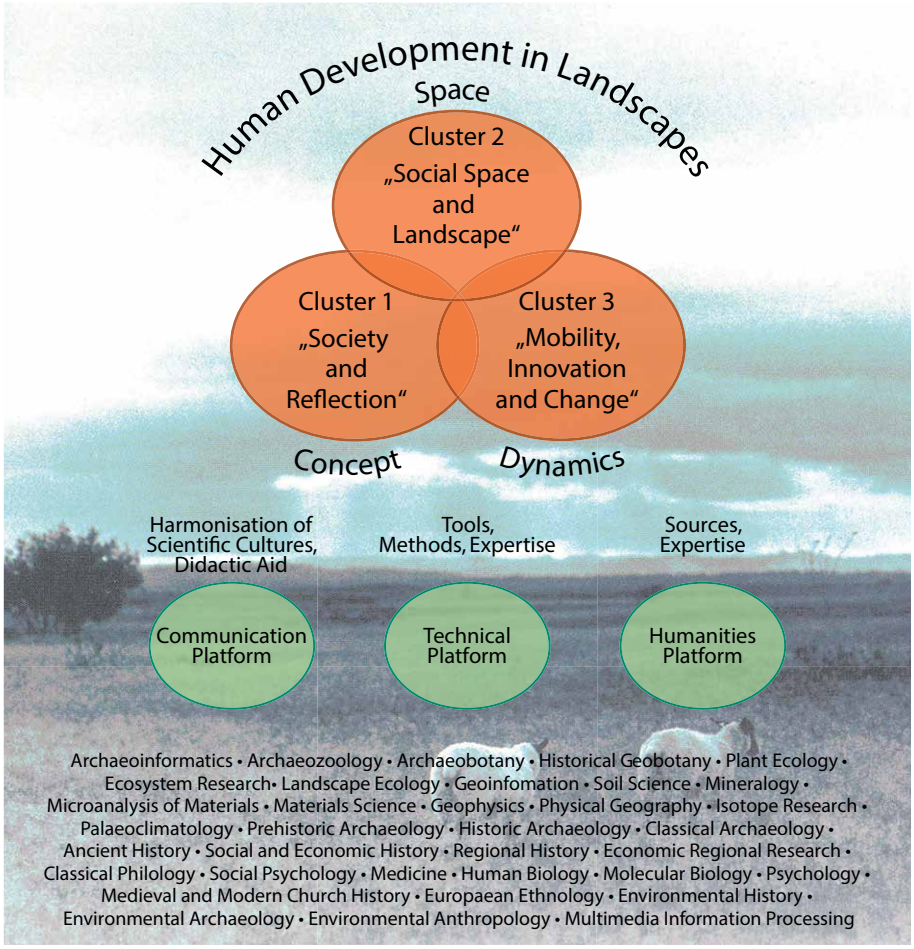

Figure 1: The structure of the Graduate School, mainly constituted by the Clusters, concentrating on different foci of the subject, and the Platforms, providing resources and expertise (diagram: H. Dietrich).

on nature and vice versa. Thus, the natural change of environmental conditions has to be uncovered at more precise timescales, while the human impact on the environment needs to be understood. The creation of cultural environments amplifies the meaning of landscape: Apart from natural conditions (individual: health and genetics; ecological: soil, climate, vegetation; technological: wind and waterpower, or natural resources), social constants (social hierarchies, ideologies) play a decisive role in the formation of landscapes. Social environments, within this concept of landscapes, are not only reflected by material remains but also by the spatial imprints of mobility and sustainability. The development of social space under specific ecological conditions is linked to the ideological systems, which maintain societies, for economic reasons or ritual purposes, together. In this respect, the study of landscapes does not concern only environmental, demographic, and social reconstructions but also the ideological changes regarding 'landscapes': the conception that individuals and societies have concerning 'nature'.

Three research cores were developed, in which scholars and students were active: **Cluster 1**: Society and Reflection; **Cluster 2**: Social Space and Landscape; **Cluster 3**: Mobility, Innovation and Change. These were supported by infrastructural platforms (Fig. 1).

Research Cluster 1: Society and reflection

The topic comprises two distinct, though complementary aspects. The first aspect pertains to the physical/geographical concept of landscape and a corresponding gamut of questions related to it. The second aspect concerns 'landscapes' as mental and social concepts. Both aspects are intimately interwoven: while our mental ability to think about landscapes originated from the physical environments in which we have evolved biologically and culturally, our corresponding conceptual frameworks, on an individual, social, and cultural level, prefigure and shape our way of reflecting on landscapes and human development therein. Thus, our ideas about potential future human developments in landscapes are crucially shaped and constrained by the way the concept of landscape is represented in the individual and collective minds.

How deeply the concept of 'landscape' is rooted in our conceptual apparatus can be recognised by linking it to a partly related, but much more general concept, namely that of 'space'. In the case of 'space', the corresponding problems are more familiar, because they have been extensively dealt with in the history of ideas.

'What this space is', however, is by no means unequivocal. The basic insight into the difference between 'physical' and 'anthropological' notions of space was already formulated by Immanuel Kant: according to Kant space is a kind of matrix a priori, which enables human beings to perceive extension. Space is therefore not existent by itself, but it is exposed by the thinking of the human being. That means that space is not an attribute of the physical world, but an inherent category of human thinking, a set of rules organizing human perception.

Culture can be described as a symbolic form of human activity. In this connection, the notion of space can be differentiated as organic or epistemological on the one hand, and as symbolic on the other (Cassirer). The first two can be obtained by all living beings. The last one, however, is a specifically human construction, for symbolic spaces are constructed by the ideas of things and their correlations. In consequence, if we describe landscapes as a setting of human culture, they can be treated as symbolic spaces in the Cassirerian sense. That means, while landscapes influence the formation of human culture and human culture changes landscapes, this bi-directional relationship is mediated by our way of perceiving landscapes, which itself is again culturally determined. Therefore, the study of different perceptions of space and landscapes in different cultures and societies is an important step in any research on human development in landscapes.

Nevertheless, as much as space is a category of individual mental construction, even more, landscape is also a product of social construction. For landscape is not only the physical character of the surface of a certain region, it is also a notion of social imagination; even the word 'landscape' signifies intellectual and emotional human involvement. Moreover, societies and communities design their own identities in landscapes, and transform themselves and their identities in constant interaction with their environment. This transformation eventually affects the habitats as well, so that social transformation and the transformation

of landscapes are interdependent. This historical process happens within a framework of socially 'imagined landscapes'.

The concept of 'Human Development in Landscapes' is inherently Janus-faced and comprises above and beyond its physical aspects, with which various domains of the Natural Sciences will deal, aspects of how the human mind reflects upon the relation of individual, society and landscapes. In order to deal with pertinent questions, different levels of analysis (individual, social, cultural) have to be employed and a great variety of different types of evidence has to be scrutinised (e.g. historical data, artefacts, written sources, environmental data, experimental data, different types of analysis of qualitative data, subjective experiences). Our ways of reflecting upon human developments in landscapes can therefore adequately be understood only by articulating the perspectives of quite different disciplines, such as classical philology, archaeology, history, palaeo-ecology, art history, social psychology, and cognitive science.

We intend to make the dual character of 'landscape' as a physical/geographical concept, on the one hand, and as a mental and social concept, on the other hand, itself a topic of systematic inquiry in order to better understand how this dual character influences our way of dealing with corresponding cultural and technological developments.

The fact that our language and languages in general are deeply imbued with metaphors that originated from concrete landscape- or space-related concepts appears to us to be of particular importance. These metaphors themselves strongly influence our way of thinking about and dealing with landscapes. The psychological perspective throws light on the antecedents and consequences of identities as "places in the world". It examines how identity formation is connected to specific geographical spaces and landscapes and how human development in such spaces has left notable traces in our thinking and speaking about identity as evidenced, for example, by the common use of spatial metaphors (e.g. insiders vs. outsiders, ingroups vs. outgroups). Furthermore, the cognitive ordering of the physical landscape is reflected in material culture: the spatial distribution of monumental structures and the conscious layout of the domestic space are reflected in the human mind. By way of employing a culturally comparative perspective, both synchronically and diachronically, we want to achieve a better understanding of how such culturally and linguistically transmitted ideas shape our conceptions about Human Development in Landscapes.

Owing to its great relevance for the future development of our societies, we want to emphasise, in our interdisciplinary approach, the dynamic aspect of transforming landscapes, both concretely and culturally. We aim to investigate the ways in which our ideas about future developments have been shaped by the body of metaphors and conceptions that have emerged, and were culturally transmitted in the history of (Western) societies.

According to our concept of human development in landscapes as ongoing process of interdependencies between the human mind(s) and/or human society(ies) and landscape(s), projects explored the network of interdependencies as a whole in a given example, or they rather focus on single elements of the process. The associated PhD research projects focussed on:

1. *the* ***impact of landscape on*** *the human mind and/or society* (Fig. 2: red arrows),
2. *the* ***shaping of landscape by*** *the human mind and/or society* (Fig. 2: yellow arrows),
3. *the cultural mechanisms and transformations of mental and social* ***reflection*** *on landscape and on human development in it* (Fig. 2: blue arrows).

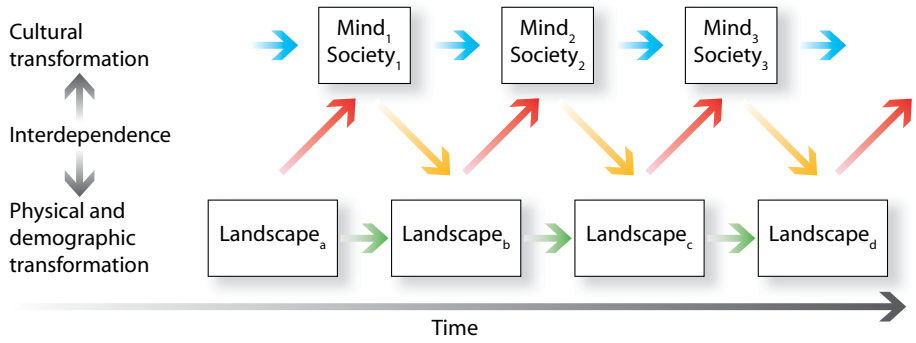

Figure 2: Society and reflection in landscapes (diagram: H. Dietrich).

Accordingly, within **Cluster 1** various dissertations were completed, which dealt with the three mentioned areas in quite different ways with often specific archives[5].

Concerning the **impact of landscape on** the human mind and/or society: In **Janine Duerr's** (2009) dissertation ("Von Tierhütern und Tiertötern: Mythos, Ethik und Jagdverhalten im kulturhistorischen Vergleich"), the double world of herders and hunters is analysed, whereby a focus is placed on the reception of living and inanimate environments and on hunting behaviour and associated taboos (Duerr 2010). **Karina Iwe** (2015) is successful in identifying the influences of various landscapes on the development of the Scythian animal style on the Eurasian steppe belt in her dissertation ("A Study of the Scytho-Siberian Animal Style in the Eurasian steppe belt. Multi-figured compositions"). In her investigation ("Communication Structures of Early and Middle Neolithic Societies in North-Central Europe"), **Luise Lorenz** (2015) processed the influences, i.a., of Northern German landscape diversity on the communication structures of Funnel Beaker societies (Lorenz 2018). **Anne Liewert** (2015) discovered elements of environmental medicine in the corpus of the Hippocratic scriptures, in particular, the so-called 'Umweltschrift' from the 5th century BC ("Meteorological Medicine in the Hippocratic Corpus") (Liewert 2015). **Maren Biederbick** (2017) reflects on imprints of loyality and corporate identity in Early Modern landscapes in her dissertation ("'Imprints of Loyalty and Corporate Identity in Early Modern Landscape' – New Index to Paolo Giovio's and Gabriele Symeoni's Devises, Lyon 1574"). **Christoph Nübel** (2011) analysed the spatial experiences of German soldiers during the First World War on the Western front with respect to the design of various defense systems ("Perceptions of Landscapes and Space. German Soldiers in the Great War"). **Artur Ribeiro** (2016) elucidates in his highly theoretical dissertation ("Archaeology and the Historical Understanding") on the shaping of the mind by institutions that are reconstructed on theoretical grounds in archaeology.

Concerning the **shaping of landscape** by the human mind and/or society: In her dissertation ("Time and Stone: the Genesis of Megaliths and Megalith Societies in Europe"), **Bettina Schulz Paulsson** (2014) investigated the temporal and mental processes involved in the construction of megalithic tombs in various European regions

5 In the second phase of the Graduate School (2012–2017), the subcluster concept was continued without changes.

(Schulz Paulsson 2017). **Natalia Toma-Kansteiner** (2015) was concerned with Roman marble production and the associated trade routes ("Marble and the Monumentalisation of the Urban Landscape of the Roman Cities. The Phenomenon of Marble Trade and its Consequences on the Roman Architecture and on the Appearance of the Roman Cities during 1st – 3rd Century AD").

Concerning the cultural mechanisms and transformations of mental and social **reflection** on landscape and on human development: **Manuel Fernández-Götz** (2012) identified changing aspects of environment and networks in Iron Age Iberia in his dissertation ("Identity and Power: Northeast Gaul from the Early Iron Age until Romanization (600 BC – AD 70)") (Fernández-Götz 2014). **Nicole Taylor** (2013) was able to reconstruct "burning questions" in spatial contexts of Bronze Age rites of passage at death ("Burning Questions – Identity and Late Bronze Age Cremation Cemeteries") (Taylor 2016). **Sonja Plischke** (2014) investigated the influences of landscape on the formation of the Seleucid kingdom in Hellenistic Iran ("The Seleucid Kingdom and Iran – The Development of Empire-building in the East") (Plischke 2014). Silvia Balatti (2014) dealt with the social conditions of hill tribes in ancient Iran in connection with the Zagros Mountain area ("Mountain Peoples in the Ancient Near East: The Case of the Zagros") (Balatti 2017). **Chiara Matarese's** (2017) dissertation ("Deportation of People in the Achaemenid Empire") also reflected on processes and cultural transformations of landscapes, in this case, in ancient Iran. The production of knowledge in the context of monument preservation praxis was the topic of **Jelena Steigerwald's** (2014) dissertation ("Denkmalschutz im Grenzgebiet. Eine Analyse der Wissensproduktion und der Praktiken des Denkmalschutzes in der deutsch-dänischen Grenzregion im 19. Jahrhundert") (Steigerwald 2015). **Merle Zeigerer** (2015) analysed the role of war correspondents during the German colonial wars ("Mental Appropriation of Colonial Landscapes by War Correspondents – Based on the Example of German Colonial Wars in China, German Southwest Africa and German East Africa") (Zeigerer 2015). **Kathrin Marterior** (2016) described the bilingual landscape in the context of the Slavic settlement of Holstein ("Slavic settlements in Holstein: Bilingual language landscape?").

Research Cluster 2: Social space and landscape

The developments of human societies were shaped by the landscapes in which they took place and in turn shaped those landscapes. Both societies and landscapes evolved over time, partly interactively, partly under the influence of external factors like climate (Fig. 3).

Traces, left at and below the present landscape surface, offer a non-written archive of human development that can be read together with its time frame using various methods available in natural sciences. This information complements that from written and oral sources, making other landscape and climate conditions and other stages of human development accessible to research, and extending the study of the dynamic aspects of transforming landscapes far back in time. In addition, critical reflection on the symbolic significance of objects, structures, and landscapes may lead to new interpretations and insights.

The geological, biological, and climatological components of environmental change need to be assessed to extract the purely anthropogenic changes either by modelling or by direct observation. While soil scientists, geographers, geologists, and ecosystem researchers reconstruct

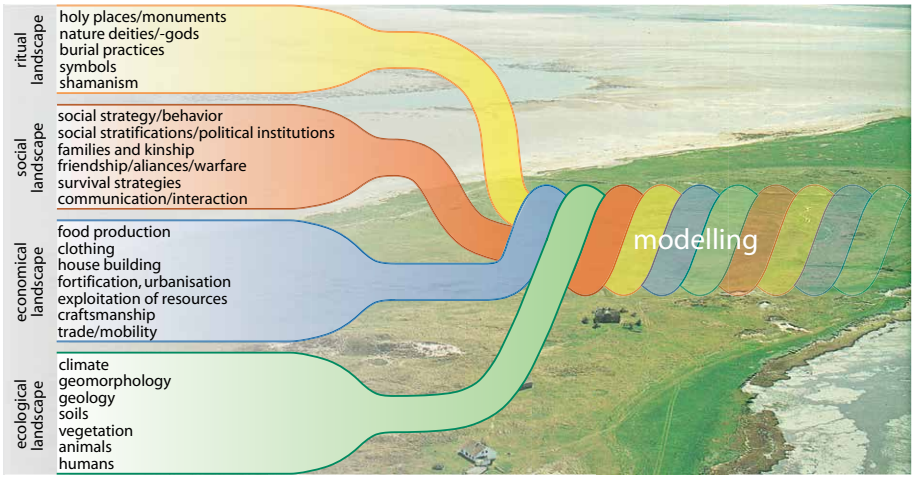

Figure 3: Different spheres of landscapes that are interwoven (diagram: H. Dietrich).

soil use and landscape dynamics, archaeo- and historical botanists explore the development of vegetation; and archaeo-zoologists trace faunal change and domestication, and palaeo-climatologists quantify climatic and hydrologic forcing. Scientific dating methods provide a time frame for bio- and geo-scientific reconstructions.

The intentional development and alteration of the landscape by human societies is a product of social structures and symbolic systems, including the ritual sphere. Settlement structures, of which characteristics are determined by social groups and interactions and by natural conditions alike, are a significant component of any landscape. Geophysical surveying methods provide a valuable assistance in making visible the spatial layout and character of buried remnants of identified settlements and in identifying hidden sub-surface traces of human activities in the landscape. The interpretation of the survey results in relation to the form of social organisation of the human societies concerned is subject to methods supplied by prehistoric and proto-historic archaeology, including selective excavation. The layout of settlement systems and settlement hierarchies within specific environments, the division of local and regional environments in areas for domestic and sacral uses, and the interrelation of identity groups by communication spheres provide options for analysing differences within the human adaptation and cultural reshaping of environmental premises. Ceremonial spaces and structures provide evidence of the conceptual space and environment frameworks of early societies. Defensive structures and their location in the landscape reflect competition for and defence of natural resources and development of local or regional competition and dominance of cultures. Objects found within the settlements may indicate, in their fabrication and in the materials used, trade networks as well as patterns of political influence, war, and occupation.

The development of vegetation and topography of the landscape is not only determined by human societies, but also by climatic variations, affecting, for example, temperature and regional hydrology at decadal to millennial time scales. Thus, the development of natural landscapes without human influences needs to be quantified by pollen analysis, archaeobotany, archaeozoology, and ecosystem studies of topography and soils, in parallel with similar studies of human-influenced landscapes in order to bring out the human influences. Growing settlement

density and increasing sophistication and extent of human activities influence the regional and possibly global climate; not only in the course of industrialisation, e.g. greenhouse gas emissions, damming and water management, but also well before historical times through deforestation, fires, and soil erosion induced by land and forest use for agriculture and construction.

Social spaces in landscapes are the most visible imprint of human development under different environmental conditions in time and space. The cluster records and catalogues this imprint using selected regions as 'laboratories' to study and quantify the interrelations between environment and humans. Both the impact of human activities on the environmental record through time and the changing pattern of human settlement systems and landscape concepts are themes, which were and are at the root of the PhD research projects within this cluster. A further topic was and is the development of methods and proxies for quantifying natural and human impacts. The overall research strategy will be to describe the interaction of the development of the ritual, social, economical and ecological compartments of landscape.

Within the scope of Cluster 2, three research foci on "**social and ritual landscapes**", "**changing technologies and landscapes**" and "**social communication and environmental conditions**" were defined in the first proposal of the Graduate School. In the second phase (from 2012), these were augmented or expanded by the research foci "**social space and environment**", "**social space in transformation"** ("increasing complexity") and "**social communications and environmental conditions**" ("social links and changing environments"). Depending on the submitted applications, not all of these foci were covered or evenly represented.

Focus 1: Social space and environment

Numerous dissertations dealt with the reconstruction of the relationships between humans and the environment at individual sites or in small regions, mostly in a processural perspective. On the basis of reconstructed environmental and/or relevant social events, processes and finally the resulting structures were often reconstructed in a diachronic perspective. This is the case in the following listed PhD theses:

– **Katerina Glykou** (2011): "Neustadt LA 156 – Ein submariner Fundplatz des späten Mesolithikums und des frühesten Neolithikums in Schleswig-Holstein. Untersuchungen zur Subsistenzstrategie der letzten Jäger, Sammler und Fischer an der norddeutschen Ostseeküste" (Glykou 2016). – **Martin Hinz** (2011):"Neolithische Siedlungsstrukturen im südöstlichen Schleswig-Holstein: Dynamik in Landschaft und Besiedlung" (Hinz 2014). – **Carolin Lubos** (2011): "Geomorphologisch-umweltarchäologische Untersuchungen der Genese eines urgeschichtlichen Siedlungshügels bei Niederröblingen (Sachsen-Anhalt) und seiner Umgebung". – **Robert Hofmann** (2011): "Okolište – Spätneolithische Keramik und Siedlungsentwicklung in Zentralbosnien" (Hofmann 2013). – **Annegret Larsen** (2012): "Past natural and anthropological altered sediment flux in the Spessart Mountains – a Central European landscape". – **Magdalena Wieckowska** (2012): "Palaeocological studies for the reconstruction of human-environment interactions on insular sites in Schleswig-Holstein". – **Sarah Nelly Friedland** (2012): "Die Olsborg und ihr Umfeld. Entstehung, Entwicklung und Bedeutung einer slawenzeitlichen Region in Wagrien". – **Mykola Sadovnik** (2012): "Reconstruction of the Forest and Land Use History from Neolithic to the Present for the Westensee Area, Schleswig-Holstein, Germany, using a Multi-Proxy Approach". – **Svea Mahlstedt** (2012): "Das

Mesolithikum im westlichen Niedersachsen. Untersuchungen zur materiellen Kultur und zur Landschaftsnutzung" (Mahlstedt 2015). – **Susann Stolze** (2012): "Human Impact and Environmental Change during the Neolithic in the Carrowkeel Area, Co. Sligo". – **Hannes Knapp** (2012): "Habitat Harz: Paläobotanische Untersuchungen zur Umweltgeschichte eines Mittelgebirges". – **Engdawork Assefa** (2012): "Landscape Dynamics and Sustainable Land Management in Southern Ethiopia". – **Doris Jansen** (2013): "Holocene Wooded Environment and Wood Economy of Northern Germany – Investigated by Archaeo- and Geoanthracological Methods". – **Elke Hänßler** (2013): "Holocene coastal evolution in Greece: Lagoons as geo-archives". – **Ricardo Fernandes** (2013): "Challenges, approaches, and opportunities in radiocarbon reservoir effects". – **Sarah Diers** (2014): "Mensch-Umweltbeziehungen zwischen 4000 und 2200 cal BC: Vegetationsgeschichtliche Untersuchungen an Mooren und trichterbecherzeitlichen Fundplätzen der Altmark" (Diers 2018). – **Marta Dal Corso** (2014): "Environmental history and development of the human landscape in a northeastern Italian lowland during the Bronze Age: a multidisciplinary case-study" (Dal Corso 2018). – **Stefanie Bergemann** (2015): "Zauschwitz (Lkr. Leipzig): Siedlungen und Gräber eines neolithischen Fundplatzes" (Bergemann 2018). – **Franziska Hage** (2015): "Büdelsdorf/ Borgstedt: eine trichterbecherzeitliche Kleinregion. Siedlung, Grabenwerk, megalithische und nichtmegalitische Grabanlagen" (Hage 2016). – **Jan Piet Brozio** (2015): "Megalithanlagen und Siedlungsmuster im trichterbecherzeitlichen Ostholstein" (Brozio 2016). – **Hauke Dibbern** (2015): "Das trichterbecherzeitliche Westholstein: Eine Studie zur neolithischen Entwicklung von Landwirtschaft und Gesellschaft" (Dibbern 2016). – **Camille Butruille** (2015): "Mid- to late Holocene seasonal variability in northern Germany and adjacent oceans and its potential impact on human societies".

– **Felix Rösch** (2015): "Das Schleswiger Hafenviertel im Hochmittelalter. Entstehung – Entwicklung – Topographie". – **Andrey V. Mitusov** (2015): "Geomorphometric Regularities of the Spatial Distribution of Colluvial Deposits". – **Uta Lungershausen** (2016): "Late Holocene aeolian activity and landscape development in a northern German inland dune system – An approach to spatially reconstruct past landscape dynamics using geoarchaeological records and scientific visualization techniques". – **Hermann Gorbahn** (2016): "Pernil Alto – An agricultural village of the Middle Archaic Period in Southern Peru". – **Michael Teichmann** (2016): "Mensch und Landschaft im südwestlichen Latium in der römischen Antike". – **Maria Gelabert Oliver** (2017): "Landscape Distribution of Talaiotic Monuments as Markers of Social Space". – **Svetlana Khamnueva** (2017): "Landscape Development and Soil Transformation in the Former Viking Settlement Hedeby".

Focus 2: Social space in transformation: Increasing complexity

In three dissertations, the increasing complexity of developments was in most cases empirically investigated:

– **Kemal Moetz** (2011) analysed aspects of sedentism in the aceramic and early ceramic Neolithic of Upper Mesopotamia in his dissertation on "Sesshaftwerdung. Aspekte der Niederlassung im Neolithikum in Obermesopotamien" (Moetz 2014). – **Andrea Ricci** (2014) conducted "An Archaeological Landscape Study of the Birecik-Carchemish Region (Middle Euphrates River Valley) between the 5th and the

3rd Millennium BC" (Ricci 2017). – **Monica De Cet** (2014) completed her dissertation on "Long-Term Social Development on a Mediterranean Island: Menorca between 1600 BCE and 1900 CE" (De Cet 2017).

Focus 3: Investigation of social and ritual landscapes

In particular, the reconstruction of local ritual foci and their role in the landscape, the relationship of different worldviews to each other in larger regions and the change of social institutions in the context of environmental conditions were discussed in the following dissertations:

– **Christoph Steffen** (2011) analysed social structures and space in the Southwest German Iron Age in "Gesellschaftswandel während der älteren Eisenzeit – Soziale Strukturen der Hallstatt- und Frühlatènekultur in Baden-Württemberg". – **Donat Wehner** (2012) studied structure and change of Slavic settelement areas in "Das Land Stodor. Eine Studie zu Struktur und Wandel der slawenzeitlichen Siedlungsräume in Havelland und in der nördlichen Zauche" (Wehner 2012). – **Ralph Grossmann** (2015) analysed the dialectic relationship between Corded Ware and Bell Beaker rituals in Germany in "Das dialektische Verhältnis von Schnurkeramik und Glockenbecher zwischen Rhein und Saale" (Grossmann 2016). – **Kay Schmütz** (2015) analysed different concepts of monumentality in "Die Entwicklung zweier Konzepte? Großsteingräber und Grabenwerke bei Haldensleben Hundisburg" (Schmütz 2017). – **Julia Menne** (2017) reconstructed Neolithic networks in Northwest Germany in "Keramik aus Megalithgräbern Nordwestdeutschlands. Interaktion und Netzwerke der TRB-Westgruppe" (Menne 2018).

Focus 4: Changing technologies and landscape

The approach to register technological developments and to reconstruct their effects on the social and natural environment was pursued in a number of dissertations:

– **Arne Paysen** (2010) studied "Nachhaltige Energiewirtschaft? Brenn- und Kohlholznutzung in Schleswig-Holstein in Mittelalter und früher Neuzeit" / Sustainable energy economy? The use of forests for fire and charring wood supply in Schleswig-Holstein during Mediaeval and early Modern Times. – **Stefanie Klooß** (2010) investigated, "Holzartefakte von endmesolithischen und frühneolithischen Küstensiedlungen an der südwestlichen Ostseeküste" (Klooß 2015). – **Rémi Berthon** (2011) completed his dissertation on "Animal exploitation in the Upper Tigris River Valley (Turkey) between the 3rd and the 1st millennia BC". – **Vincent Robin** (2011) analysed "Reconstruction of fire and forest history on several investigation sites in Germany, based on long and short-term investigations – Multiproxy approaches contributing to naturalness assessment on a local scale". – **Daniela Moser** (2016) examined "Wood in the Roman Age: cultural landscapes, forest exploitation and timber circulation in Southern Italy". – **Daniel Zwick** (2016) investigated "Maritime Logistics in the Age of the Northern Crusades".

Research Cluster 3: Mobility, innovation, and change (adaptation and innovation)

Mobility, innovation, and change denote a combination of concepts emphasizing dynamics in the overall theme of human development in landscapes. All three terms refer to processes altering humans, their societies, and the landscapes they inhabit over time. Man-environment interactions have been influenced by demographic, technical, and organisational changes within human societies and also by natural conditions, such as weather, climate, and ecology.

Mobility is to be understood both geographically and sociologically. Therefore, the term is clearly linked to the conditions, dispositions, and possibilities of individuals as well as societies with regards to the adoption and implementation of innovations of any kind, be it technological, ideological, or sociological. All this is subjected to spatial and ecological conditions that the manifold types of environments provide.

Innovation, understood in a broader sense, encompasses the implementation of a new tool, process, idea, or value that exceeds the existing state in a given cultural context and therefore changes this context. Its complement in the context of cultural change is the concept of tradition.

While mobility and innovation are clearly linked to human actions, the term change also entails flux and impermanence that are not directly caused by humans. In contrast to innovation, change refers to the transition from one state to a different one, irrespective of the notion of novelty.

The overall theme of dynamics is dependent on the concept of time. For most topics described below, a reliable chronology is essential and will be the basis on which further investigations can stand. Depending on the period studied, projects within this cluster will investigate dynamics occurring over very different time intervals. While in the Palaeolithic, events or changes are placed in time intervals that can cover several millennia, more recent periods warrant temporal differentiation on a much smaller scale. Appropriate dating methods will be chosen to fit the needs of the specific projects, being radiocarbon dating, correlation with historical events, tephra layers (when available), or U/Th dating, among others.

The theme of mobility, innovation, and change of this cluster involves the studies of humans, animals, plants, and artefacts addressed by different disciplines such as history, typo-stylistic analysis of artefacts, trace element analysis, osteological investigations of human skeletal remains, isotope analysis, human molecular genetics, archaeozoology, or archaeobotany. The study of human development in landscapes with an emphasis on dynamics requires an integration of all findings from the disciplines mentioned above into a framework of historical, social, and environmental development.

In light of the developments of GS phase 1, the title of Cluster 3 has been changed to 'Adaptation and Innovation' to provide more room for the study of indigenous developments – in the form of adaptive strategies or innovations – from supra-regional to local scales. It should be clear that the Cluster seeks to investigate the variety of strategies that humans use in order to adapt to and intentionally shape their own natural and social landscapes. In addition, biological adaptation, where phenotypic traits with a genetic basis in animals and humans have adaptively evolved in response to changing natural and anthropogenic environments may also be considered.

Within the cluster, 5 PhD projects were realized. **Rouven Schneider** finished his study on "Kommunikation und Interaktion. Kontakt- und Einflusssphären während der jüngeren Bronzezeit und älteren Eisenzeit Europas" in 2011. Typological spatial-temporal analyses were used to reconstruct mobility and change. In his dissertation "Molekulargenetische und archäologische Untersuchungen zur Domestikation und Züchtung des Schweins (*Sus scrofa*)", **Ben Krause-Kyora** (2011) described gift-giving and first domestication between societies of different economic backgrounds by using and interpreting aDNA results. In 2012, **Melanie Harder's** work on "Rekonstruktion humaner Pigmentierungsmerkmale mittels SNP-Analyse – Entwicklung eines molekulargenetischen Analyseverfahrens sowie dessen Anwendung an degradierter DNA" integrated new approaches on aDNA to the archaeological world. The dissertation "Tracing human mobility and cultural diversity after the fall of the Western Roman Empire: A multi-isotopic investigation of early medieval cemeteries in the Upper Rhine Valley" (2014) was the result of **Christine Schuh's** investigations. **Marion Bonazzi** (2016) identified diseases in her dissertation "Genomic study of *Mycobacterium leprae* in medieval northern Europe".

Environment: Archaeology, history, anthropology

The content-related conception and the integration of doctoral candidates and scientists in the first phase of the Graduate School were also promoted by new junior research groups. The *JRG Environmental Archaeology* (Wiebke Kirleis) studied and continues to study pre- and protohistoric human development in landscapes, linking aspects of the physical level of past human-environmental interaction with aspects of the reflective level of cultural conceptualization of landscapes. The *JRG Environmental History* (Ingmar Unkel) focused and continues to focus on the development of humans' relations to nature in the course of history. Hence, research in this field uses methods and approaches from both natural sciences and those disciplines from the humanities that refer to written sources. The *JRG Environmental Anthropology* (Antonia Davidovic) explored human-environment relationships by analysing the perceptions and meanings of landscape and nature, the practices involved in the production of landscape and nature as well as the theoretical debate of these terms in different cultural, social, and natural sciences.

As of 2012, the Graduate School and the Johanna Mestorf Academy increasingly developed a postdoctoral programme, which, on the one hand, reflects the increased demand for middle level positions in the European context but, on the other hand, also represents a means of integrating additional theoretical and methodological aspects in the Kiel research context. The individual topics include aspects on "social and landscape theory", "material culture", "palaeodemography", "urbanity", "archaeological conflict research", "social inequality", "isotopy" and "dendroarchaeology". From the various fields, publications have resulted on new approaches, which describe the dynamics of developments in Kiel (*e.g.* Arponen *et al.* 2015; Arponen 2017; Carnap Bornheim *et al.* 2012; Dörfler *et al.* 2012; Dreibrodt *et al.* 2017; Hinz *et al.* 2012; Eriksen 2010; Feeser/Furholt 2014; Hansen/Müller 2017; Horn 2014; Käppel/Pothou 2015; Kirleis/Fischer 2014; Krause-Kyora *et al.* 2013; Kleingärtner *et al.* 2013; Kneisel *et al.* 2012; Miller/Makarewicz 2018; Müller 2015; Müller *et al.* 2016; Nakoinz/Knitter 2016; Weinelt *et al.* 2015).

Socio-environmental dynamics over the last 12,000 years: The creation of landscapes

The results of the dynamically developing questions and investigations have been and are being organized in small and large workshops with numerous partners. Since 2009, the International Workshop: "Socio-Environmental Dynamics over the Last 12,000 Years: The Creation of Landscapes" has been held every two years (2009, 2011, 2013, 2015, 2017), during which the different scientific developments of both methodological and content-related aspects become apparent in many sessions through the cooperation of mostly Kiel doctoral students and the numerous cooperation partners.

The workshop, which has evolved over the years to a very large conference with different sessions, gave and gives an impression not only on how the dynamics of historical developments are delineated according to methodological changes but also how the premises, especially from the Graduate School, have evolved. The landscape concept used in 2006, which conceived the landscape as an archive of both environmental and social developments, has increasingly become a "global" container, in which most diverse discourses on landscape and social aspects of past societies develop. The establishment of a "reflective turn", which repeatedly criticises the most diverse scientific fields in a self-reflective manner, is one of the means to accompany the progress of the Graduate School in the upcoming years.

Finally, it should be emphasised that the Johanna Mestorf Academy – resulting from the Graduate School – was founded in 2011 as a central institution of Kiel University. Socio-environmental research of pre-modern societies has developed into a "trademark" of the university. The decisive fundamental concept continues to be the basic concept designed by Wilhelm von Humboldt 200 years ago of a unity of research and teaching – or in a modernized sense: research-based learning and teaching research. Instead of falling into the fast-paced nature of scientific research, this is at the same time a message for intensive, fact-based basic research, as it can take place in analytical form only in a multifaceted exchange of ideas within the diversity of university processes.

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I: Past Landscapes

Theories and Concepts

The Disentanglement of Landscapes

Remarks on Concepts of Socio-Environmental Research and Landscape Archaeology

Johannes Müller

Abstract

'Landscapes' are social practises, in which both the authorships of societies and the changing pre-conditions of environmental developments are visible. Topographies, which develop in association with the backdrop of ecological and climatic parameters, are distinctive, socially generated social spaces. In a historical perspective, recent landscapes become containers, in which "landscapes" of the present and the past are coded. Modern landscapes are always past landscapes, past landscapes are always already future ones. From the practice of our investigations, which are value-dependent, we can record, decipher and understand the mentioned components.

Introduction

Within the framework and the investigations of the Graduate School "Human Development in Landscapes", the concepts of landscape archaeology and social archaeology played and still play an important role (Kiel Graduate School "Human Development in Landscapes" 2010; Müller 2014). In view of basic concepts on *landscapes* and *societies*, the ensuing questions of the dynamics of social-ecological research within the framework of archaeological and philological historical sciences and environmental archaeology will be decidedly addressed.

In principle, with the investigation of human societies – and past societies in particular – we are concerned with the analysis and comprehension of diverse facets of

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human-environmental relations. For the basic structure of such an analysis, we posed three important, all-encompassing questions in order to structure the research of the Graduate School:

1. How have human groups conceived their natural and cultural environments?
2. How was social space re-organised in relation to changing environmental conditions?
3. How did demographic and technical change influence the formation of social groups and landscapes?

All three topical sets of issues could only first be dealt with according to the formulation of basic assessments on the environment and the landscape.

The motivation behind such questions is also the concern whether the *dynamics* and the *receptions* of current situations in our societies can be structurally compared with prehistoric or protohistoric societies. Is, for example, the development of irrigation technology in Mesopotamia, which enabled the emergence of urban cultures but also overpopulation with fatal critical consequences, structurally comparable with questions concerning technological development, population increases and problems of current times (Johnson 2017)? On the one hand, aspects concerning the spatial design of landscapes (*e.g.* Fotheringham *et al.* 2000) and, on the other hand, aspects concerning the reception of one's own situation and thus the perception of ecological and social changes (Hahn 2000; Ingold 2002; Käppel/Pothou 2015) are in focus.

The traditional image of the relationship between humans and the environment

In a traditional sense, we employ relatively standardized conceptual terms when analysing societies and their environments, which are visualized here in figure 1.

Social practice of both daily life and social action is based on the economies of societies and on their demographies (Kristiansen 1984; Shennan 2009; Zimmermann 2003).

Economy

The basis of action is determined, on the one hand, by the subsistence economy in order to satisfy human basic needs and, on the other hand, by different sectors of the rest of the economy, which establish the material framework for the possibilities of action of individuals in social practice (Earle/Kristiansen 2010). Both the production and reproduction of subsistence and status goods are located in this sphere as well as the organisation of production, distribution and consumption of the respective values (Bernbeck 1994; Müller/Bernbeck 1996). The productivity of the economies determines the possibilities of the people (Arponen *et al.* 2016): the production of a surplus, which is available for different non-utilitarian activities beyond the actual subsistence, is both quantitatively and qualitatively dependent on the basic economic conditions. Thereby, exchange values for goods and actions, which also include a non-utilitarian dimension, only first exist alongside use values.

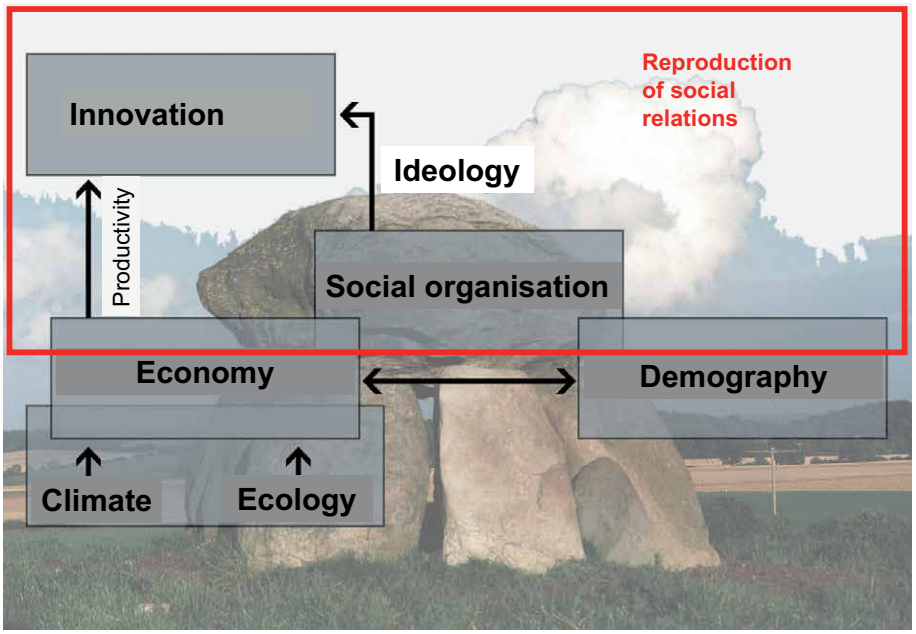

Figure 1: The reproduction of social relations based on a triangle of economy, demography and social institutions (diagram: H. Dietrich).

Independent of these basic statements on "economics", which can be well reconstructed within the framework of, for example, archaeological finds and findings – that is of material culture – and the ecological "fingerprints" of human action in, for instance, the surrounding vegetation or soil development, the basic question on what is induced by "economics" in societies with different scribality and various modes of production is certainly to be answered differentially (Audring 1989; Earle *et al.* 1998; Godelier 1972; Sahlins 1972). Thus, value accumulation in an industrial society can be a factor for an acceleration of processes and an increase in the production of goods, whereas in a pre-literate agrarian society, for example, the non-utilitarian necessity for the construction of monuments, that is, a ritual economy, exhibits very similar consequences (Holst *et al.* 2013).

Demography

A further basic societal condition is the demographic development of a society or the societies included in it (Shennan 2009). In general demographical terms, one basically assumes demographic growth that is promoted or limited by economic and social conditions. Thus, for example, we can observe similar worldwide tendencies within the context of neolithisation processes of initially strong demographic growth, which decreases after a certain period of time and can even be regressive in association with adjustments to local situations (Bocquet-Appel/Bar-Yosef 2008; Bocquet-Appel/Dubouloz 2003).

Apart from respective general tendencies, we can generally note that the size of a decision-making group is important for the social constitution of the society: small-scale decision-making is possible with small group sizes, whereas multi-stage, institutional

decision-making seems necessary with larger group sizes (Johnson 1982). Both group size and population density influence the economic and social potentials of groups. Thus, from empirical investigations we know that more densely populated groups are not inclined to exhibit egalitarian structures and that societies based on "Big Man" structures rather display hereditary power structures (Roscoe 2012).

Moreover, kinship relationships affect social organisation (*e.g.* Das 1993; Mauss 1971). The relationship between kinship and residential groups is formative for social organisation in different forms of society (Steuer 1982). Of course, one must keep in mind that kinship is, in itself, a social construct that is not necessarily based on genetic reality (Sahlins 2012).

Climate and ecology

Crucial for our initial, definitely simplified linkage of various aspects of human-environmental relationships and the organisation of societies is that both economies and demographics develop on the basis of ecological and climatic conditions (Sutton/Anderson 2004). In our observations, ecological change – irrespective of its perception by the actors in society – directly affects economic and demographic constants on a short-term, medium-term or long-term basis (*e.g.* Bertemes/Meller 2013; Butruille *et al.* 2016; Halstead/O'Shea 1989; Kneisel *et al.* 2012). Ecological changes are associated, on the one hand, with the environmental conditions of the subsistence economy and, on the other hand, with basic aspects concerning the accessibility of raw materials and the disposability of plants, animals and humans.

Social organisation

In order to organise economic and demographic relations, individual actors of societies necessarily adopt forms of basic social rules, i.e., social forms of organisation (Dobres/Robb 2000; Müller *et al.* 2013a; Renfrew 1986). How and when during the course of a day that crops, for example, are harvested from a field or how and with what procedures the extraction and extrication of metals is carried out, are only possible through institutionalized rules (Hofmann *et al.* 2010; Kirleis/Klooß 2014; Vandkilde 2006). Since there are relatively many alternatives of social organisation, the actors involved can, in principle, decide "freely". Nevertheless, it is clear that a triangle, conceived as the interchange of the constants *economy*, *demography* and *social organisation,* determine the basic goal of the reproduction of social relationships within a framework of possibilities and limitations.

Decisive, influential factors for the possibilities of social reproduction are addressed, among others, in questions concerning actual group sizes (see above), processes of production, distribution, consumption and the *history of institutions* (Apel/Knutsson 2006; Foucault 1981; Johnson 1982). According to a present understanding, the history of institutions – *i.e.* the regulated and consensual agreements of social action – is strongly influenced by economic aspects so that a socio-economic environment is definable. We assume that, on the one hand, the organisation of production, but above all also the possibilities and limitations of distribution or re-distribution of goods – and thus consumption – significantly influence social roles and thus the opportunities of individual actors or entire groups within societies.

Productivity, ideology and innovation

In this context, the productivity of societies – as seen from an economic standpoint – and also the reception of social conditions by actors play a crucial role. The reception of society and environment is always also "ideology": in a hermeneutical sense, one's "worldview" is driven by one's own possibilities and interests, which is formative for the "maintenance" of things and processes (Earle 1991; Maran 2006; Wood/Wood 1978). In this respect, all receptions and perceptions are value-driven and decisively influence the form of reproduction or revised reproduction of relations/conditions. Consequently, things affect representations and processes: whether these are socially-generated spatial structures, whose feasibility and characteristics are influenced by productions and ideologies, or, for instance, non-utilitarian goods for the representation of social relations, for example, innovations in the form of technologies, which have, on the one hand, economic functions and, on the other hand, social meaning and therefore an immanent ideological function (Dobres 2000; Furholt/Stockhammer 2008; Killick 2004; Maran/Stockhammer 2012; Müller 2002).

Social space

Within the framework of corresponding structures, each society and each group "creates" social space (*e.g.* Nakoinz 2013). Social space is initially discernible in the design of the "natural" environment by humans. Secondly, it becomes visible through the constellations in the framework of, for example, the construction of monuments (Kristiansen 2006; Sherratt 1997; Müller *et al.* 2013b), thirdly through the design of populated areas, including villages and towns (*e.g.* Dafinger 2010). Thus, social space is recognized as landscapes.

Landscape: Terminology and dynamics

From a historical perspective, consequences arise from the above-mentioned for the reception of what we find around us. Starting from environmental conditions, primary topographies, which develop in association with the backdrop of ecological and climatic parameters, are distinctive, socially generated social spaces (Fontijn 2002; Müller-Scheessel/Burmeister 2006). Exemplarily, the spatial distribution of social architecture has a determining effect on the landscape – whether one considers manor houses, megalithic tombs, railway lines or urban agglomerations. The construction of lines (*e.g.* railroad lines), landmarks (*e.g.* by megalithic tombs), dense demographic crystallisation points (*e.g.* by cities) or power representation (*e.g.* manor houses) changes the landscape as space that is perceived (Furholt/Müller 2011; Thomas 2010). "Socio-cultural landscapes" are those, in which the constantly changing ecological topographies are integrated and used for the invariably socially founded anthropogenic overprint and exploitation of the "natural" environment. Consequently, the *socio-economic* sphere is joined with the *socio-cultural* sphere. Accordingly, we perceive the "landscape" as the *container* in which both socially shaped space and the natural environment converge: socio-ecological, socio-economic and socio-cultural. In the framework of such a simplifying, but clear definition of landscape, we can observe the landscape as space, where environmental conditions and social conditions merge for spatial design without necessarily yielding a dichotomy: cultural phenomena are always something new and independent.

In a historical perspective, recent landscapes become containers, in which "landscapes" of the present and the past are coded. Modern landscapes are always past landscapes, past landscapes are always already future ones. From the practice of our investigations, which are value-dependent, we can record, decipher and understand the mentioned components, for instance, landmarks of past times (*i.e.* monuments, paths, etc.). Landscapes are composed of diverse historical layers, which influence the reception of today's viewers.

Thus, "landscape" is the product of primarily dynamic social processes, but also a relic of past social processes. In this context, the ecological aspects of landscape provide, on the one hand, the framework and, on the other hand, represent a socially relevant product themselves in light of high human influence. The impact of natural changes, for example, including short, medium or long-term climate changes, influences societies, but can also be intensified by societies. Correspondingly, the following is important for the different scales of social development: On a local scale, for example, the local ecological environment already exhibits extreme human influence in Neolithic societies, for instance, through the over-exploitation of resources, which surely led to the abandonment of settlements. On regional and global scales, the sum of events leads to corresponding processes, which can be significant for structural formation.

Therefore, "landscape" is also the space in which the reciprocal relationship between humans and the environment – between complex societies and individual questions – becomes visible. Accordingly, individual elements of "landscape" acquire meanings, which can be comprehended as the reception of their own social conditions and the environment. These co-exist with the environment, which is usually perceived as "natural", with its ecological and climatic parameters.

Landscape archaeology

From the described positioning of the term "landscape" as the interaction between the social and natural environment in dynamic processes with socio-ecological, socio-economic and socio-cultural parameters, the following methodological considerations emerge for landscape archaeology.

Landscape archaeology is accordingly understood as *environmental* archaeology, which investigates ecological and natural aspects, and furthermore as *social archaeology*, which examines social conditions. By definition, landscape archaeology is consequently the combination of both methodological frameworks. Hence, there are fields of investigation, which, *per se*, can only be handled and interpreted by both at the same time.

In the following description of the methodological fundamentals of both areas, it must be stressed that different spatial and chronological scales play a decisive role in the investigations. 'Spatial' can be comprehended from local to global, but also as the settings of individuals, groups and populations (Doneus 2013). 'Chronological' can be grasped as short, medium and long-term, but also as the periodical phases of events, processes and structures. Methodologically, the mentioned different scales actually enable the implementation of data processing of different qualities: for example, in order to localize events or historically identify individuals, other data is needed than that for structures or groups. The fuzziness of the data and archives, which is often perceived as problematic, can thus be conceptually integrated.

Environmental archaeology

The reconstruction of the "natural" environment is the task of environmental archaeology. It deals, on the one hand, with the reconstruction of climatic and weather conditions, soils, and vegetation, and with this also the reconstruction of resources at a given time in a given space and, on the other hand, the reconstruction of the dynamics of climatic and ecological processes (Sutton/Anderson 2004). Correspondingly, the archives of the various disciplines (for example, palaeoclimatology, sedimentology and soil science, palynology, botanical macrorest analysis, phytolith analysis) are examined and synthesised to a common image of the spatially and temporally determined environment. In accordance with the possibilities and limitations of the respective scientific fields and the qualities of the individual archives, we obtain different spatial and temporal resolutions. Whereas, for instance, we achieve exact yearly dating for the reconstruction of sedimentation and vegetation developments by means of laminated profiles from Eastern Holstein and Western Mecklenburg, in other regions processes can only be reconstructed on the basis of centuries. It also remains a challenge to intersect the different time-scales of different disciplines – for example, to match the results from low-resolution marine profiles with high-resolution profiles from lakes. In consequence, modelling aspects must be taken into account.

For the time of the Holocene, our study area does not exhibit environments that were not influenced by humans. In this respect, all environmental-archaeological studies include aspects of "human impact" on the natural environment. The corresponding fingerprints can be characterized as anthropogenic-induced and thus provide the opportunity to reconstruct aspects and influences of the economy and demography on the environment. In particular, environmental archaeology – in contrast to general environmental research – includes aspects of settlements or archaeological sites with on-site and off-site data, whereas studies, which deliberately deal with the anthropogenic influence, gather primary data on the role of humans, lake sediments or the like have rather general character, for example, to reconstruct vegetation processes. The same applies to sedimentology, which, on the one hand, can determine the intensity of local economic activities with direct investigations on colluvia and, on the other hand, contributes to assertions about general developments with regional and supra-regional cumulative curves.

Social archaeology

Developments and requirements of societies are investigated by social archaeology. In doing so, such studies deal fundamentally with the representation of humans in societies and additionally with the dynamics of these processes. In principle, according to the above-mentioned remarks, we assume that the social actions of humans and the social structure of societies are mirrored in the material culture (Kienlin 2005). Based on a model of social practice, in which behavioural and institutional aspects emerge, we can recognize respective social activities in the archaeological archives.

Socio-archaeological investigations examine societies, in which no vertical social differences are perceptible that are not caused by biological factors, and societies, in which vertical social differences are identifiable. The latter can only be the case if a subsistence economy with a surplus-product develops, enabling the exemption of individuals or parts of the society from subsistence production (Johnson 2017, 29ff). Such societies can

assume very different spatial and temporal dimensions – from non-specialised groups of foragers, whose social system continued over thousands of years, to complex urban societies, the duration of which, according to experience, rarely exceeds several centuries.

Of particular socio-archaeological relevance is the access to resources by individuals or groups of a society. Different access opportunities to resources represent a fundamental pattern of socially differentiated societies, which determine the possibilities of different actors. Resources can and must be both of economic and cultural nature. Without considering the qualitative differences between different social formations, access opportunity can be identified in landscape areas and therefore meanings of landscapes can be discerned. From an etic viewpoint, it appears easy to achieve this, and from an emic standpoint various methods are also conceivable in order to identify the historical or prehistoric meaning of landscape spaces (one could think, for example, of the implementation of different findings, such as settlements, graves, and hoards, to identify and understand the meaning of special units).

Overlaps of social and environmental archaeology

The socio-archaeological relevance of landscape is thus expressed, for example, in a spatial division in settlement and grave areas, deposition areas or in areas, which are subject to taboos and access restrictions. The marking of such an area, for example, by aboveground visible landmarks belongs to social landscape design just as the inner-socially regulated, limited access to raw material reserves. Hereby, we record a different area than that recorded by environmental-archaeological investigation, which records the development of dead and animated material and thus refers to the changeable reservoirs for anthropogenic developments.

Thus, "economy" and "culture" become investigation areas of socio-ecological investigations, in which both actors and structures, in the sense of socio-environmental research, are fields of investigation. Both spatial and temporal dimensions of landscapes are discernible. We can also embed the development of structures in these fields: This is the necessary impetus in order to comprehend – in the sense of cultural anthropological significances – the comparability of events and processes of different times. But to investigate this more closely, a further different basic consideration of times, things and humans is essential.

Prospects

In the basic knowledge of scientific society, it is thus discernible that in addition to the disciplinary fields of investigation, a holistic claim to the explanation of humans and the environment is only possible in interdisciplinary cooperation. We should not shun visible agreements concerning terminology. Only then can a controlling reflexivity of one's own investigations be embraced. We are thus connected to the socio-ecological environment ourselves, which is relevant for the landscape: This, however, does not absolve us from the immense ability to interpret and understand past socio-ecological, socio-economic and socio-cultural processes with the possibilities of socio-environmental research, which includes both humans and the environment.

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On Melting Grounds

Theories of the Landscape

Antonia Davidovic

Abstract

This contribution explores the concept of landscape and whether it is useful as an analytical term. By concentrating on approaches from sociocultural anthropology, the paper first explores the history of the term, then discusses symbolic, material and social aspects of landscape concepts, and finally analyses its relation to identification and memory. Landscape can be seen as a specific segment of space, constructed through permanent processes of meaning-making and boundary-production, and is therefore always connected with multiple perceptions. As any definition of landscape is too imprecise and vague, and as several other terms, such as territory, region, area, place and spaces, address similar phenomena, I argue that landscape is too inaccurate to serve as an analytical concept. Instead, I suggest to the use of more precise terminologies for different aspects of landscape: for example, the perception of space might be described as 'representated landscape', physical or ecological elements can be better addressed by the term 'environment', and aspects of the ordering of space might be more precisely labeled by the terms 'space', 'area', 'region' or 'segment'.

Introduction

Landscape is everything and everywhere. It seems that there is nothing left which was not yet labelled as landscape. Landscape appears as a liquid, elastic, and vague term, connected with often unspecified and even contradictory meanings. The list of the terms and definitions used in scientific debate as well as in ordinary parlance is endless: landscape views, natural landscape, cultural landscape, political landscape, urban landscape, economic landscape, the landscape of your mind or your computer screen, landscaping,

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landscape painting, photography and so on (Mitchell 2000, 99). Nevertheless, the geographer Don Mitchell describes it as a "complex and fascinating term" (ibid.).

But what does the term landscape mean exactly? Is a homogenous definition possible? This paper aims to explore current theoretical descriptions of the term. Although natural science as well as art historical concepts will be taken into account, I will primarily concentrate on sociocultural/anthropology approaches. In the following, several aspects will be explored – first looking at the history of the term and at debates in specialized sub-disciplines, then discussing symbolic elements, materiality and social formations, and finally analysing the relation to identification and memory. Hereby, the central question will focus on how landscape is defined and whether it is useful as an analytical term.

This analysis is not meant to provide an exhaustive overview of all landscape meanings, but it rather intends to examine some central aspects. The terms landscape, region, territory, and area are used in a somehow synonymous way, but this equation will be evaluated at the end according to its plausibility. Nature concepts are, of course, of central importance for the landscape idea, but they cannot be explored in detail, as the paper concentrates on landscape.

History of the term 'landscape'

Landscape concepts had different meanings in medieval times. Initially, the term described a regionally defined sociopolitical entity, defined as a "'set of social norms (customary law) recognized in a particular settlement'" (von Oppen 1997, 9, cited in Mather 2003, 24). Therefore, it was used synonymously to "*Provinz*" (Köhler 1995, 609, cited in Fischer 2008, 22).

But this definition changed fundamentally in the 17th century, mainly through the adaptation of the term '*landschap*' by Dutch genre painters (Dubow 2009, 124). Subsequently, landscape was associated with a specific aesthetic perspective – a "*gesellschaftsspezifische Anschauung von Natur, die sich angesichts der neuzeitlichen Entfremdung menschlicher Arbeit von Natur entfaltet hat*" (Groh/Groh 1991, cited in Fischer 2008, 22). Landscape became art as well as nature. The landscape-painting genre provided a new perspective – a specific artistic practice of seeing, invented by artists (Fischer 2008, 23).

This aesthetic perspective spread into literature and finally materialized since the 18th century in the form of landscape parks and gardens (Fischer 2008, 24). The cultural anthropologist Norbert Fischer describes it with reference to the art historian Adrian von Buttlar (1989) in a catchy phrase: "*Aus Landschaftsidealen wurden konkrete Ideallandschaften*" (Fischer 2008, 24). Thomas Hauck defines this circulation convincingly as a process of the reification of an aesthetic idea, and these landscapes-as-objects could now be not only painted, but also lived-in, designed and destroyed (Hauck 2014). The historian Lars Behrisch points to the role of scientification and rationalisation in modern landscape conceptions, as these park ideas were developed in "*jene Epoche, in der das ingenieurhafte 'Vermessen, Zählen, Berechnen des Raumes und der Natur einem ersten Höhepunkt entgegenstrebte*'" (Behrisch 2006, cited in Fischer 2008, 24). According to Norbert Fischer, the landscape parks were seen as "*kompensatorische Fluchtpunkte*", as a counter-argument against such rising

rationalism (Fischer 2008, 24). The aesthetic landscape concept evolved at the turn of the 20th century as observed in the design of urban graveyards and zoos (*e.g.* Leisner 2005; Gretzschel *et al.* 2007). Real territories were transformed into landscapes through discovering, painting, literarization and touristic marketing (Fischer 2008, 24): "*Landschaft wurde zum Kult und zugleich zum Label einer neuen Art des Reisens, zunehmend unterstützt von Dampfschiff und Eisenbahn*" (Knoll 2006, cited in Fischer 2008, 25). Therefore, landscape is now conceptualized as a natural as well as an aesthetic idea, as the "*unterschiedlich ausgebildete Repräsentation von Umgebungen* […] – *im Verlauf der Neuzeit immer mehr geprägt von der ästhetisierten und idealisierten Wahrnehmung von Natur*" (Fischer 2008, 26). The aesthetic views – the ideal romantic landscape – derived not only from landscape painting and rationalization but from economical interests as well. Mitchell construes landscape, referring to the cultural geographer Denis Cosgrove (1985, 46) and others, as "linked to the development of modern capitalism" (Mitchell 2000, 115).

Today, it seems to be quite difficult to find a general definition of landscape as there are various meanings, usages and approaches. For example, the geographer Donald Meinig (1979) names at least ten different meanings/significances of landscape: nature, habitat, artefact, system, problem, wealth, ideology, history, place and aesthetic (cited in Macnaghten/Urry 1998, 120). So, is there any chance for a common definition? Maybe the concepts of the disciplines dealing with landscape bring some clarification.

Landscape disciplines

Many disciplines discuss landscape: cultural geography, art history, landscape architecture, environmental studies, archaeology, sociology, or the anthropology of regions, territories and locations (Dubow 2009, 124), not to mention specialized sub-disciplines such as cultural landscape studies or landscape ethnoecology[1]. In this section, I will concentrate on sociocultural/anthropological and geographical perspectives. Therefore, other disciplines working with the landscape idea, such as landscape ecology, landscape history, landscape art, or landscape archaeology will not be explored.

Human geography is very prominent in the landscape debate, focusing on the rather scientific sense, which may usually be understood as a "particular synthesis of physical and human elements that serve to constitute a distinct region" (Macnaghten/Urry 1998, 120). According to Fischer, landscapes are usually characterized by a certain "*Kleinräumigkeit*" and can be distinguished by "*naturkundliche Charakteristika von anderen Gegenden*" (Fischer 2008, 22). Therefore, landscape is mostly defined as the natural topography – the specific landform – and as the material base of human existence. But these rather material aspects are always considered as intertwined with human elements. Some geographic approaches combine scientific und aesthetic conceptions, for example, by defining landscape as "'that part of country that nature offers up to the eye that looks at it'" (Gregory 1994, 39, cited in Macnaghten/Urry 1998, 120). The sub-discipline of landscape geography is described by the geographer Jessica Dubow as the continental European school of morphological analysis (Dubow 2009, 124).

1 For a comparison of landscape concepts in various disciplines see, for example, Förster et al. (2012).

Landscape ecology, on the other hand, examines the spatial patterning of diverse ecosystems or environmental types (*cf.* Johnson/Hunn 2010, 1), therefore concentrating on the physical aspects. In contrast, landscape ethnoecology focuses on the meanings. According to the anthropologists Leslie Johnson and Eugene Hunn, the discipline analyses the "perception of the land, the parsing of its patterns, and the classification of its constituent parts in local ethnoecological systems, and the significance of these understandings in the ethnoecology of local groups" (ibid.). Therefore, they see landscape as "perceived and imagined by the people who live in it, the land seen, used and occupied by the members of a local community". As a consequence, they focus on people's knowledge of and interaction with landscape (ibid.). Although landscape elements are "culturally heterogeneous, vary in scope, and lack the discreteness of biological species, they nonetheless reflect aspects of landscapes that have biological and, we would argue, adaptive significance" (ibid., 3). Therefore, "landscape is not a tabula rasa, on which culture elaborates". It is rather a "feedback loop that takes in both the potential of the land and human ways of making a living". They see no clear distinction between natural und anthropogenic landscapes, because landscape varies among cultures, and can best be construed as a continuum (ibid.).

An even more landscape-focused field is represented by so-called cultural landscape studies. Here, landscape is conceptionalized as the "*gesamte menschliche Umwelt*" (Franzen/Krebs 2005, 8), therefore employing a very wide definition, including almost everything, but always connecting it with human influence. According to the art historian Brigitte Franzen and the landscape architect Stefanie Krebs, the discipline first followed a conventional concept, which cultural landscape "*zwar in Abhängigkeit von zeitgenössischer Form der Bewirtschaftung begreift, aber anderen alltagskulturellen Praktiken bislang wenig Beachtung geschenkt hat*" (Franzen/Krebs 2005, 8). Since the 1990s, the influence of cultural studies led to a more open culture concept: cultural landscapes were now interpreted as "*durch politische, ökonomische und soziale Prozesse immer wieder verändert und neu gestaltet*" (Franzen/Krebs 2005, 12). Similar concepts are applied in the anthropology of landscape, looking at the cultural perceptions, understandings, meanings (Johnson/Hunn 2010, 1) and practices of landscape.

Landscape is even assigned a role in legislative measures as the central term in the "European Landscape Convention", developed by the Council of Europe. As it is mainly used for heritage conservation purposes, landscape is defined as "an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors" (chapter 1, article 1). They aim to facilitate the protection, management and planning of all living landscapes as well as to support a raising awareness of the value of living landscapes. Thus, in this context landscape refers to spatial zones with characteristic shape, which are produced through human activities.

General features of landscape

Comparing these definitions, there are many conceptual overlaps. Almost all follow a combination of physical features and symbolic aspects. But there are some central differences, and even quite divergent perspectives. Concepts focusing on natural features are not easily compatible with the perspective that landscapes are always symbolically

created. For Franzen, landscapes are "*immer und grundsätzlich geformt, selbst wenn nie eine Menschenhand sie berührt hat. Landschaft existiert nur dann, wenn sie vom Menschen gesehen wird. Tiere kennen keine Landschaft. Landschaft entsteht weniger im Bild, sie bedarf des Bildes nicht. Sie entsteht im Blick*", whereby this gaze is "*grundsätzlich kulturell codiert*" (Franzen 2006, 298).

Therefore, landscapes may be defined as a socio-cultural construction and a material product at the same time. As Dubow puts it, landscapes are "the space in which we live, move and have our being" and the "scenic framing of that space for our observation, contemplation, and appreciation" (Dubow 2009, 124). Others, pointing mostly to the constructive element in the relation, describe landscape as "the dynamics of material, cognitive and political construction of a society's environment" (Luig/von Oppen 1997, 16, cited in Mather 2003, 25). Landscape is "always an inseparable admixture of material form and discursive sign" (Mitchell 2000, 144).

Two elements are most central: meaning and practice. Landscape is always linked with "*handelnde Akteure und visuelle Alltagskultur*" (Franzen/Krebs 2005, 13). Art historian William J.T. Mitchell defines it as a "natural scene mediated by culture. It is both represented and presented space, both a signifier and signified, both a frame and what a frame contains, both a real place and its simulacrum, both a package and a commodity in the package" (Mitchell 1994, 1). "So landscape is both a place and a 'way of seeing', both a sensibility and a lived relation" (Mitchell 2000, 99). But so far this is a very wide definition, including nearly everything, as no environment is left untouched by human action and perception.

Some authors try to narrow the definition by applying a dichotomy between landscape and land. Such a distinction is mentioned, for example, by the Australian anthropologist Adrian Peace in his research on conflicts about an interpretive centre for touristic purposes at Mullaghmore Mountain in Ireland. Land, he argues, is used as a term when space is seen from utilitarian aspects, while landscape is used only from aesthetic perspectives: "when these local residents looked at Mullaghmore, what they saw was land, not a landscape. They viewed Mullaghmore through utilitarian spectacles and not ones tinted with aesthetic awareness" (Peace 2005, 499, *cf.* also Milton 1993; Macnaghten/Urry 1998). But the aesthetic view concentrating at the beautiful is now broadened by looking at 'ugly' landscapes as well, for example, wind farms (Fischer 2008, 27). Landscape is detached from the "*als harmonisch idealisierten Raum*" (Fischer 2008, 27). Nevertheless, Fischer believes that there is a "*kulturelles Bedürfnis nach der homogen gestalteten, in sich harmonischen Landschaft*", visible for example in the success of indoor-landscapes such as "Tropical Island" near Berlin. He claims that there is a "*Sehnsucht nach Landschaft*", which such places satisfy (Fischer 2008, 29).

Early concepts tried to limit the landscape term to rural areas, but such restrictions are now seen as very problematic, as hierarchies between urban and rural landscapes are presently negated, conceptionalizing landscape rather as a fusing of city and land (Fischer 2008, 28) and concentrating on new spatial concepts like "*Metropolregionen*" (Fischer 2008 28).

So restrictions referring merely to rural space or to aesthetic parts of the landscape or even to human-transformed space alone do not encompass all the complexities, divergences and inconsistencies of the current use of the term 'landscape'. In the

following, I will try to go beyond the dichotomy of nature vs. human or aesthetics vs. geographical perspectives, or urban vs. rural areas, concentrating rather on aspects of meaning, materiality, sociopolitical phenomena, identification, and memory.

Representation, meaning and reception

Landscape is not "allein materiell vorgefunden, sondern entfaltet sich erst durch das Bedeutungsgeflecht bestimmter Gesellschaften, Kulturen, Epochen" (Fischer 2008, 29). Thus, it is always a "produced space, a form, a socially transformed portion of earth's surface" (Mitchell 2000, 99, compare, e.g., also Meinig 1979). Therefore, in a general sense, it is a specific cognitive or symbolic way of ordering space (*e.g.* Ingold 2000, 189; Dubow 2009, 125). Dubow describes it as the expressions of a "scenic framing for observation, contemplation, appreciation" and an "objective spatial formation of pictorial representation" (Dubow 2009, 124). Mitchell sees it as "both systems of meaning und systems of social reproduction" (Mitchell 2000, 100). That is the reason why it is so often labelled as a particular way of seeing, which Dubow decribes as "an aestheticizing operation which solicits us to withdraw from a site, to 'view' it from afar: a distanciating move inseparable from a retreat to higher and safer ground, a rationalizing perception and a kind of refusal of whatever practical, political, or proximate involvements the scene might make on us" (Dubow 2009, 125).

This way of seeing enables the artist to "reduce three-dimensional visual experiences of scenery to two-dimensional images" (Macnaghten/Urry 1998, 119). Landscape is then conceptionalised as a "linear perception" of spatial phenomena (ibid.).

With this understanding in mind, landscape representation obscures partiality of subjective vision and "effectively suspends the perceived scene from flux of time and historical specificity" (Dubow 2009, 125). Therefore, landscape is a visual ideology, mainly with the function to neutralize a scene. The constructive process hides itself quite successfully from the constructor and the wider audience alike, and creates the illusion that the construction has never happened, through transforming the production process into an ahistorical 'fact'. Following this argument, landscapes mask the specific world views that shaped its making. Several authors argue that especially western concepts dominate landscape ideologies. The human geographer Phil Macnaghten and sociologist John Urry describe them as "culturally specific visual strategies which have reinforced a particular 'western' view of the world". They "reduce the complex multi-sensual experience to visually encoded features and then organise and synthesize these into a meaningful whole" (Macnaghten/Urry 1998, 120)[2]. Cosgrove argues that landscape is a "particular bourgeois way of seeing" (Cosgrove 1984, 24, cited in Mitchell 2000, 116).

Since the late 1980s and early 1990s, there is a growing appreciation of landscape as a textual practice (*e.g.* Dubow 2009, 126), often influenced by techniques of literary and cultural theory (ibid.). Such textual approaches include a greater awareness of its discursive effects: all landscapes are seen as "constructed within a realm of signs and their unstable meaning" (ibid.). Therefore, all landscapes can be understood as a "sys-

2 In this regard, they are similar to the strategy of maps, despite the differences between maps and pictures/paintings in the formation of visualisation (for example, bird's eye versus human eye) (ibid.).

tem of culturally encoded signs" (*e.g.* Barnes/Duncan 1992; Duncan/Ley 1993, cited in Dubow 2009, 126), as a "part of the cultural 'signifying systems' through which we make sense of our worlds" (Mitchell 2000, 99).

Landscapes are now described as intertextual phenomena: they are not only representations of the material world but also the "representation of something that is already a representation" (Dubow 2009, 126). "Long before it becomes the subject of a picture, it participates in a world in which cultural meanings and values are already inscribed and which we behold with an eye that is already implicated in, and mediated by, an endless field of discursive practices" (Dubow 2009, 126). That's "what the optical eye sees in a physical landscape – its empirical, phenomenal data – is already presupposed by an entire network of discursive determinations which enable its visual recognition" (Dubow 2009, 126). Therefore, landscape is a story – a "'way of guiding the attention of listeners or readers into it'" (Ingold 2000, 190). "Landscape tells – or rather is – a story, a 'chronicle of life and dwelling'" (Adam 1998, 54, cited in Ingold 2000, 189). Mitchell even labels landscape a "stage" which is used, for example, for "the politics of economic development and the politics of culture" (Mitchell 2000, 144).

Materiality, practice, and bodily encounter

To see landscape as text or a stage does not mean to reduce it to the symbolic level alone. Materiality is always important: "if landscape is a text, then it is so because of its very materiality – its existence as trees, shrubs, bricks, mortar, paint, canvas, and the pages of a book – not despite that materiality" (Mitchell 2000, 144). Mitchell argues that "the very value of a landscape – in structuring ways of life, in providing a place to live – is precisely this mixture of textuality and materiality" (Mitchell 2000, 144).

This encounter with the physical world, the "solid form of built environment" (Mitchell 2000, 99), is always mediated through bodily experiences and practices. It is "the living and perceiving body itself that forms the basis or precondition of spatial experience and perception, and not the work of 'mindful' consciousness set over and against it" (Dubow 2009, 129). Consequently, it cannot be reduced anymore to a mere way of seeing. Landscape no longer rendered as static or mute matter capable of being observed by virtue of a detached distance. Rather, "view and viewer, observer and observed, are indistinguishable from each other" (ibid., 130).

The human body plays a central role in all discursive practices (*e.g.* Dubow 2009, 128). Dubow, referring to David Matless (1989; 1992), points out: "how the bodily display of certain *authentic* landscape practices – instantiated, for example, by the rustic *organic* movement of the 1930s, or alternatively, by the figure of the planner-preservationist 'walking, cycling, camping, map-reading' – is itself the means 'whereby individual and nation might give form to itself environmentally', generating particular codes of moral and aesthetic conduct necessary to a particular version of a proper, participatory or 'landscaped' citizen" (Dubow 2009, 128, emphasis in original). Thus, meaning and cognition are never seen as separated from materiality, body and practice, as meaning-making can be seen as a specific material practice.

Therefore, the bodily encounter with landscape is always happening through the senses. Usually, the visual sense receives the most attention in landscape research. The individual view is "'*als sinnlich wahrgenommener Raumausschnitt stets durch die*

Eingrenzung des Blickfeldes, durch einen Horizont definiert'" (Lehmann 2007, 96, cited in Fischer 2008, 30). "The eye, indeed the single eye, is regarded as the centre of the visual world" (Macnaghten/Urry 1998, 119). Therefore, scale is always a significant issue: landscape is limited by what "can be observed by people on the ground as they travel through their environments in the course of their normal activities" (Johnson/Hunn 2010, 2). Thus, beside the view from afar, as mentioned above as part of aesthetical perspectives, there is also the concept of landscape as something, which we are very close with, through bodily experiences. And that points to the importance of other senses: smelling, touching, hearing, and even tasting. The cultural anthropologist Tim Ingold explores such sensual aspects by developing the concept of "taskscapes" (Ingold 2000, 190-201). "Taskscapes are a pattern of activities 'collapsed' into an array of features" (ibid., 198), therefore, landscape being the "taskscape in its embodied form" (ibid.). He points convincingly to the importance of hearing, as taskscapes consist of activities which we can hear (ibid., 199). Furthermore, he describes the importance of movement: "we experience the contours of the landscape by moving through it, so that it enters – as Gaston Bachelard would say – into our 'muscular consciousness'" (ibid., 203). "Paths and tracks 'impose a habitual pattern on the movement of people'" (Jackson 1989, 146, cited in Ingold 2000, 204). "The same movement is embodied […] in their 'muscular consciousness', and […] in networks of paths and tracks. In this network is sedimented the activity of an entire community, over many generations. It is the taskscape made visible" (Ingold 2000, 204).

Cultural, social, political, economic, colonial, and gendered landscapes

Landscape constructions are materializations of structures, powers und ideologies on various levels. Firstly, landscape is shaped through and is an expression of *cultural practices*. Dubow, for example, defines this practice as making "history in both the real and represented environment" (Dubow 2009, 126). Earlier concepts described landscape as the expression of a "process of cultural adaptation" (*e.g.* Sauer 1925, 343, cited in Mitchell 2000, 104). The geographer Peirce F. Lewis described landscape as the "*Schlüssel zur Kultur": "die Kultur einer jeden Nation spiegelt sich unbeabsichtigt in der gewöhnlichen, vernakulären Landschaft*" (Lewis 2005[1979], 158). But today, this kind of equation of individuals or groupings with their environments is strongly criticized, as cultural practices vary enormously even within the same environmental features or social settings. Current concepts assume that cultural practices and physical environments generate each other.

Second, landscape is shaped through and is an expression of *social practices*. Many authors see landscape as a form of social organisation, for example, as a "system of social reproduction" (Mitchell 2000, 100) or just simply as a "product of society" (Zukin 1991, 16, 19, cited in Mitchell 2000, 113). Cosgrove argues that "landscape represents a way in which classes of people have signified themselves and their world through their imagined relationships with nature, and through which they have underlined and communicated their own social role and that of others with respect to external nature" (cited in Dubow 2009, 125).

Social structures and ideologies operate through practices of power and their materialisations in the landscape (*e.g.* Mitchell 2000, 113). "While as a physical form it is a concrete materialization of social contradictions (a land owned by a privileged economic class but worked and maintained by another), it is also a system of aesthetic and conventional ordering useful in the management of such contradictions" (Dubow 2009, 125).

The physical landscape is, according to Mitchell, always a "product of negotiation between those with the 'power to define'" a certain space "and those who had to live their lives in it" (Mitchell 2000, 107). "Those with the power of definition can, in a sense, create places by arbitrarily regionalizing the external world and attaching to them symbolic significance" (Anderson 1991, 249-250, cited in Mitchell 2000, 109). Therefore, landscapes and landscape-representations are "incorporations of power. But sometimes, landscapes are made precisely to intervene in relations to power themselves. They are made to actively represent who has power, certainly, but also to reinforce that power by creating a constant and unrelenting symbol of it" (Mitchell 2000, 109). Thus, power works in several ways through landscape: through the direct ownership of land, but also through the power of definition, and through being the symbol of power. Consequently, for Dubow, landscape is an "exemplary site where systems of European knowledge, politics, ethics, and aesthetics are formed" (Dubow 2009, 128). Mitchell points out that although landscape representation is "an important aspect of nationalism, it is not so hegemonic as to preclude alternative readings or other forms of resistance" (Mitchell 2000, 119). Therefore, these power expressions may be contested regularly through resistance and counter narratives.

Third, landscape is always a manifestation and consequence of "underlying economic structures" (*e.g.* Dubow 2009, 127). But as mentioned above, the construction "actively hides (or fetishizes) the labor that goes into its making" (Mitchell 2000, 103). Landscape "naturalizes a cultural and social construction representing an artificial world as if it were simply given and inevitable" (Mitchell 1994, 1-2, cited in Mitchell 2000, 113). One example may be the "asserted congruence between the desires and constructions of landowners and the landscape of the nation" mentioned by William John Thomas Mitchell (2000, 119). Landscape also plays a role as an expression and consequence of class formation (Green 1996, cited in Mather 2003, 24). Economic aspects influence the construction of landscapes not only through their materialisation as working sites, industrial zones or market places but also through touristic strategies like photos or videos as well (Lippard 2005 [1999]), 112-126).

Many authors see landscape as a powerful *site of colonization*. Within the construction of colonial landscapes, both nature and the indigenous people were defined as something, which can be discovered, tamed and exploited. Therefore, colonization worked on humans as well as on nature. Postcolonial writings analyse "how a certain surveillant gaze is implicit in the ways that European travellers, settlers, administrators, mapmakers, and artists attempted to comprehend a foreign landscape: evaluating its productive potential, classifying and categorizing its alien flora and fauna, inhabiting its spaces, projecting a future – and appropriating it for the European itself" (Dubow 2009, 128-129).

According to Dubow, "the modern west has used landscapes to weave together regimes of value, morality, perception, and social power" (ibid., 128). The colonial space is

therefore the "site of radical difference, a 'contact zone' filled with competing indigenous meanings and fractured by local contests over material and symbolic power" (ibid., 129).

Landscape is analysed from a *feminist perspective* as well, focusing on how landscape is "as a cultural practice constituted around epistemic equivalence of the 'male' and the 'gaze'". Here, the "discursive transcoding of the male viewer as the bearer of reason/culture and woman as pacified body/nature" is explored (ibid., 127). Feminist geography analyses the role of the "division between space of family, domesticity, and intimate life". They reveal the "material gendering of the industrialized urban landscape", and the "masculinist codes of public memorials and the differential spatiality of the workplace, to patterns of consumptions and practices of mobility" (ibid.), or the change of gender-specific spatial practices through different forms of travelling, colonization, migration and tourism (*e.g.* McDowell 2005 [1999]).

Spatial identification

Landscape and identification are often seen as closely related. Dubow argues that landscape is used as "an active site of identity formation" in national and colonial settings (Dubow 2009, 128), as the place of identity negotiation and construction. Franzen argues that in contemporary postmodern phenomena of constant changing identity constructions landscape as well as region seem to offer a kind of stability "*durch seine spezifischen landschaftsbezogenen Ästhetiken und Wahrnehmungangebote*" (Franzen 2005, 287). But, as she argues, this perspective of an "*Orts- und Traditionsbezug", a "Bindung der Konzepte des Regionalen an das Lokale, den Ort, der mit einer charakteristischen Raumidentität belegt wird, die als authentisch und identitätskonstituierend gilt*", involves "*Tendenzen der Simplifizierung und der Radikalisierung*". Current cultural identifications are much more complex, looking at the example of Europe with its federal structures and regionalities and its centuries-old "*Überlagerungen, Schichtungen und Wanderungen*" (Franzen 2005, 288).

Generally, there are personal and group-specific elements in the relation. As Franzen describes it convincingly: "*die landschaftsbezogene Identitätsbildung des Menschen ist ein Konglomerat aus selbst- und fremdreferenziellen sowie psychoevolutionären Momenten, die Eingang in die kollektiven Repräsentationen einer Gesellschaft finden und, umgekehrt, gleichzeitig ständig von diesen gespeist werden*" (Franzen 2005, 286). These two aspects will be explored in more detail.

Individual spatial identification

Everyday practices and social interactions (such as working, shopping, meeting neighbours, friends or relatives, or leisure time activities) create a connection with the location where they take place. The place provides the stage and the physical environment for everyday interaction – even when the physical space itself become less important, as everyday contacts or shopping are possible via internet as well. But such rather functionally connotated appropriations of space can provide the base for a spatial identification, a kind of feeling of belonging, of being at 'home'. The German term '*Heimat*' refers explicitly to such a sense of belonging. *Heimat* is usually defined as the affective connection to a specific habitat – local or place identification (Welz 1991, 42), or, on a bigger

scale, regional identification. But for that, the space has to provide satisfaction and safety: *„'Heimat' manifestiert sich als Ort entsprechend einem emotionalen und materiellen Gefühl von Sicherheit*" (Franzen 2005, 287).

In order to analyse the capacity of a certain space to produce such a kind of satisfaction, the cultural anthropologist Ina Maria Greverus developed, by adapting the concept of Eric Cohen (1976), the "*humanökologische Raumorientierungsmodell*" (Greverus 1979, 219-222). Here, she identified four categories. First, she notes the "instrumentale" dimension – referring to the availability of resources, the modes of production, and their accessibility. Second, a "*politisch-strategische or kontrollierende*" dimension is mentioned, which refers to both formal and informal mechanisms of controlling the individual and collective access to environmental resources and of participation in decisions concerning this access. Third, she delineates the "*soziokulturelle*" dimension, referring to the potential of the environment to facilitate social and cultural production and reproduction, such as opportunities for social interaction, activities and stimulations. Finally, a "*symbolische*" dimension is described as "*ästhetische Präferenzen, moral-rechtliche Bedeutungen, Bedeutung als Image/Wahrzeichen und Traditions- bzw. Erinnerungswerte*" (ibid., 222). Greverus argues that the identification with the specific territory, a '*Heimatgefühl*', depends on the level of satisfaction of these dimensions of necessaries of life (ibid., 218-219). Only then will the territory function as an "*Eigenwelt" – "eine im jeweiligen Territorium erreichte und erworbene Vertrautheit mit den Menschen, Gegenständen, Werten und Normen und ein unreflektiertes Handeln im Sinne des erlernten Gefüges von Verhaltensweisen*" (Greverus 1972, 56).

Another concept concerned with individual spatial appropriation is the model of "sociospheres", developed by the sociologist Martin Albrow (1997). Analysing global situations in local settings, using the example of the Wandsworth district of London, he labels these local settings as "localities", whereby individuals develop specific sociopheres within these localities. These are characterized by "distinct patterns of social activities belonging to networks of social relations of very different intensity, spanning widely different territorial extents, from a few too many thousands of miles. In the locality, they may scarcely touch each other. To convey the sense of varying but overlapping spatial scope, discrete movement and separateness, I am going to call these social formations 'sociospheres'" (ibid., 51).

His results show that they cannot be equated with "anything like the traditional concept of community based on a shared local culture" (ibid., 52). Albrow convincingly puts activities, mobility and symbolic appropriation in the centre of his analysis of the production of spatial identification, and avoids presuppositions of any identifying effect of the sociospheres. Similarly, Greverus' approach emphasises practices, interactions, connections and networks, with space being only the frame or base for these.

Social spatial identification

As mentioned above, earlier concepts implied a passive adaptation and equation of groupings with their environment. Early ethnographies implied territory as a natural base of group identification, as they were often engaged in "delineating the nature of ethnic ties to landscape, in showing how 'homelands' were created out of nature, so as to justify nationalist projects" (Mitchell 2000, 102). Culture geographer

Carl O. Sauer implied that landscape is a direct expression of an ethnic group, as he saw it "fashioned from a natural landscape by a culture group" (Sauer 1925, 343, cited in Mitchell 2000, 102). The shared territory was imagined as a collective living habitat, the '*lebensraum*' of the group, where history, tradition, and norms were created and, consequently, 'rooted'. Specific places were seen as symbols of identity. From this perspective, ethnic identifications were almost automatically seen as attached to a specific space. Similar concepts were applied to regional or national identifications. But such essentialistic views are seen today as quite problematic due to the ambivalence of the spaces to which such identifications refer to and because landscape works on humans as humans work on the landscape.

Among the concepts going beyond these essentialistic models is, for example, the notion of "socioscapes", developed by Albrow (1997). He argues that socioscapes evolve on the base of the above-mentioned sociospheres. "From this vantage point where the sociospheres intersect we view the socioscape" (ibid., 52). But, this "composite socioscape is not to be equated with a pattern of underlying rules which make everyday life possible for the inhabitants of a locality" (ibid.). It is not "social and cultural diversity per se which replaces the old-style community as a basis for everyday life in a locality, it is the generation of routine procedures and pragmatic accommodation" (ibid., *cf.* also Dürrschmidt 1997). Thus, Albrow convincingly takes social practices as the starting point and looks at the meaningful networks.

Another concept developed in landscape ethnoecological approaches borrows the concept of ecotopes from landscape ecology, which are usually defined as the smallest units of landscape (Johnson/Hunn 2010, 2; compare as well Hunn/Meilleur 2010, 15). Johnson and Hunn develop the terms "folk or cultural ecotopes" or "place kinds", which they describe as the "array of culturally recognized landscape elements", which means "recognized as significant in the landscape ethnoecology by members of specific local communities or cultural groups" (Johnson/Hunn 2010, 2). "Folk ecotopes highlight features of the landscape useful for people making a living off the land" (ibid., 3). As culturally defined entities, they are not equivalent to a cultural understanding of habitat. They are highly variable between cultural groupings, especially in comparison to the classification und naming of plants and animals, which show more cross-cultural similarities. Johnson and Hunn assume the reason for this may be that ecotopes are less discrete (ibid., 2). Such folk ecotopes may be homogenous among social groupings, but, by concentrating on utilitarian aspects, the concept does not imply that they serve automatically as a base for shared group identification. However, it may provide an interesting starting point for the analysis of how common understandings and categorizations of landscape elements may initiate or intensify a grouping process.

So, what can be said about the relationship between landscapes and identifications? According to Greverus, every identification is connected with a certain space: besides identifying social interaction, individuals also need the identification with "*einem spezifischen, einmaligen Raum, an der er sich in seinem Alltag orientieren kann und der ihm die Chancen einer konfliktbewältigenden Befriedigung seiner an den Raum gerichteten Bedürfnisse gewährleistet*" (Greverus 1979, 222). Indeed, it is difficult to imagine any kind of identification that does not refer to any spatial formation. But such a formation does not necessarily have to be the place of birth or childhood. It even does not have to

be a homogenous territory with clear boundaries, but can be a network of spots scattered across an otherwise meaningless space. Furthermore, spaces of identification do not have to be physical spaces, but can be virtual spaces as well – such as social media contacts, internet communities, game-sites and so on, as well as migrant societies whose participants are connected via internet, telephone, and travels. Third, there is not always only one space to which one is associated with but also usually several spaces – such as current or former residences, holiday spots, place of birth, or desired destinations. Therefore, the space of identification may be heterogeneous, changing and hybrid. Furthermore, it is not possible to define a kind of a most efficacious or influential dimension, for example, the birth space or the space of current residence do not necessarily have to have identifying meaning. Lastly, spaces of identification are often contested. Usually, more than one person or group refers to the same space, often with contradictory perceptions. Thus, different meanings can be attached to the same place. Therefore, there is never only one homogenous physical space with clear borders, but spaces should rather imagined as an assemblage of physical, virtual and imaginative networks of spots and spaces of various sizes – a translocal, virtual, or scattered space of identification.

Memory

Finally, another central aspect of spatial identification is memory (*e.g.* Steward/Strathern 2003). "The landscape envelops events, people, and places from the past, which are reiterated and remembered in the movements, actions, and relation of those who presently dwell within the landscape. Learning to move in the landscape involves learning about the past and the people who preceded us there in time and space" (Mather 2003, 25).

The relationship between landscape und memory is explored, for example, in the so-called dwelling approach by Tim Ingold and others. "Landscape is constituted as an enduring record of – and testimony to – the lives and works of past generations, who have dwelt within it, and in so doing, have left there something of themselves" (Ingold 2000, 189)[3]. Other approaches focusing on national memory landscapes (*e.g.* Schama 1995) show how political myths are inscribed into the landscape, for example, in the portraits of Mount Rushmore. The historian Pierre Nora coined the influential but not undisputed term "*lieux de memoire*" (*e.g.* Nora 1990), referring to places, objects, or events which can gain identifying meaning. He also focuses on national memory places. Furthermore, there is the recent trend to explore landscape and "politics of memory or memorialization" (Dubow 2009, 130).

Every landscape can be connected with memory and every memory is connected with a specific place or space. The question remains if landscape can serve as a material memory even when no verbal and written testimonies exist. Visible signs of human practices are always a base for memory, but often change their meanings when the original meanings are lost, and can acquire new meanings completely detached from the former ones. Moreover, many memories do not have any visible signs, surviving only in the remembrance.

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3 Ingold defines dwelling as something "we move along with". Therefore, everything is suspended in movement (Ingold 2000, 200).

Conclusion

In conclusion, what is landscape? Can there be a general concept of landscape? It seems that there are too many divergent versions: the ecologically defined physical space, the aesthetic ideal of a beautiful landscape, a way of seeing, a cultural space, a space of power (social, political, economical, colonial, or gendered), an identifying space or a memory space, and so on.

Some general characteristics of landscape constructions can be observed. First, the *spatial size* on which landscape constructions are based can vary enormously. It can encompass a street or a neighbourhood, a village, a valley, or a whole network of regions. Second, it is always a *process* and a product (*e.g.* Dubow 2009, 125; Mather 2003, 25). Constantly, new divergent spatial formations are constructed through perception and action, for example, through new movement practices by increasing mobility (*e.g.* Werner 2006, 27-28). "Landscape change, and change is itself an intrinsic aspect of our experience of landscape. The landscape is a polyrythmic composition of processes" (Reason 1987, 40, cited in Ingold 2000, 201). Therefore, landscape can be seen as a liquid or *fluid formation*. The architect Frank Werner labels it convincingly as "*das Zerfließen bzw. die Verflüssigung alles Landschaftlichen*" (Werner 2006, 27). Thus, landscape is a product, which constantly changes its form, content, meaning, or practices, without ever reaching any kind of standstill or completion. Therefore, it is always only a *temporal* phenomenon, as historical contexts are also constantly shaping landscape constructions. As a consequence, landscape is always a *plurality of meaning and practice*. Fischer characterises it as a "*patchworkartige Partikularisierung und Dynamisierung der Räume*" (Fischer 2008, 27), consisting of a "*pluralistisches Angebot von Nutzungs- und Wahrnehmungschancen*" (ibid., 28). Franzen and Krebs use the term "*Mikrolandschaften*" which they define as an "*Agglomeration von Zwischenräumen*" (Franzen/Krebs 2006, 12). Consequently, landscape constructions can be ambivalent, contradicting and even competitive and conflictive. Therefore, landscape "*kann nur relational verstanden werden und nicht als vorgegebene Größe*" (Haug-Moritz 2006, 35, cited in Fischer 2008, 29). Furthermore, the agency of landscape constructions has to be taken into account. First, as an active construction of landscapes by human actors (Fischer 2008, 10), and second, as Cosgrove argues, landscape itself as the actor, bringing nature and culture as spatial actors together (cited in Franzen/Krebs 2005, 7).

As Franzen and many other authors point out, landscape is only created through the human gaze, so its shape and meaning is always subjectively constructed. But even if landscape is defined as a text, as several authors have argued, perceptions and practices of landscaping are only fully comprehensible when verbal or written descriptions or testimonies are available. Even when perceptions have left material traces, it is not possible to 'read' their meaning out of the material landscape alone. Practices and actions, on the other hand, often leave material formations. But again, their meaning cannot be retrieved on the material base alone. Nevertheless, the analysis of such traces of landscape practices may serve as a fascinating field of inquiry. In this regard, a productive concept may be the model of the 'operational chain', introduced by Andre Leroi-Gourhan and others (*e.g.* Lemonnier 1992) with its focus on the affordances of objects (Gibson 1977) and its materially defined frames of constraints and choices.

Finally, the question remains whether the landscape term is appropriate in a theoretical, analytical sense. Dubow argues that it is a "critical tool useful in the analysis of culture and society" (Dubow 2009, 128). "Landscape not only names the ability of a given social and cultural environment to consign some types of subjectivity to the margin, but also authorizes the alternative possibility of revisioning nature in terms of more complex, varied, and less determined lines of sight" (Dubow 2009, 128). Franzen and Krebs see landscape concepts as particularly suited to bring together different versions and perceptions of space (Franzen/Krebs 2005, 7). As mentioned above, landscape may make alternative, divergent perceptions and practices visible. New concepts aiming to go beyond dichotomies may be helpful, such as, according to Dubow, the phenomenological approach, as it "provides a means of communication between the space of the body and the realm of culture, between the determinations of nature and the weight of history" (Dubow 2009, 130). Similarly helpful are models of socioscapes as well as cultural ecotopes with their concentration on practices and their avoidance to implicate any identificatory power of such categories.

But even if landscape is helpful to make these divergent aspects visible, such a definition makes landscape too imprecise to serve as an analytical term. One plausible limitation may be to only define landscape as a specific practice of ordering of space, as the practices of classification, categorisation, and structuring of space are a central part of human life. But it makes less sense to restrict the landscape term to the human-made parts of nature, as nature is always approached through the cultural gaze.

Landscape could then be defined as a specific segment of space, highly variable, always a process, and always a plurality, characterized by temporality, fluidity and relationality. However, such a definition still seems to be too imprecise and vague, as several other terms also address such phenomena: territory, region, area, place and spaces are sometimes even regularly used synonymously. Seemingly, there are no clear differences between landscape and most of these terms. Nevertheless, one difference may be the emotional implications of the landscape term, but the same can be said about region and place and even territory. Another difference may be the employability of landscape ideas in political or economic strategies, but this also counts for region or place.

Therefore, landscape seems to be too inaccurate to serve as an analytical concept, as too many divergent and even inconsistent aspects are addressed. To include all of them into one single term denoted as 'landscape' might render the term meaningless. But to try the contrary and use landscape for only one of these aspects would restrict it too much. Therefore, as a theoretical concept landscape stands on melting grounds, is a liquid term, constantly changing its context, intention, meaning and form, and therefore does not appear to be very useful. The alternative is to find more precise expressions: To address physical or ecological elements, the terms nature or environment might be more appropriate. If the ordering of space is intended, then the terms space, area, region or segment might be more precise. If perception is focused upon, then the specified term 'representated landscape' may be plausible. Furthermore, if practices are meant, we could speak of 'landscaping practices'. Another way would be to construct new, more precise terms using -scape as a suffix, as, for example, the culture anthropologist Arjun Appadurai introduced in his analysis of global cultural flows, where he explored ethnoscapes, mediascapes, technoscapes, finanscapes and ideoscapes (Appadurai 1990).

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Ritual and Landscape

Theoretical Considerations

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Abstract

Rituals are a seemingly indispensable – some might say an all-pervasive – aspect of human existence in premodern and ancient as well as in modern times. In the following, some aspects of archaeology, rituals and landscapes will be examined. At the same time, we demonstrate that archaeological interpretation, like any other scientific work, does not exist in a vacuum, but always has and probably will continue to draw on influences from other academic disciplines.

Introduction

Our paper begins with an overview of perspectives from sociological and philosophical literature on ritual and religion before moving on to look at some archaeological materials. Our aim is to show that rituals, magic, and religion are best seen as multi-faceted phenomena that, in their respective dimensions, may display a range of aspects highlighted in the various strands of classic human scientific theory from the Durkheimian idea of religion as a tool of identity building to the Marxian idea of religion as power and much more beyond this.

In the face of the multitude of theories, the lesson for archaeology is, we believe, that in archaeological interpretation, even greater care ought to be taken to sufficiently differentiate between the different dimensions of ritual practices highlighted in the classics of human scientific theory, especially with regard to the explanatory role and relevance of a given aspect in relation to a given archaeological case.

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Perspectives from sociology and philosophy

In sociology and philosophy, the topic of rituals has often been subsumed under the rubric of the sociology and philosophy of religion. Here, some of the indisputable classics of the sociology of religion include the perspectives developed by Max Weber, Émile Durkheim, and Karl Marx.

In his sociology of religion, Weber asserted that "forms of behaviour motivated by religious or magical factors are orientated to this world" before quoting the phrase "[t]hat it may go well with thee […] and that thou mayest prolong thy days upon the earth" from Moses' sermons and then referring to the Israelites (Book of Deuteronomy, Jewish Torah, Hebrew Bible) as "the reason" for which religious or magical actions are performed (Weber 1978, 399). Illustrating this worldly orientation of religious belief, in another famous work, Weber argued that the Protestant Ethic was intimately connected with the spirit of Capitalism in that certain proper actions in this world would yield rewards in the other world (Weber 1930).

Weber's fundamental message about religion and magic was, according to Talcott Parsons – one of Weber's most influential followers in sociology – that they address the "problem of meaning" or "the functional need for emotional adjustment to such experiences as death […] a cognitive need for understanding, for trying to have it 'make sense'" (Parsons 1954, 208). The performance of services to a god and the belief that 'it thereby goes well for one' is a way of finding meaning in human existence.

Parsons was one of many to prefer a Weberian view about what he called the positivist view of magic. In positivism, "magic was essentially primitive science, serving the same fundamental function" (Parsons 1954, 203). That is to say, according to positivism, magic was to be thought of as false and primitive natural science, allegedly orientated to the task of explaining the workings of the world in a manner similar to modern natural sciences. To this day, discussions are still carried out over the very same theme as to whether religious views are to be thought of as errors of factual judgement of some kind – say, to provide a particularly topical example, when a suicide bomber explodes himself apparently in the belief of then entering paradise and marrying with 72 virgins – or if they should be understood in some other manner, for instance, as ultimately reflecting economic deprivation and the lack of chances in life[1].

Related to the debate about positivism, in modern (Anglo-American) philosophical discourses religious belief has most explicitly featured as a question of the rationality or irrationality of such views. Somewhat parallel to Weberian views of religion answering the problem of meaning, philosophers advanced emotivist or expressivist theories in which religious belief is non-factual and primarily orientated to the expression of wishes, fears, preferences and the like (*e.g.* Mackie 1990). In a contrasting development, some modern classic philosophers, such as Peter Winch (1980), expressed social constructivist views in which religious and magical belief was considered to be constitutive of a groups' form of life, a view that bears certain resemblance to Durkheim's ideas (more below).

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1 In the wake of the November 2015 Paris terror attacks, professor Bart Cammaerts of the London School of Economics wrote a blog on the topic of the economic roots of homegrown terrorism. http://blogs.lse.ac.uk/europpblog/2015/11/18/there-is-no-belgian-problem-with-radical-islam-only-a-european-one [12.10.15].

Alongside the Weberian view of religion and magic, which addresses the problem of meaning, Parsons also commended Durkheim's view "that religious ritual was of primary significance as a mechanism for expressing and reinforcing the sentiments most essential to the institutional integration of the society" (Parsons 1954, 206). With such a view, the perspective can be seen to shift from a focus on the relationship of human psychology/epistemology to religion/magic and to an analysis of the role or function of religious and magical practices in social structures.

In philosophical and sociological thought, ideas such as Durkheim's have led to the exploration of practices as the medium in and through which anything at all exists, including belief. Springing chiefly from the (in themselves distinct) philosophies of Martin Heidegger and Ludwig Wittgenstein, sociologists and other theorists, such as Anthony Giddens and Pierre Bourdieu, developed complex theories of how social structures are both built upon beliefs as well as encourage or steer members of a group to adopt particular beliefs. In social psychology, similar ideas took root in the classic works of such authors as George Herbert Mead and Herbert Blumer, studying the structure of social interaction. An interesting offshoot of the focus on practices is the idea of the embodiment of belief in human action (Taylor 1995; Clark 2001; in archaeology, *e.g.* McGraw 2015).

In a shift arising from Durkheimian and social constructivist ideas, our attention turns naturally to the philosophy of Marx. In Marx's view, religion is fundamentally not a mere belief, but a tool of social control. In Marx's materialism, human associations appear as having what he called the base as well as the superstructure (Marx 2009; Marx/Engels 2007). The base denotes the materiality of the forms of humans wrestling their means of existence from the environment – basically, the ways in which humans provide themselves with their material basis of existence – whereby this wrestling is, for Marx, the first fundamental historical task to be taken care of by humans if they wish to continue to exist at all.

The superstructure, on the other hand, denotes the forms of discourse, ideologies, systems of belief and the like that articulate and legitimate (as well as invalidate) the relations acted out in the activities on the base. For example, various discourses elevating, say, the democratic form of government over some more authoritarian forms of government, would be considered by Marx as discourses belonging to the superstructural level. Religion for Marx is also a phenomenon belonging to the superstructure. As such, one of its functions can be to (re)assert political control through the legitimation of the existing social and political order.

Another aspect of Marxian philosophy of religion is the closely related idea that religious or ritual ceremonies, the buildings and other pomp associated with it, are, in Marx's famous words, "opium for the masses". The idea evidently is that through the creation of shared myths, ideals, stories, and the like, the elites seek to keep the masses faithful to the existing order. This is an idea seemingly close to the Durkheimian idea of religious, magical and ritual practices serving as tools of building and maintaining social control and thereby also social cohesion.

Finally, another notable extra-archaeological school of thought about religion and magic – though not a sociological or philosophical school but an anthropological one – is structuralism championed, for example, in the work of Claude Lévi-Strauss. The key to structuralist thought about religion and magic is the idea that language and thought

are the primary media in which religion and magic exist and that these media have a certain internal structure that then becomes reflected in the organisation of human praxis. We shall return to these themes in archaeological contexts below.

A shift of focus

Ritual studies are a ubiquitous element, present everywhere in archaeological research and have been the focus of a very interesting revival in the past decades. Prior to the rise of post-processual archaeology, rituals were associated with something mental, for example, beliefs, and therefore were thought of as difficult to study archaeologically. As Christopher Hawkes (1954, 160) claimed, the fertility symbols found in Europe during the Neolithic, the Chalcolithic, and the Bronze Age derive their meaning from analogous meanings found in the historical ancient Near East. Without the Near Eastern analogy, obtaining an interpretation of symbols was thought of to be quite difficult if not impossible. Rituals are, of course, specific cultural items and are imbued with symbols and significations, which are difficult to interpret unless we have historical documents that support our research or we take part in the culture itself. Therefore, for Hawkes (1954, 161-162) there was a hierarchy of what could be inferred about past societies based exclusively on the material record, a hierarchy that placed production techniques as the easiest thing to infer, subsistence economies as also fairly easy, social institutions as something much more difficult, and religious institutions and spiritual life as very difficult.

This attitude began to change in the 1980's. As Colin Renfrew wrote:

> "[…] there is nothing inherently obscure or problematic about [Hawkes'] fourth category: the ancient civilisations and their predecessors are rich in monuments which we readily recognise as in some sense religious" (Renfrew 1985, 1).

This change of attitude was also largely a consequence of the introduction of meaning and symbols as an objective of research, an introduction that had already seen some relevance in archaeology through structuralist influence (*e.g.* Glassie 1975; Leroi-Gourhan 1993 [1964]). With post-processual archaeology, ritual and religion became a main area of focus, creating a whole host of assorted interpretations of how past societies engaged in spiritual life (Fogelin 2007).

In this archaeological shift from processual to post-processual thought about religion and magic, for example, one may well recognize some of the aforementioned philosophical and sociological developments. Broadly speaking, the critique of positivism led to the emergence of various forms of social constructivist views as well as views regarding the social role of religion and magic, a broad development that we can see in the emergence of so-called post-processualism in archaeology.

The ritual landscape and the importance of place

Archaeology is characteristically thought of as a science fundamentally interested in materiality, material culture as well as the space and place of prehistoric human life.

Related to this, probably one of the most popular ways to archaeologically think about rituals and religious belief is through the phenomena of landscape and monumentality (Baird *et al.* 2011; Bradley 1991; Haaland/Haaland 2011; Müller *et al.* 2013; Robb 1998; Scarre 2011). This way of thinking about rituals and religious belief manifests in itself a notable range of interpretations, although most would agree that these interpretations focus on the intersection of ideology and geography: in short, 'ritual landscape' is the sacred place where rituals were enacted. The creation of these ritual landscapes usually translates into the construction of monumental structures that mark the landscape in a meaningful way. Examples of this practice can be seen in a wide variety of places and periods: the open-air rock-art site of Foz Côa, Stonehenge, the Pyramids of Giza, the Potala palace in Lhasa, the Seville Cathedral, Göbekli Tepe, Angkor Wat, and many more.

Ritual and landscapes are connected in complex ways. For a landscape to gain signification, one cannot simply erect a monument in any place. The choice of the place will vary from culture to culture – while the location of a modern church might reflect more immediate practical needs or necessities, the location of rock-art might have involved different selection criteria. Caves are a good example of a type of place that is carefully selected for rituals. Richard Bradley relays the story of one of Arthur Evans' first forays into archaeology: in Finland, there is a lake that contains a small island called Ukonsaari, and on this island, there is small shallow cave that is venerated by the local people. Evans, who was an Oxford undergraduate at the time, found his way to the cave to find it full of soot and modern debris. He decided to start digging and eventually found, under recent material, some prehistoric burnt human bones and a metal ornament. Evans' interpretation of the site was simple: the unusual topography of the cave deterred long time occupation, and the contents were not the remains of ordinary meals. The cave was a Saami sacrificial site (Bradley 2000, 3-5).

Going back to the theoretical ideas reviewed at the beginning of this analysis, the special locations of ritual places might reflect a number of things. Most generally, the differentiation between locations (sacred locations versus profane, everyday locations) might be considered to mirror a similar differentiation in the social organization of society in a Durkheimian or Marxian sense. Alternatively, the division of special or sacred and ordinary or profane might also be studied according to a structuralist principle of how these people thought and spoke about the world around them.

However, one may also consider the following interpretation. Traditionally, Palaeolithic hunter-gatherer groups are thought to have occupied caves because of the presence of Palaeolithic representative rock-art. However, the material record found within caves since the 1980s gave rise to a wider frame of interpretation, one that puts the properties of the location of the art in focus (Conkey 1987). Whereas structuralist interpretations of Palaeolithic cave art concentrated on the linear development of Palaeolithic art over time with sustained meaning and context (Conkey 1985), it may have been very likely that the caves were spaces in which rituals of a certain complexity were performed. As places that might have led to the aggregation of Palaeolithic groups (Conkey 1980), the caves which contained Palaeolithic rock art were more than just places for 'art' *stricto sensu*. When thinking about the physical qualities of caves, it is easy to imagine their appeal in relation to the open air: caves have a direct connection to the earth itself and are dark and damp within – conditions, which made

them unsuitable for long-term occupation, but appealing for particular kinds of short-term stays. J. Davis Lewis-Williams and Thomas A. Dowson (1988) have made a very compelling case in comparing some of the geometric elements found in Palaeolithic art with those obtained under hallucinatory experiences, whereby the darkness and isolation that the caves provide gain remarkable significance. The trance-like state that we witness in the practices among many contemporary shamanistic societies is one that is favourable for the perception of what Lewis-Williams and Dowson (1988, 202-203) call entoptic phenomena – phenomena that allow the perception of geometric forms while under altered states of consciousness. Given that trance-like altered states are facilitated when the senses are deprived, a cave would appear to be the ideal place for these states to occur (Lewis-Williams/Dowson 1988, 214).

Philosophically speaking, these archaeological interpretations can be seen to draw from ideas about practices tied to particular spatial locations as well as ideas about how embodied experience of ritual can be intimately tied to its physical surroundings. Recently, John McGraw (2015) has pursued a similar line of thought in archaeology, arguing that ritual practices are essentially about doing or enacting something, a view in which both the creation and maintenance of Durkheimian social cohesion through joint action, as well as the bodily performance possibly leading to dissociated states in the participants, play a key role.

Megaliths: Identity and power

Interesting insights into our understanding of sacred places is provided by the study of megaliths. In a publication of the Graduate School "Human Development in Landscapes" (Furholt *et al.* 2011), megaliths were discussed in connection with collective identity building and maintenance, an approach in which we can see distinct Durkheimian overtones:

> "[…] monumental buildings are seen as media for the creation and maintenance of Cultural Memories, who again serve as means to create and maintain collective identities" (Furholt 2011, 109).

A different kind of a Durkheimian approach can be seen in a recent study of the Moai statues on Easter Island. Recent research on the island has argued that instead of a quasi-industrial process of statue manufacture, the whole process of 'production' itself might have already held ritual significance for the people in question (Hamilton *et al.* 2008). The quarry site, Rano Raraku, which provided material for the statues, was much more than just a place to obtain stone. It seems to have been a place of veneration itself. Rano Raraku is a broad volcanic cone that is located on the southeast side of the island from where green volcanic tuff was extracted to create the *moai*. At Rano Raraku there are still roughly 400 statues in various forms, 80 of which were erected on the volcano itself (Hamilton *et al.* 2008, 179). It can be argued as well that the statues might hold little significance themselves, but that significance is obtained through a web of practices associated with the statues (Hamilton *et al.* 2008, 184) – practices that were certainly ritualistic in nature. Thus, in a Durkheimian manner one might argue that not only the ritual activities taking place at finished sites (in this case at the

statues) but also already the production process itself might have served the function of enhancing social cohesion.

Turning to one of the most famous megalithic monuments of all time, Stonehenge near Amesbury in Wiltshire, England, it may be asserted that just as is in the case of Easter Island there might be much more to Stonehenge and similar monuments than merely the sites themselves. The research conducted by the Stonehenge Riverside project, led by Mike Parker Pearson, has revealed a whole new understanding of what Stonehenge meant to the prehistoric population of Britain. First, Stonehenge was anything but isolated: like Easter Island and the *maoi* statues, there was probably much activity surrounding the creation of Stonehenge, a process that included the transportation of the stones that constitute the structure, dolerites, from Southwest Wales all the way to the Salisbury Plains, 200 miles away (Parker Pearson 2016). Although previously known, there is also the relation of the structure with the solstice axis, which indicates the high probability of calendrical feasts and celebrations at this location (Bender 1998). Moreover, there is the relation of Stonehenge to the deceased: similar to other megalithic structures in the western part of Europe, Stonehenge was, in fact, linked to funerary practices with an estimate of 150 to 240 cremation burials associated with it (Pearson *et al.* 2009). Finally, there is the relation of Stonehenge to the world of the living, more precisely, to Durrington Walls (Parker Pearson 2013). The relation of Stonehenge to Durrington Walls, located a mile and a half from Stonehenge, must have been much more intimate than initially assumed. As Pearson *et al.* (2006) argue, the presence of Woodhenge, a circular wooden structure similar in placement as the stones of Stonehenge, within Durrington Walls, is evidence of the strong symbolism surrounding the complex, of which Stonehenge is only a part. In their own words: "[a]lthough ceremonial use of this landscape already went back at least a thousand years by this time, the sheer scale of this work programme suggests a millenarian zeal in which people from across Britain must have participated in a religiously inspired remodelling of cosmology" (Pearson *et al.* 2006, 233-234). While highly speculative, the interpretation of Durrington Walls and Stonehenge as part of a rite-passage from the world the living to the world of the dead, from wood to stone, is very attractive. The ceremonial procession in this rite of passage included not just a simple trek from Durrington Walls to Stonehenge, but it probably also included funerary feasting before transportation along the Avon River, marking the transition from life to death, and further downstream transportation of the bodies to their final resting place: Stonehenge (Parker Pearson/Ramilisonina 1998; Parker Pearson *et al.* 2006). There are very few prehistoric rituals that have been explained in such detail. Stonehenge and the associated rituals provide a paradigmatic example of the close relationship between rituals and landscapes. As the several examples above show, there is much more than just a simple framing of a monument within a given landscape – monuments and rituals derive their meaning from the actual material of the landscape, be it water, stone, or wood. There is also the cosmological understanding that also gives the spatial distribution of the monuments meaning. Moreover, there is also, of course, the direct connection of these monuments and rituals with people through funerary rites of passage as in the case of Stonehenge and the connection with animals as seen in Upper Palaeolithic cave art.

Displaying a different approach in drawing from Marxian ideas about religion, another contribution in the aforementioned volume (Furholt *et al.* 2011) argued that: "The praxis of community burials is an indication of one prevailing group within soci-

ety which dominates the investment in the maintenance of burial sites while attempting to ideologically 'simulate' the egalitarianism of the structures within and without" (Müller 2011, 284).

In this approach, one might observe something of the Marxian idea that religion is the "opium of the people", that is, that religious or magical ritual can be used or serve as a political tool of control. More generally, just as the Durkheimian approach would view rituals in the functional role of enhancing social cohesion, similarly, the Marxian view casts rituals in the functional role of supporting power hegemonies. In this manner, Timothy Earle and Kristian Kristiansen (2010) articulate a powerful and multi-dimensional view of the Northern European Bronze Age, a focus point of which is the notion of political economy: "The political economy is the material flows of goods and labour through a society, channelled to create wealth and to finance institutions of rule" and as such "[t]he reproduction of the physical landscape, its settlements, burials and households, and broader social relations depends on the political organised economy" (Earle/Kristiansen 2010, 6-7). In their study, Earle and Kristiansen maintain that ritualistic elements, such as the "gifting of objects" and "items of display and identity", play the important role of building up and consolidating the political economic structure. Magic and religion can be seen to serve a role in maintaining and legitimizing the continuity of the political economic structure.

In a different approach, the intentional placement of stones in megalithic constructions might be taken as an attempt to reproduce the landscape (Scarre 2000; Tilley 1994). For instance, the megalithic phenomenon in Alentejo, in Southern Portugal, has two distinct facets: on the one hand, there are the portal tombs, also known as cromlechs and dolmens, which were used primarily for funerary purposes (Gonçalves 1999, 2002; Gonçalves/Sousa 2003) and, on the other hand, there are the standing stones that sprinkle the granitic landscape of Alentejo (Calado 2015). Here, it has been argued that the anthropomorphic nature of standing stones and their intentional framing within a specific landscape is apparent (Calado 2015, 250).

Conclusion

The foregoing overview shows only an excerpt of the wide range of approaches to rituals and landscapes available in the breadth of human scientific literature. The variety of approaches probably indicates that rituals are best thought of as multi-faceted phenomena to which all different kinds of theoretical approaches can contribute to a holistic understanding. Conceivably, a ritual can simultaneously be a Marxian tool of social power, a Durkheimian maintainer of social cohesion, an answer to existential questions as suggested by Weber, and possibly much more. If this is true, it appears to be essential in archaeological interpretation to differentiate among these facets in the explanation and scrutinisation of which aspects of rituals manifest themselves in which surroundings and to explain these in precise analyses. In a hypothetical case, a ritual practice of a society might manifest Durkheimian or Weberian aspects, although it might be the Marxian power aspect that is the most relevant to explain, for example, the disintegration of the practice following a power struggle within the hypothetical social formation studied. Or conversely, in another hypothetical situation, a given archaeological case

might manifest Marxian power relational aspects, whereas a Durkheimian or Weberian approach might better explain the persistence of the social formation in question.

In a joint paper (Arponen/Ribeiro 2014), the authors argued that in archaeology, but also in the human sciences more broadly, ritual and religious phenomena tend to be ultimately understood as a consequence of belief. That is, ultimately, for social formation, the practice of ritualistic or religious actions is driven by holding a set of religious or magical beliefs. A similar interpretation is seen in a part – although by no means all – of the contemporary discourse about religious extremism in which religious beliefs in life after death, religious duty and so on are cast as major drivers of the phenomenon. A more nuanced understanding of the phenomenon can involve interpreting it according to aspects of most of the major traditions of human scientific theory. Hence, an extremist group surely displays Durkheimian attempts at the creation and maintenance of a group identity in contrast to other groups. For the individuals involved, to belong to such a group may well be a matter of finding meaning in an otherwise meaningless, perhaps socially and economically deprived existence. On a different level, scale or dimension, surely Marxian power politics, having in this case to do with regional power vacuums and struggles therein, will also play a role. Our idea in Arponen and Ribeiro (2014) was to call for sensitivity towards these multiple dimensions of religion and rituality. We argued that rituals are institutions and that

> "Social institutions are comprised of several elements that interact with each other in space and time and it is this dynamic quality of institutions and their individual constituents that allows us to observe them in their historical development" (Arponen/Ribeiro 2014, 173).

However, in archaeology most of that level of detail will of course often be invisible. Yet, this should not mean that archaeological thought about rituals must be one-dimensional. Armed with a set of different theoretical insights into religion, magic and ritual, archaeology is able to interpret collected data in a creative, holistic and an interdisciplinary fashion.

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II: Past Landscapes

Concepts and Practices

Putting Things into Practice

Pragmatic Theory and the Exploration of Monumental Landscapes

Martin Furholt, Martin Hinz, & Doris Mischka

Abstract

The Neolithic and Bronze Age burial ground of Flintbek provides a well-documented case study of a monumental landscape, whose shaping and development through ritual practices of monument building can be studied over the course of centuries. The minute excavation and data analyses (Mischka 2011a) enable a discussion of the interrelations between collective social practices of monument building and modification as well as the practical effects those individual monumental features – and the monumental landscapes as a whole – would have had on those social collectives. We want to explore pragmatic theory as a tool to better understand the dialectic between the creation and recreation of landscapes and the reproduction of social organization in the course of social practices.

This paper aims to highlight how an inquiry into prehistoric social practices based on semiotic pragmatism, as was formulated by Charles Sanders Peirce, provides a theory on how meanings and social relations are created and recreated in the course of social practices, a model explaining how these practices as material and spatially situated phenomena can be used to explore the interrelation of social practices and their material outcomes, which have practical consequences for subsequent practices and social relations. We exemplify this by the reconstruction of building activities on the megalithic long barrow Flintbek LA3, Northern Germany, 3500-3400 BCE. Here, it can be demonstrated how construction activities over the course of a century are both shaped by and actively shape social relations. New developments can be explained by a creative recombination of already existing singular components. A process of complexification and enlargement of building activities is set into motion, including inter-group competition. This development is terminated around 3400 BCE, whereafter grave construction activities are re-directed towards a smaller number of collectively used passage graves, which further enhance the level of complexity of design, but dis-

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pense with the unequal, competitive component. This represents a process of social collectivisation paralleled with the establishment of first larger villages in the region.

Introduction

Practice theory has been discussed in archaeology for quite some time (*e.g.* Dobres/Robb 2000; Sillman 2001; Barrett 2012) – mainly in theoretical papers and among theoretically minded colleagues. However, it also seems to have gained importance among more empirically engaged archaeologists in recent years (Kleijne 2013; Beckerman 2015). The view that it is less productive for archaeologists to describe the shapes and formal characteristics of their objects than to view them as part of practical actions has opened new possibilities for the exploration of things, buildings or landscapes as active participants in socially significant interaction processes of the past (Maran/Stockhammer 2012). Such a perspective goes along with a rejection of dualist thinking and the rejection of an anthropocentric world view, i.e., the rejection of the notion that it would be possible to think of autonomous human minds as the sole base or subject of agency. In the context of what is called "new materialism", it is held that practice is to be seen as a materially situated, interrelational phenomenon, where assemblages of actants, minds, concepts, bodies and things form practice network(s) (Olsen 2003; Olsen 2010; Olsen *et al.* 2012; Webmore/Witmore 2008). With a slightly different terminology, others see humans as "entangled" in substantial things and surroundings (Hodder 2012). Others stress the possibilities of a phenomenological approach to past social reality (Tilley 1994; Tilley 2004). All these approaches share the main argument that the material world is not something inherently separated from the realm of meaning and thought, and moreover that the materiality of worldly experiences takes part in the creation and modification of meaning.

This notion is actually very well expressed in the Peircian variant of semiotics, which also lies at the root of the philosophy of pragmatism. Thus, it is somewhat surprising that this school of thought has not yet had a larger impact on these archaeological debates (with the exception of Preucel 2010; Knappett 2005; Watts 2008; Knappett 2011). The main basis of pragmatism is the notion that practice is a phenomenon primary to all mental phenomena, which themselves are outcomes of processes of practice and can only ever exist when they are performed in the real world. What is more, in one of the most influential early writings Peirce formulated the "pragmatic maxim", which is held to entail the core argument of pragmatism. This maxim proposed an angle for the clarification of meanings that creates a direct link from the materiality of social phenomena to the realm of meaning.

> "Consider what effects, that might conceivably have practical bearings, we conceive the object of our conception to have. Then, our conception of these effects is the whole of our conception of the object" (Peirce 1960).

Although there are different opinions on Peirce's intentions behind this statement, it does, we want to argue, contain an argument about how meanings are dependent on and constantly influenced by the materiality of practice – how meanings are grounded

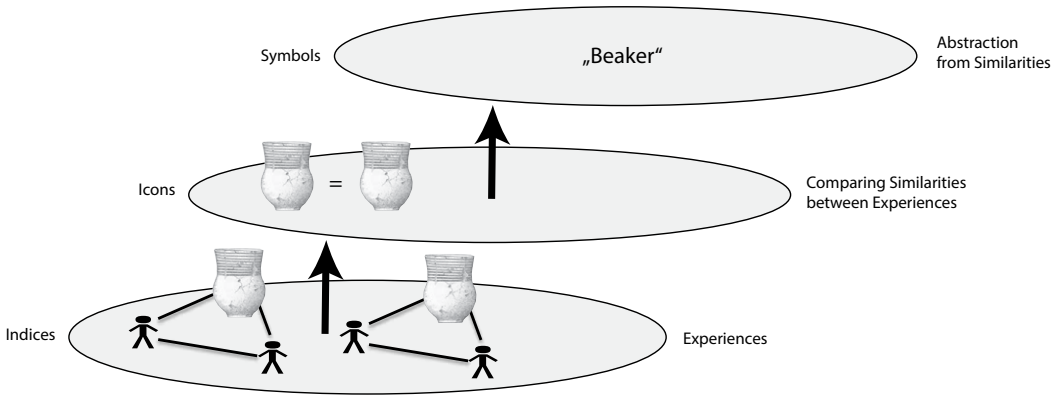


Figure 1: The pragmatic three-level model of meaning (illustrations: M. Furholt).

in real-world phenomena. Here is not the place to discuss whether or not this pragmatic maxim could be taken as a general theory of meaning. What it does provide, however, is a theory on how meanings are created in a human subjects' mind, and what role real-world experiences play in this process. The pragmatic maxim thus creates a direct link from the practices situated in the material world, i.e., from the archaeological record to the realm of prehistoric signification.

The meaning of a thing or concept ("*the object of our conception*") is determined by the assumed real-world impact(s) that this thing or concept can be thought to have ("*effects, that might conceivably have practical bearings*"), based on previous real-world-experiences. The meaning assigned to a thing, situation, or concept is an abstraction of our expectations about the practical consequences resulting from our practical engagement with the thing, situation, or concept, based on our previous experiences. This process is well described by Terrence William Deacon (1997, 73) in his discussion of Peirce's triadic sign system. As is well-known, Peirce distinguished three types of signification, three ways in which a sign can relate to meaning, namely the *iconic*, the *indexical*, and the *symbolic*. These three modes of signification also represent levels of abstraction (Fig. 1).

The *iconic* signification draws on a material similarity of one thing with another, like a drawing of a tree to a real tree, which we are visually able to recognise. The *indexical* signification draws on a functional, physical connection of one thing to the other, e.g., that smoke refers to a fire as lightening to a storm. However, such a connection is never simply known. Rather, to make that connection one needs to have learned, one has to have had previous experiences with this kind of connection, and memorised that the presence of smoke is closely linked to the phenomenon of fire. This is practically done by connecting and abstracting from several already experienced, similar situations; by comparing the similarity between these situations. In other words, one is using *iconic* sign relations. Finally, the *symbolic* type of sign relation draws on social convention, for example, in the case of human languages. However, such social conventions are not created in a vacuum, but are rather created and upheld in situations with interactions of social practice. As a child, one learns the meaning of these symbols by one's ability to abstract certain parameters

from real-world experiences. This is done by using both iconic and indexical sign relations. While learning its first language, a child makes the connection between, say, the frequent co-occurrence of a dog or the iconic representation of a dog and the spoken word "dog". Thus, the *symbolic* meaning of "dog" is determined by the real-world experiences with the concept of "dog", and uses both iconic and indexical sign relations. The regular co-occurrence of the spoken word "dog" and its meaning (involving, mostly, directly or indirectly, a real dog) is recognised as if it were an indexical sign relation, and the recognition of this relationship is only possible because an iconic similarity between different experienced situations is created.

Pragmatic semiotics thus presents a theory of meaning that starts from real-world practices, and explains how meanings are created and altered in the course of ongoing interactive social practices. With this concept as a starting point, Peircian pragmatic semiotics additionally provides a model of signification, which both emphasises the groundedness of meaning in practical action within the material world and the dynamics of signification processes.

Peirce's model of signification has three poles, the *sign*, the *object* and the *interpretant*. The *sign* represents the material bearer of meaning, corresponding to Ferdinand de Saussure's "signifiant", or "signifier", which can be a solid thing, the sound of a spoken or the shape of a written word. The second pole is the *object*, the content of meaning, to which the sign refers, corresponding to Saussure's "signifié" or "signified". The most remarkable component of Peirce's signification model is, however, the "*interpretant*", which represents the act of interpretation. The *interpretant* makes clear that there is no relation between *sign* and *object* unless it is practically experienced as such, in a real-world situation. The idea of an *interpretant* is a complex concept, which Peirce altered throughout his lifetime (see Morris 1977; Schönrich 1990), but the main issue, in our view, is that the *interpretant* situates the process of signification into a real-world social context. To understand the role of the *interpretant* means that there is actually no difference between acting and signification, because all mental processes – the connections of *sign* to *object* – take place in the course of practical actions. Practical action always consists of ideas and intentions (*object*), a material carrier medium, be it a body, neurons, or tools (*sign*) and motion (*interpretant*).

The *interpretant* is also the component of the signification triad, which represents the dynamic nature of signification processes and explains how meanings are altered through practice. Any act of signification modifies the meaning of a *sign*, because the *interpretant* of one act of signification becomes part of the *object* in the next act of signification. Any practical experience with a thing or concept has effects on our conception of this thing or concept and thus becomes part of our idea of this thing or concept (Fig. 2).

These two models of the creation and re-creation of meaning – the "ladder of abstraction" constituted by the *iconic*, *indexic* and *symbolic* (Fig. 1) modes of signification and the triadic sign model (Fig. 2) – constitute what one could call a pragmatic theory of situated meaning. It represents a powerful tool for archaeological reasoning based on a bottom-up approach, starting from the fundament of material evidence, as we will demonstrate in this paper.

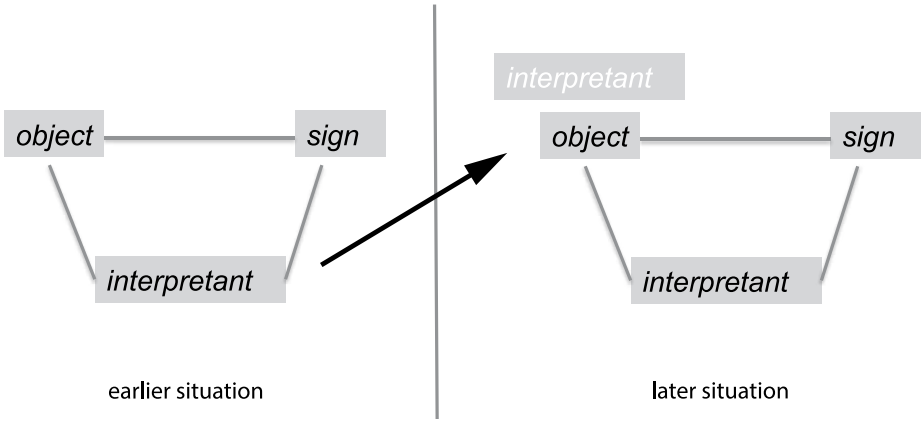


Figure 2: The triangle of semiosis, the triangle of practice (illustrations: M. Furholt).

This pragmatic theory of meaning does not provide a tool to "reconstruct the meaning" from material remains, because the variability of signification and connotation that has developed in human history is far too complex and dynamic, and the level of abstraction for symbolic concepts much too high to be traceable via its material constituents. But this theory of meaning helps us to understand the circumstances under which meanings are created, and it allows us to better understand the consequences that changes in the configuration of the material arena will have on its social constituents. By its notion of the material situatedness of practices/signification processes, which generate and alter meanings, it allows archaeologists to trace structural changes in practices and thus meanings.

Such an explicit theory of meaning has also been discussed for phenomenological approaches (see Rump 2013), but it has never made its way into archaeology. There are other theories of meaning connected to entanglement theory (Hodder 2012), material engagement theory (Malafouris 2013) or Christopher Y. Tilley's *Metaphor and Material Culture* (Tilley 2000). Still, we would like to argue for the strength of the pragmatic theory of situated meaning as the basis for archaeological inquiries, as is proposed here. It presents an alternative approach to phenomenological, actor-network-based, or entanglement-theory-based approaches to social practices. Its advantage is that it provides an explicit model connecting the materiality of situated actions to the creation and maintenance of meanings.

The pragmatic approach to social practices meets the specific needs of prehistoric archaeology because it starts from the material record, which is seen as a result of practices, and because it uses practice as the link between the material and the mental. It is historical, because it respects the specific situatedness of practices and highlights the socially interactive nature of practices (Furholt 2017).

The pragmatic approach is also processual, as acts of practice are not seen as isolated events, but as having consequences for each other. It enables an empirical approach, which meets the nature of the archaeological record, but it does not advocate a radical empiricist position. Human intentions and human creativity are not excluded, but they are seen as enmeshed in the empirical, emerging from practice.

Case study: Monument construction as meaningful social practice exemplified by Flintbek LA3

To be more concrete, we want to consider our approach in conjunction with the meaning of a specific Neolithic megalithic structure. What this specific burial monument actually meant to a prehistoric group of people is, to a great extent, constituted by the practical consequences of their engagement with it, for example, in joint construction activities. Surely, there must have been pre-conceptions towards this kind of building, based on earlier engagements with the concept of megalithic structures and material megaliths, but the actual engagement with this individual monument brought forth transformations of that conception.

Turning the argument around, the specific shape of the megalithic structure is a practical consequence of the construction activities, and these activities are influenced by the specific shape of the group constructing it, their group size, their social struc-

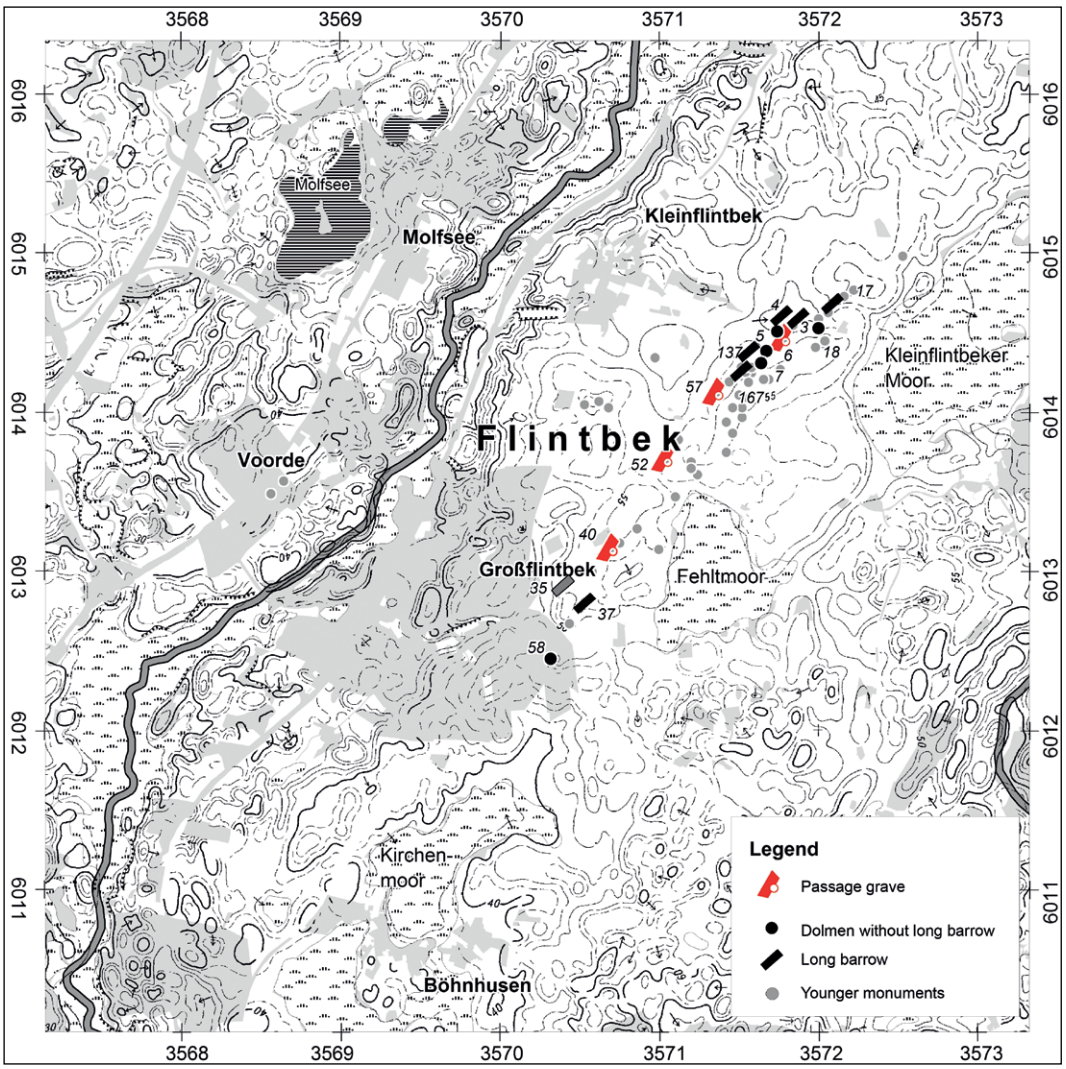


Figure 3: Flintbek LA3 (map: Mischka 2011a).

ture, their organisational status, the presence or absence of specialists, and so on. In turn, the building activities yielded practical consequences for the social shape of the group engaged with it. The performance of collective efforts as well as the impact of outstanding individuals directing these influenced and altered social relations and social roles.

In consequence, this means that we as archaeologists can potentially infer knowledge about this specific social group, because the specific shape of a megalithic structure or of the remains of individual construction events are indexical signs referring to the group engaged in this construction.

We want to illustrate these concepts using the example of the long barrow Flintbek LA3 (Fig. 3).

This structure has gained a degree of international recognition because it contains the oldest known wheel tracks worldwide (Mischka 2010; Mischka 2011b). The reason why we chose this structure as a case study in this article is the excellent excavation carried out by Dieter Stoltenberg and Bernd Zich, which allows for the detailed reconstruction of building practices, as has been elaborated by Doris Mischka (Mischka 2011a).

Flintbek LA3 is part of a larger cemetery of Early, Middle and Younger Neolithic (3600-2200 BCE) burial monuments, located in a linear configuration along a gentle ridge just a few kilometres southwest of Kiel, Germany (Fig. 4).

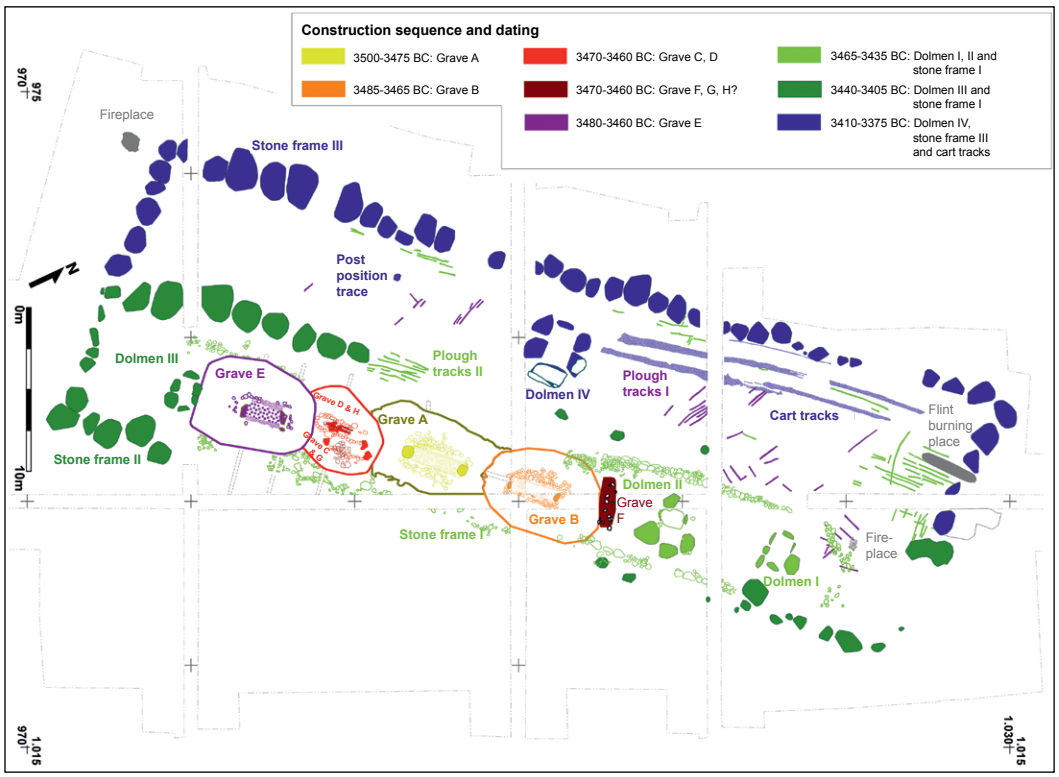


Figure 4: The Flintbek cemetery (plan, Mischka 2011c).

It consists of four groups of monuments, which can, as we will see later, be said to have undergone comparable developments.

LA3 is a long-barrow that was excavated in 1988 and 1989 by Stoltenberg, who could document the complex construction history. This was then ^{14}C dated and published by Mischka (2011b), who established through a Bayesian model that the whole construction sequence took place within a time span of 100 to 150 years. For our reading of the construction activities, we use the "short" chronology, acknowledging that radiocarbon dates tend to exaggerate durations, even when modelled. It is probable that the building sequence took place between 3500 and 3400 BCE. In the following account of building events, we use intervals of 10 and 20 years, although it is clear that in reality the time between building events might have been much less regular.

Social background

The Funnel Beaker Complex in Northern Germany and Southern Scandinavia (normally referred to as the "North Group of the FBC", see, e.g., Bakker 1979) is an archaeological culture connected to the Neolithic communities in the region from 4100 to 2800 BCE. Although the term brushes over a variety of different phenomena and social formations (Furholt *et al.* 2014), for the Northern German region we know that farming and animal husbandry were successively introduced and gradually established in different areas from 4000 BC onwards, while it took at least until 3700 BCE that any substantial human agricultural impact was significant enough to be detectable in the palynological records (Hinz *et al.* 2012; Feeser/Dörfler 2015). This impact reaches a first peak around 3500 BCE. This is the time when monumental building activities commence with non-megalithic long barrows around 3800 BC and megaliths around 3600 BC, reaching a first peak around 3500 BC (Furholt/Mischka in press).

Settlement is small-scale and dispersed, organised in single farmsteads and small hamlets. The establishment of larger villages is first observed around 3350 BC (Hage 2016; Brozio 2016). It is thus convincing to interpret the monumental building activities as a crucial means for these small, autonomous, dispersed social groups to create larger communities of practice and establish some form of larger-scale social identities (Müller 2009). Therefore, we are – as we discuss the building sequence of Flintbek LA3 – not dealing with the random outcome of some kind of remote ideological or religious superstructure, but with an integral component of group dynamics.

The construction events

The long barrow of LA3 was not planned as such from the start. Rather, it was first conceived on a very small-scale, when around 3500 BCE a rather meagre structure, a so-called Konens Høy grave (Madsen 1975; Madsen 1979), was probably built as a grave for a single individual (grave A, Fig. 5.1).

About 10 years later (3490 BCE), a similar grave (grave B, Fig. 5.2) was erected directly beside grave A. It has the same form, the same orientation, and approximately the same size. During the following 10 to 20 years (until 3480-3470 BCE), five new graves are added on both sides of the existing ones (graves C, D, G, H, F, Fig. 5.3-4). They exhibit some slight variations, but are generally very similar, small-scale burials with

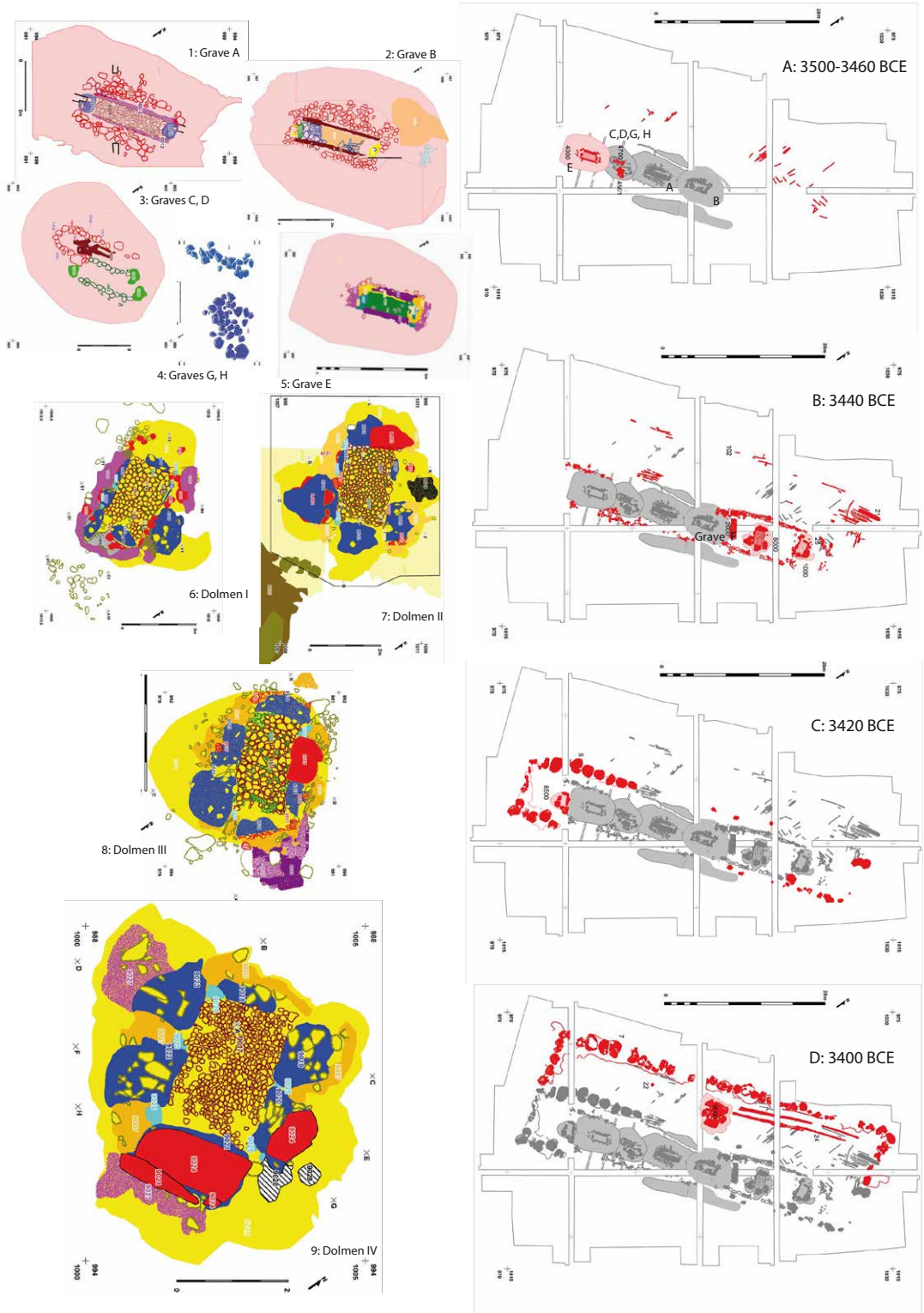


Figure 5: The construction process of Flintbek LA3 (plan: Mischka 2011a).

stone packings and earthen and wooden elements – again with the same orientation and constructed as an extension of the already existing structure. Around 3460 BC, another Konens Høy type grave is added on the southwestern side of the structure (Fig. 5.5).

Thus, a linear grave structure emerged around 3460 BCE, which was created by additions of several small structures (Fig. 5A). This linear structure was then "acknowledged" or marked by a stone frame around 3440 BCE (Fig. 5B), at the same time as the construction of the first megalithic graves, two dolmen chambers (1 and 2, Fig. 5.6-7). 20 years later, at 3420 BCE, the first stone frame was replaced by a second, megalithic version of a frame, constituting a more representative outer appearance (Fig. 5C). At the same time, a third megalithic dolmen was erected (Fig. 5.8). Finally, around 3400 BCE the northern side of the megalithic frame was removed and the size of the structure was doubled (Fig. 5D). Within the northern part of the structure, a fourth – and until now the biggest megalithic dolmen chamber – was erected (Fig. 5.9) towards which the famous cart tracks seem to lead.

A pragmatic perspective on the construction events

From a pragmatic perspective, we can identify different modes of practices in the sequence described above, i.e., qualitative changes of the shape that these practices take. In the beginning, we observe simple small-scale grave constructions (see Fig. 6).

They are relatively standardised, but there is room for variation, which does not, however, disregard the main principle of small, individual graves made of wooden posts, stone pavements, stone packings and an earthen cover. During the first 60 years,

Figure 6: A reconstructed Konens Høy grave from "Steinzeitdorf Albersdorf" (photo: with courtesy of the Steinzeitpark Dithmarschen, Albersdorf).

there is a sequence of rather similar repetitions of the grave construction activities. The earlier practices and their outcomes, the graves, become signs influencing the shape of the following construction practices, which, as *interpretants* of the older practices, are added as *objects* of meaning to the *sign* influencing further activities (*interpretants*). It is well conceivable that these recurrent acts of construction could have been carried out by a small group of people, possibly the inhabitants of one or several farms or a hamlet without any specialist knowledge or the need for any larger workforce. During these 60 years, there is not much change or development in the practices, very much in contrast to what happens around 3440 BCE.

The first qualitative change is noticeable at ca. 3440 BCE, when the stone frame defines the shape of the long barrow. This is a structure that was actually already practically present, although it grew out of several additions that were attached to the first Konens Høy grave, on either side, according to its initial orientation. Thus, the idea of a long barrow can be seen as a practical consequence of past practices and their material outcomes, which is at a certain point, around 3440 BCE, acknowledged and "realised" by the application of a stone frame. This addition adds a new layer of complexity to the activities. Now LA3 is no longer just a cluster of graves, but it has an overall building plan, and every following building activity has to regard both the grave level and its relation to the level of the whole complex, which is now a long barrow. At the same time, the elaboration of the graves is increased by the construction of the first two megalithic dolmen chambers, which also significantly increases the workload carried by the group performing the constructions. At 3440 BCE, it is likely that the constructors could have already witnessed the construction of both long barrows and megalithic dolmens elsewhere and at Flintbek as well. Nevertheless, it was a deliberate decision to frame the row of graves present thus far and to start adding megalithic architecture, thus including or transforming the structure already present into these concepts.

Figure 7: A reconstructed long barrow with a representative, outward-directed megalithic façade in Munkwolstrup (photo: D. Mischka).

The addition of a megalithic barrow frame around 3420 BCE, adds, apart from an even more extensive workload, a new quality of outward directedness, a representative function (see Fig. 7).

It is important to stress that this new quality is realised because two elements previously known and forming part of earlier practices – the stone frame which defined the form of the long barrow and the "megalithisation" or "monumentalisation" of architecture through the use of large boulders – are combined. This combination then generates this new quality of outward representation, which might very well be interpreted as a competitive notion towards the other burial groups in Flintbek.

In the last building phase around 3400 BCE, the overall design is stabilised, but the shape is further monumentalised by doubling its size. One megalithic grave, the largest hitherto constructed, is placed in a central position in the long barrow. Its relation to the already existing graves suggests a clear structure: It "mirrors" and "equals" the whole line of ancestor graves in the southern part of the barrow, whereby a small group of individuals (4 to 8 to be judged from some preserved teeth and bones; Mischka in press) are centralised and "made equal" to the entire line of ancestors. By doing so, they are assigned a markedly exceptional position.

A striking aspect of the structural development just described is surely its uni-directionality. What we notice is a constant rise in the complexity of architecture and design, combined with an increase in size and labour investment. After 60 years of rather uniform, small-scale construction events from 3500 to 3440 BC, a constant increase in efforts sets in. From 3440 BC on, it appeared impossible to fall back behind the efforts of already existing structures. On the contrary, every new event seems to require a higher investment in labour and an addition of complexity to the overall structure. It appears to have been inconceivable to scale back on the effort and resources invested into the construction thus far. This observation together with the rising outward representativity of the structure since 3440 BC suggests the competitive character of these practices. Such competition could be conceivably directed towards the in-group of constructors or towards other groups, for example, those engaging in comparable practices during the same time span in Flintbek. Finally, the last building phase suggests that certain individuals had gained outstanding social importance, which ranks them above everybody else. Along the developments we followed thus far, one could assert that the high workload and the complexity of design connected to the last building phase are just a continuation of the constant increase in the aforementioned aspects and are therefore not a sign of a specific social importance of the individuals buried in the last megalithic construction event. At least from a pragmatic point of view and in the context of all the practices connected to structure LA3, the question whether the accentuation of the individuals buried in the last grave was an intentional and conscious act is actually unimportant. Given the relationship of the older and newer signs represented by all these grave construction events, the construction of the last building phase does, however, have "practical bearings", i.e., practical effects on the social group engaged with it. The people buried in the last grave are – in light of the overall context – effectively given a highlighted position. Inevitably, this would have generated consequences for the group structure.

Another interesting aspect is the change that took place around 3440 BCE, after 60 years or more of small-scale and rather monotonous activities. Why did people start

to innovate around 3440 BCE? Was there an input or an impulse from outside? This scenario is possible, especially considering that the choices made (*e.g.* the shape of the long barrow, the megalithic chambers, and the megalithic frames) were probably based on known architecture from other parts of Northern Germany (including Flintbek itself, e.g., LA4, LA37, LA167, see Mischka 2011a). However, what should also not be underestimated is the generative power of a creative recombination of already existing elements, as in the case of the elongated grave mound and the stone frame, generating a long barrow, or the combination of this frame-idea with the idea of megalithic tombs and their construction, generating an outward-directed representative quality and possibly inter-group competition. Even if the elements or their combination were adoptions from elsewhere, their practical realisation in the concrete LA3 context had profound practical consequences, not only for the structure itself but also for the activities carried out and thus also for the group of constructors.

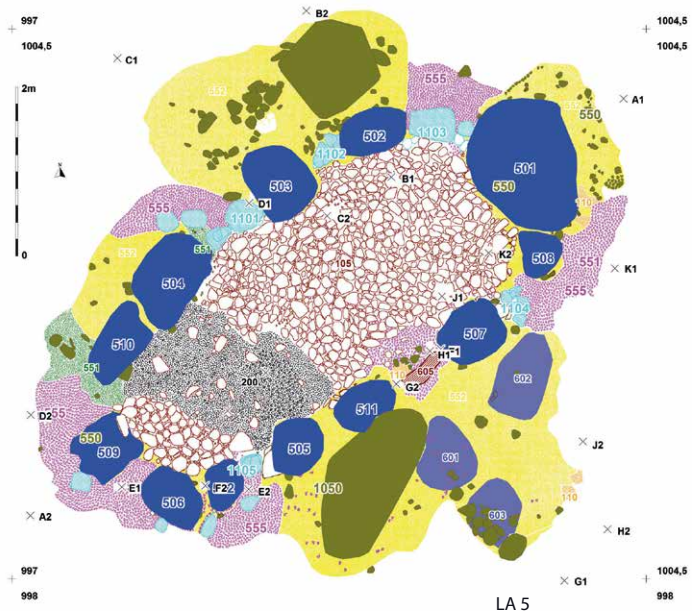
What is interesting, however, is how the development proceeds after 3400 BC. At this point in time, activities on LA3 cease and a separate passage grave (LA5) is constructed nearby (Fig. 8).

This structure is an even more complex building than the youngest additions to LA3. The passage grave consists of three elements – the chamber, the passage and the grave mound (Fig. 8, LA40) – which are clearly preconceived and their realisation was carried out, as it seems, in one building event. Although there are later modifications, these do not change the overall shape of the grave structure. Thus, the complexity of the building activities increases by the switch from LA3 to LA5. But what is now totally lost is the notion of single individuals with a central position, which we observe in the case of the last megalithic grave of LA3. Instead, the passage grave exhibits collective burial rituals, whereby the function of the open passage is to enable consecutive interments.

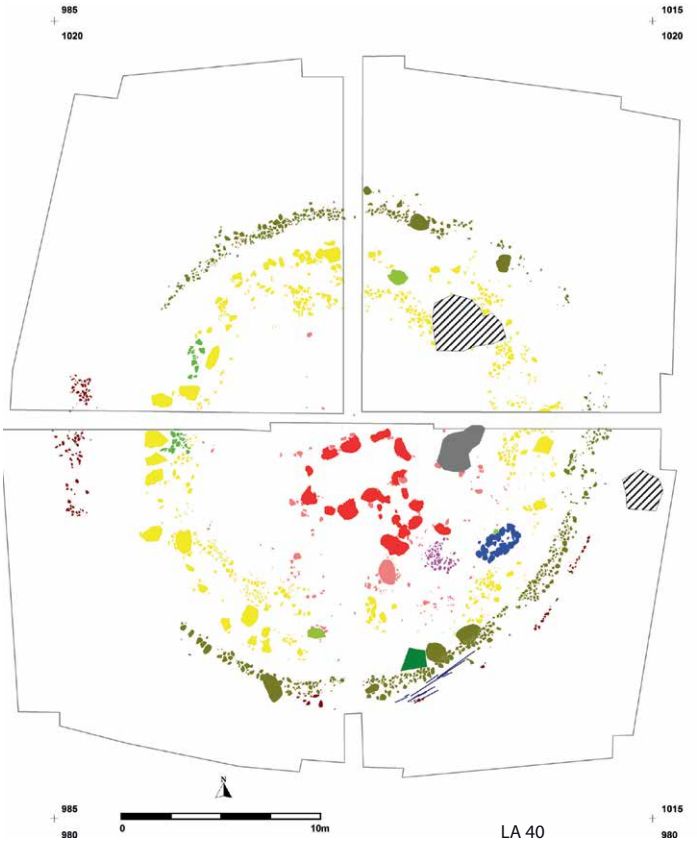
This notion of collectivity is even more striking when one takes a look at the bigger picture. In Flintbek, we can identify 4 or 5 clusters of Neolithic grave monuments (Fig. 9).

In the northernmost cluster, there are three long barrows, LA3, LA4, and LA17, which show comparable features, dolmen chambers and stone frame buildings, as well as comparable histories. LA3 and LA4 are roughly contemporaneous (within the period from 3500 to 3400 BC). LA17 has not yet been dated, but could very well date within the same period. After 3400 BCE, however, only one passage grave (LA5) was built and used. It seems plausible that these three long barrows were – just as LA3 – built and repeatedly altered in an early phase by three different groups of people, who then used one joint, collective burial place after 3400 BC. What is striking is that a very similar pattern is discerned for the four grave clusters in Flintbek (see Fig. 9). To the south of the cluster just described, there is the succession of two long barrows (LA137 and LA167) and a passage grave (LA57). A similar pattern is found at the southern end of the cemetery – two long barrows (LA35 and LA37) and a passage grave (LA40). Finally, to the north of this group there is one isolated passage grave. What is striking is that the four mentioned passage graves are spaced quite regularly along the ridge, about 700 m from each other.

From the different Bayesian models and individual datings obtained by Mischka (2011a), it is clear that these passage graves constitute a later phase than the single dolmens and the long barrows. Thus, apart from the notion of collectivisation, we can also speak of a concentration of activities from a larger number of repetitive, small-scale



LA 5



LA 40

Figure 8: The passage graves of LA5 and LA40 (plan: Mischka 2011a).

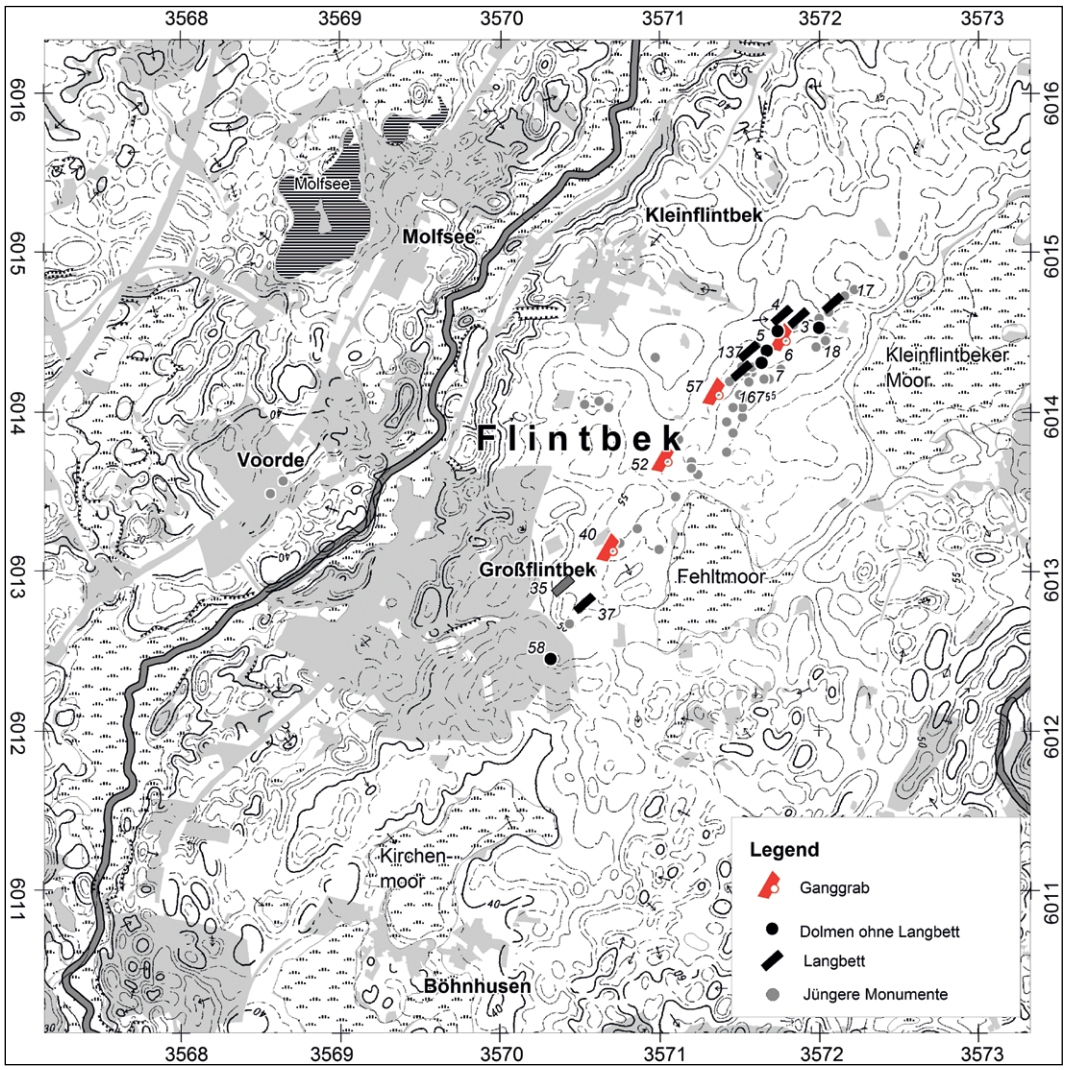


Figure 9: The Flintbek "grave clusters" (map: Mischka 2011a).

activities before 3400 BC to only four passage graves – *i.e.* larger-scale construction activities – shortly after 3400 BC. Although recurrent renovations and alterations took place in the passage graves, their overall shape was basically established and then maintained from the beginning. The focus of activities at these structures shifts from building, altering and adding to the constructions to the interment of the dead and other activities (*cf.* Furholt 2012), some of which are witnessed by depositions of pottery, tools and ornaments (Mischka 2011a). As is argued elsewhere (Furholt/Mischka in press), this development in burial practices – from fragmented and dispersed activities before 3400 BC to more concentrated, collective and durable structures after that time – reflects an overall Northern German and Southern Scandinavian trend, and it is also mirrored in settlement patterns around the same time with an agglomeration of settlement and the creation of villages (Hage 2016; Brozio 2016).

The triad of practices, material outcomes and social relations

Taking our considerations of semiotic pragmatism seriously, we have to stress the interdependence of the social group interactively engaging in acts of construction and the generative power and the impact of the material outcomes of these practices. Additionally, social actions and material outcomes influence the social relations, the following acts of practice, and their "following" material outcomes.

In the early phase, a probably small, rather unskilled and unspecialised group of people performs simple building acts for burials, repeating these over generations with some variation, but generally maintaining the same lines, thus creating a community of practice, which draws on joint experiences, the physical presence of graves, and associations with the deceased, ancestors, etc.

These practices generate signs – that is material outcomes and practical consequences – as each new act of practice incorporates elements of older practices as signs and new elements, which might stem from impulses coming from outside, the recombination of elements already present, or from sheer creativity. Pure creativity is seldom, however, and in most cases, the process is mainly one of constant addition, re-combination and transformation. The history of LA3 is one of constant growth and, after 3440 BCE, one of rising complexity. What we do not encounter in the context of LA3 is a reduction, neither of any parts of the whole structure by the removal of some elements, nor by reducing the efforts of one new building event as compared to a previous construction effort.

We want to argue that the constant rise of complexity that we observe is not the outcome of purely mental concepts, not wholly due to intentional decisions of the human individuals taking part in these activities, but rather that they are, at least in part, practical consequences of the specific material form and social structure involved in the practices in question. When adding building activity to (remains of) building activity, the material outcome is an ever growing and gradually more complex edifice, which in itself promotes the complexification of further activities. As soon as a linear succession of several small graves has been created, it is hard not to adopt the idea of this structure being a long barrow, in other words to "treat it" as a long barrow, which then complicates the next decision on where and how to construct a grave. It also motivates the creation of a frame or other defining features. These ever more complex practices as well as their planning and realisation engender more sophisticated interactions between the individuals involved. The more planning and coordination involved, the more one might even argue that some kind of specialisation, even differential possibilities of decision-making, are likely to evolve. In the same way as cooperative relations are created and reinforced by all joint activities, more complex and challenging activities could spur relations of authority, and power could be established through the performance of more complex or work-intensive building events.

The more complex practices of burial construction, we would argue, both required and created rising complexity within and between groups, and evoked a higher level of planning and coordination of group-relevant, overall (centralised or collective) decision-making. This is compatible with the observed need for outward representation, as assumed for the installation of the megalithic façade after 3420 BCE, and the elevation of single or a few buried individuals to the height of the whole lineage of ancestors (3420 BCE). It is unclear whether this can be read as a sign of social inequality, as the 4 to 8 individuals buried in the last chamber might very well represent every deceased

person from the burying community after the dolmen was built. In any case, it can be read as a further sign of inter-group competition.

However, both social complexity and competitive behaviour actually reach an upper limit, which is then counter-balanced by the introduction of the collective burial custom in the form of passage graves, where – as it seems – even several formerly individual and competing burial communities join in together. This happens not only among the communities burying in Flintbek LA3, LA4 an LA17, but among all burial communities in Flintbek, possibly even in the whole area of the Funnel Beaker Complex. Here, monuments' construction plans never reach the level of complexity that we observe in other regions, for example, in Brittany (Scarre 2011) or Ireland (Stout 2008), or let alone a level of complexity and institutionalised inequality as in the Mediterranean or the Middle East. Rather, social systems in the Funnel Beaker area seem to be incompatible with highly rigid social institutions necessary for the development and realisation of complex building projects. Nonetheless, it is conceivable that, following our pragmatic reading of the Flintbek building history, a group of people living in dispersed single farmsteads or small hamlets might develop a certain degree of social differentiation and centralised decision-making. We propose here that such developments are triggered by monument building practices. Yet it is impossible, we argue, to maintain any larger or more lasting system of dominance or social inequality with a group of people who live in small autonomous, self-sufficient communities. The development of larger and structured villages after 3400 BC can surely be interpreted as a process, which strengthens larger-scale social institutions, but it is counter-balanced by a collective burial ritual, which actively opposes the development of competitive behaviour. Moreover, these villages do not last very long, and the single farmstead or dispersed hamlet mode of social organisation prevails until the Iron Age.

Conclusion

An inquiry into prehistoric social practices based on semiotic pragmatism, as was formulated by Peirce, provides a theory on how meanings and social relations are created and recreated in the course of social practices. It also provides a model explaining how these practices are material and spatially situated phenomena, and therefore how the shape and arrangement of archaeological remains can be used to explore the dynamics of social engagements with the world, with concepts and human actors.

We exemplified this by applying these models to the reconstruction of building activities on the Neolithic cemetery of Flintbek, in particular the megalithic long barrow Flintbek LA3. There, it could be demonstrated how the pursuit of activities over the course of a century, when viewed as signs for social interactive practices, are both shaped by and actively shape social relations. In addition, the material outcomes of such practices constitute new components in these practices, which influence the subsequent acts of practice. In several cases, it was possible to demonstrate how new developments can be derived from the creative recombination of already existing singular components.

By this phenomenon, a process of complexification is set into motion, which includes inter-group competition. However, this development and probably comparable developments on other early monuments in Flintbek are then terminated around 3400 BCE. Thereafter, grave construction activities are re-directed towards a smaller

number of passage graves, which maintain, or even further enhance the level of complexity achieved in the latest phases of the long barrows, but dispense with the unequal burial structure by counterbalancing it with a collective burial ritual. This represents a process of social collectivisation paralleled with the establishment of first larger villages, where, as we interpret it, collective institutions are strengthened, while internal social competition is less visible than in the earlier periods.

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Who Is in Charge Here?

Material Culture, Landscapes and Symmetry

Christian Horn and Gustav Wollentz

Abstract

In this paper, we study the relationship between human beings, landscapes and material culture. We review previous research within the post-processual turn and the new material turn, which have moved away from the problematic view that sees material culture *solely* as acted upon, and the landscape as a passive arena where events take place. However, even though we consider it to be significant that the focus has shifted, we see a danger in viewing the landscape and material culture purely as a visual ideology, a human cognitive construction, which has prevailed in the post-processual turn, as well as seeing landscape and material culture as primary agents on a symmetrical axis with human beings, which prevails in the new material turn. Instead, we would like to move away from these dual categories by focusing on a dialectic relation based on the transmission of stories and human engagement with material culture and landscapes. Here, we apply memory studies with a particular focus on how activities and habits in the landscape shape and enforce memories, as well as how the landscape and material culture can form chronotopes, narratives combining spatial and temporal dimensions, which in turn motivate and influence human activities. Our case studies to make this point are gathered from Bronze Age rock art in Scandinavia as well as from war monuments in Mostar, Bosnia and Herzegovina. Our primary argument is a fluid (opposed to static), multi-temporal approach to landscape and material culture, where the events taking place are to be traced in both spatial and temporal directions. However, it is important to note that the landscape does not store memories and it does not freeze events. It is solely through human engagement, activities, and reflexion that the landscape and material culture form narratives that are carried on in an ever-changing, multiple and highly context-dependent way into the future, by constraining the variety of possible perceptions and streamlining experiences.

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Introduction

Landscapes and material culture are the main materials that archaeologists work with. The problem is that they have been used for a long time as a means to address something else. Both landscapes and material culture were perceived as passive, malleable matter to be incorporated into human society, their social beings and doings. That is to say, they were only viewed as acted upon. Such views have been criticized during two sweeping paradigm shifts in archaeology: the post-processual critique of the 1980s and the 1990s (Hodder 1982; Shanks/Tilley 1987; Preucel 1995) and the material turn of the 2000s (Olsen 2010; Hodder 2012). This criticism proved to be very important in addressing landscapes and things on their own accord, showing that they are active agents, which influence humans and are meaningful in a wide variety of ways. Nevertheless, some of them go too far in classifying things as primary agents or placing them on a symmetrical axis with human actors (*e.g.* Malafouris 2008; Olsen 2007; 2012; Shanks 2007; Witmore 2007; Webmoor 2007).

Landscapes and material culture are interdependent as well. Many investigations focus on one or the other phenomenon and emphasize its meaningfulness. The respective other aspect is usually present, but only implicitly. In the following, the interplay of landscapes and things is the focus of interest. Landscapes and material culture fulfil various functions that make them meaningful. They can serve as chronotopes that form narratives combining temporal and spatial relations. They may restrain or enable human movement and action. A river, for example, may constrain movement through a landscape, but the use of a boat enables speedy and easier mobility along and across the river that previously was an obstacle. Our aim is to elaborate on the relation between landscapes and material culture and their connection to humans and societies.

Reviewing theories about landscapes and material culture in relation to memory studies, we will argue that landscapes and material culture do not possess agentive power by and in themselves but that it depends on human engagement. Case studies will illustrate our concepts moving from the micro-scale to the macro-scale as we integrate different analyses and theories. The case studies involve diverse material and different time-scales: we proceed from Bronze Age rock art in Scandinavia to war memorials in Mostar, Bosnia and Herzegovina.

Basically, what we are arguing for is the need to avoid an opposition between "conceptualized" landscape and the natural environment that has been and arguably still prevails in landscape studies in archaeology within both the post-processual and the new material turn, irrespective of their allegations to the contrary. Even though we lay no bold claim to "solve" the issue altogether, we do argue for a more integrated archaeological outlook, which focuses on combining different perspectives rather than differentiating between a so-called "conceptualized" and socially "constructed" landscape (which prevails in post-processual approaches) and a physically manifested natural environment that operates as an agent "in itself" (which has been argued within the new material turn). We hope to show how such a division is neither especially beneficial nor true for the kind of dialectic relationship that takes place. The followers of symmetrical archaeology (see Olsen *et al.* 2012) would criticize our approach – that it is anthropocentric – due to the fact that we do not believe agency exists without human involvement, but conversely, to give agency to material

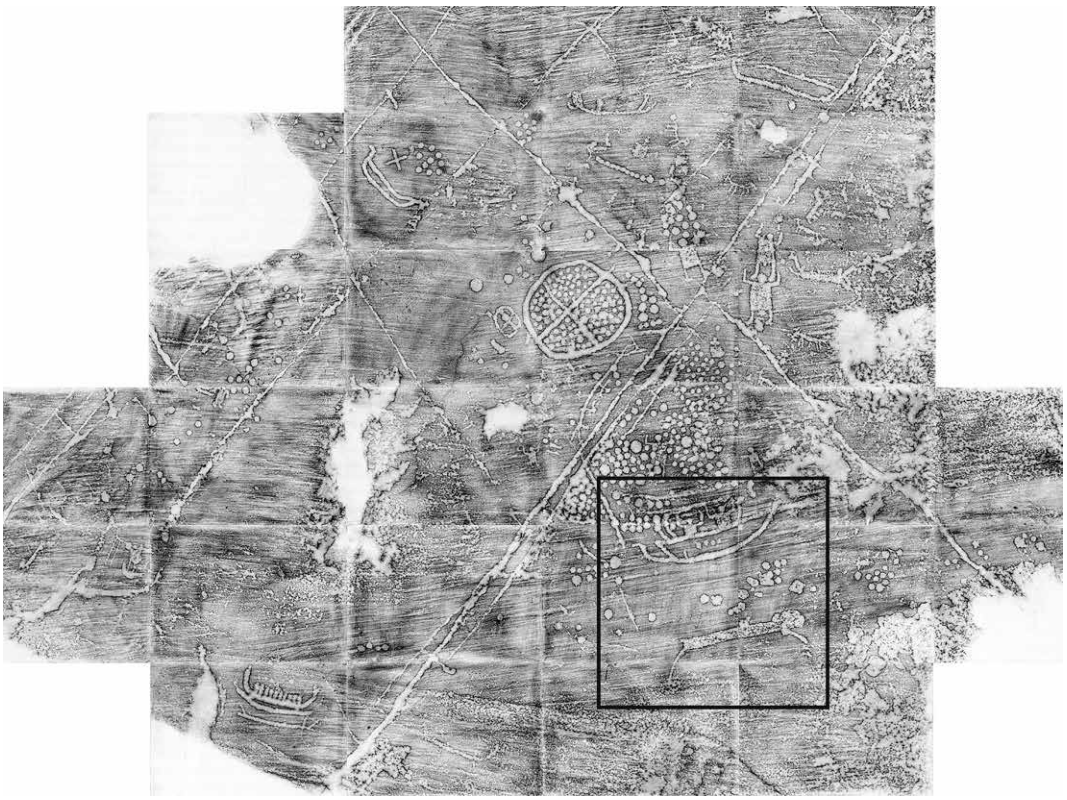

Figure 1: Frottage of Tanum RAÄ 184:1 by Tanums Hällristningsmuseum Underslös (with permission of the Swedish Rock Art Research Archive SHFA).

culture and landscapes "in themselves" (Olsen 2012) can be regarded as an attempt to humanize what is not human. Thus, the question is raised: whose approach is the most "anthropocentric" on closer inspection? More importantly, however, this paper is not a criticism of previous research *per se*, but rather an attempt to navigate new ways forward. Our cases are selected to highlight variation and different perspectives, both from pre-history (Bronze Age) as well as more recent cases (the post-conflict city of Mostar in Bosnia and Herzegovina). We believe that a great benefit can be drawn from comparisons over time and space. As an introduction, we will begin with a specific rock art panel in Tanum, Sweden.

By the stream – A rock art panel in Tanum

Finntorp, Tanum is the locale of many rock art panels overlooking a shallow valley. On higher ground, there is a panel with two ships, human figures, geometric carvings and many cupmarks (Fig. 1).

It has an interesting topography. The landscape rises gently when approached from the direction of the valley until the location of the panel is reached. However, it is quite difficult to see the rock art, because the outcrop abruptly springs up from the ground. The overall topography is elevated, but more or less horizontal and flat before it slopes

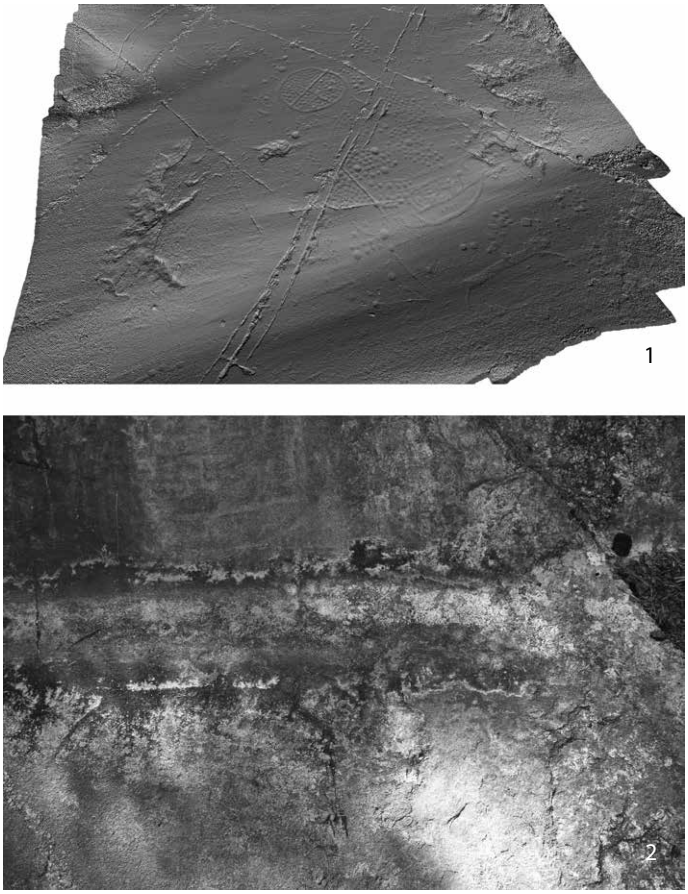

Figure 2: 1: SfM image of Tanum RAÄ 184:1, detail: ships situated to either side of the small depression (SfM: Rich Potter); 2: Residue left in the shallow depression by flowing water (photo: Rich Potter).

upward again. There are considerable cracks across the surface and some parts of the surface are blackened by occasionally flowing water. A particular feature is a shallow elongated depression on the lower part of the rock. The darker colour of the bottom of that depression reveals that water flows down over that section of the panel after rainfall (Fig. 2.1-2.2).

The rock art on this site was documented with frottage in 2008 by Tanums Hällristningsmuseum, Underslös. Despite being a very good technique for documentation, rubbings have considerable shortcomings when it comes to an old problem in rock art research. Rock surfaces do not generally exhibit flat, two-dimensional surfaces, but possess three-dimensional topography as, for example, in Finntorp. While rubbings are capable of recording some of this, mainly cracks, they fall short when recording other elements. Possibly even more problematic is the circumstance that observers in the past did not hover slightly above ground to view the panel flattened out. Instead, they observed it from oblique angles that changed the perception of the scenes according to the vantage point (Helskog/Høgtun 2004). A new documentation of the panel using Structure from Motion (SfM) and 3D-scanning was carried out in Summer 2015 by Rich Potter (Göteborgs Universitet) and one of the authors (C. Horn) producing three-dimensional imagery.

On the frottage from the Finntorp panel (RAÄ Tanum 184:1) we observe clusters of cupmarks, canoes[1], animals and human figures. Two large clusters of cupmarks, one of which fills a big wheel carving, dominate the entire panel. These clusters as well as most of the figurative rock art concentrate around an area where four large fissures in the rock meet on the sloping part of the panel. It is well-known that such large panels were augmented over time, but stylistically the human figures are all very similar to each other exhibiting square bodies and perpendicular extremities. All the standing human figures face the natural crack that is within the closest proximity, and most of them face another human figure across that fissure. The entire panel is put in a frame by scattered boats at its edges. A pair of boats stands out in the lower right-hand corner (Fig. 1). The upper boat was transformed at least once giving it a different form after the initial carving. Two human figures made in the same style as the other figures on the panel occupy the boat. Above their raised arms appears to be another boat, but at least one of the figures holds a second line in hand. Such lines are usually interpreted as a spear or an oar. Although it is difficult to observe, because the observed line intersects with the boat above, the second figure seems to hold the object as well. At one end, a potential triangular point may indicate that it is a spear. No person occupies the lower canoe. The boats are separated by a band of cup marks. It seems like the boats were carved mirroring each other, because when viewing one boat the other is seen to be upside down. From the new documentation, we can presume that the boats were actually carved on opposite sides of the elongated shallow depression and that the cup marks follow the bottom of that depression (Fig. 2.1). The boats are somewhat higher up on the incline above the depression. It is perhaps not a stretch of the imagination to state that these are two boats facing each other across a river or a fjord constructed by the natural depression and the cupmarks that were carved following its extension. This may have been especially evocative when water was actually flowing down the panel and the cup marks possibly disturbed the usually very even flow giving it more of the qualities of a stream. It could have been perceived as two meeting parties.

Everydayness and ritual

For Barbara Bender, landscapes are always already conceptualized through the human consciousness (Bender 2006, 303). Since this conceptualization happens through individuals, she maintains that "the same place will be experienced differently by different people" and an individual could hold varying views about the same place at different times. Therefore, there could be an almost infinite number of different perceptions.

1 The terms canoe, boat and ship will be used interchangeably. The boat is by far the most important figurative image in Southern Scandinavian rock art (Ling 2008) even though it is not necessarily the most important feature in subsistence or that people spent their daily lives on them. However, they were important according to two aspects as far as our knowledge goes, namely in warfare and to obtain ores for bronze making (Horn 2016; Ling 2008; Ling et al. 2013). Graves, hoards and settlement structures (Artursson 2009; Kristiansen/Larsson 2005; *cf.* Ling 2008) suggest the presence of petty elite that likely organized expeditions for both purposes, because they had the material means to staff, equip and accommodate journeys. As such, they were possibly a means to achieve status and gain prestige and a tool for competition for emergent or otherwise rivalling elites. This may explain why boats as the means of transport for expeditions could have been such an important symbol in rock art.

In that sense, the landscape cannot escape construction. If all landscapes are "something open-ended, polysemic, untidy, contestational and almost infinitely variable" (Bender 2002, 137) that would mean that they have no specific characteristics of their own and are essentially powerless and empty in themselves.

Bjørnar Olsen (2010) has criticized Bender's approach in his sweeping attack on the post-structuralist notion of total social construction. Olsen argues that things and texts are different and cannot be treated the same way. With that view, he maintains that there are non-discursive realms of reality and experience (Olsen 2010, 62). The focus on symbolic-only interpretations, "ritual monuments and contemplations of landscapes, [leaves] us with a phenomenological archaeology strangely alienated from the everydayness of herding sheep, clearing fields, cutting woods, building houses, or cooking and feeding" (Olsen 2010, 31) and the significance of landscapes for these activities. For many archaeologists within the post-processual turn, for example Richard Bradley, natural places seem only to be interesting as long as they pertain to human ritual activity (Bradley 2000, 65). In these accounts, ritual activities and natural places seem to coincide arbitrarily. The "so-called" everydayness that Olsen is advocating may be the missing mediator linking place and ritual.

Where does this leave us with our example from Finntorp? That rock art carving is a human activity should be obvious. It has long been recognized that rock art pertains to symbolism and ritual activity (Bradley 2000, 103; Bengtsson 2004, 101; Wahlgren 2002; Goldhahn 2005; for an overview see Goldhahn/Ling 2013). However, here it seems to depict a potentially mundane situation, i.e., travelling in a boat. This is a convenient example, because there is little to argue over the significance of waterways themselves for waterborne mobility. A river or a fjord can be experienced, on the one hand, as a border acting as a separator, but it can also be experienced as a facilitator of speedy travel along its stream, i.e., a connector. Both are represented in Finntorp. In Berget (Norway), rock art was discovered that also conveys the interrelation of landscapes, material culture and human activities involving rituals. The Tyrifjord is host to a rock art site depicting two Period I ships (1800-1500 BC). They are high up on a vertical cliff (Melheim/Horn 2014). The post-glacial land uplift was possibly even larger in this region than in Bohuslän. Thus, we may consider that the water's edge was perhaps over 20 m higher during the time these carvings were made (Påsse 2003; see also Ling 2008, 47-57). Following this argument, the most likely interpretation is that the boat was engraved from a boat floating in the fjord water. If spectators were present during the carving, it is likely that even more boats were on the scene. At least some of the people present must have been well-versed in travelling by boat, so that we may interpret that the selection of motifs, i.e., boats, was not arbitrary. This also suggests that the physical act of travelling through the landscape towards the rock art panel was meaningful, and influenced the choice of motifs being knocked into the rock.

A similar, but different example can be found on rock art in Bergbukten (Alta, Norway; Helskog/Høgtun 2004, fig. 5-6). Here the main focus seems to be animal movement. Houses, animals and lines are depicted on this panel. If we assume that people were not just making arbitrary lines on the rocks, then the lines viewed from a certain angle turn out to be tracks along which the animals moved (Helskog/Høgtun 2004). Possibly, the movement of animals was observed regularly. Another

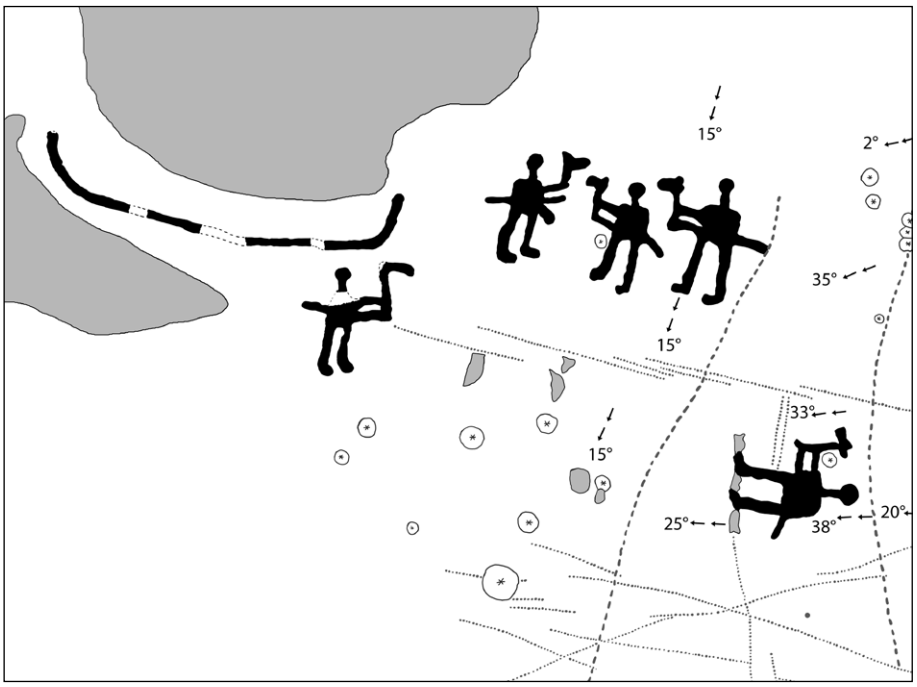

Figure 3: Facing axe men in RAÄ Kville 74:1 (redrawn: CH; original in Fredsjö 1981).

example with a different focus comes from Bohuslän (RAÄ Kville 74:1). On a panel, four warriors meet with raised axes. At first glance, it looks like they are arranged lying to each other's feet. However, in the drawing the angle and slope direction of the rocks give an indication that the figures were carved in standing position, facing and meeting each other, possibly in a conflict situation (Fig. 3).

As the study of use wear on weaponry indicates, throughout the Bronze Age in Scandinavia combat occurred frequently. The employed weaponry was occasionally sacrificed in ritual deposition. A kernel density estimate of ritual deposits of period I from Scandinavia and Denmark shows that they tend to cluster close to the shores (Fig. 4) (see Larsson 1986 for similar results) and at nexuses for waterborne mobility.

In such hotspot regions, many deposits are located within a 15 km radius to the shore or, rarely, to a river leading up to the sea (Horn 2016). Based on the assumption that material symbols, in this case primarily used weapons, and the locations for ritual activities are not arbitrary (*pace* Turner 1969), we may assume that violence and, in relation, waterborne movement through the landscape was meaningful for these rituals in their various forms (Horn 2013; Horn 2016). Although these studies do not consider axes, they do show that people living during these times may have been familiar with violent encounters (see, for example, Fyllingen 2003). Here, we may see what unites all the examples: people in the past were accustomed to the tracks of elks through the rocky landscape of Northern Norway (Helskog/Høgtun 2004), they used boats while travelling through fjords near Finntorp and Berget or through passages like Øresund on their way to violent encounters, and they were familiar with the feeling of weapons in their hands while in combat (Horn 2014).

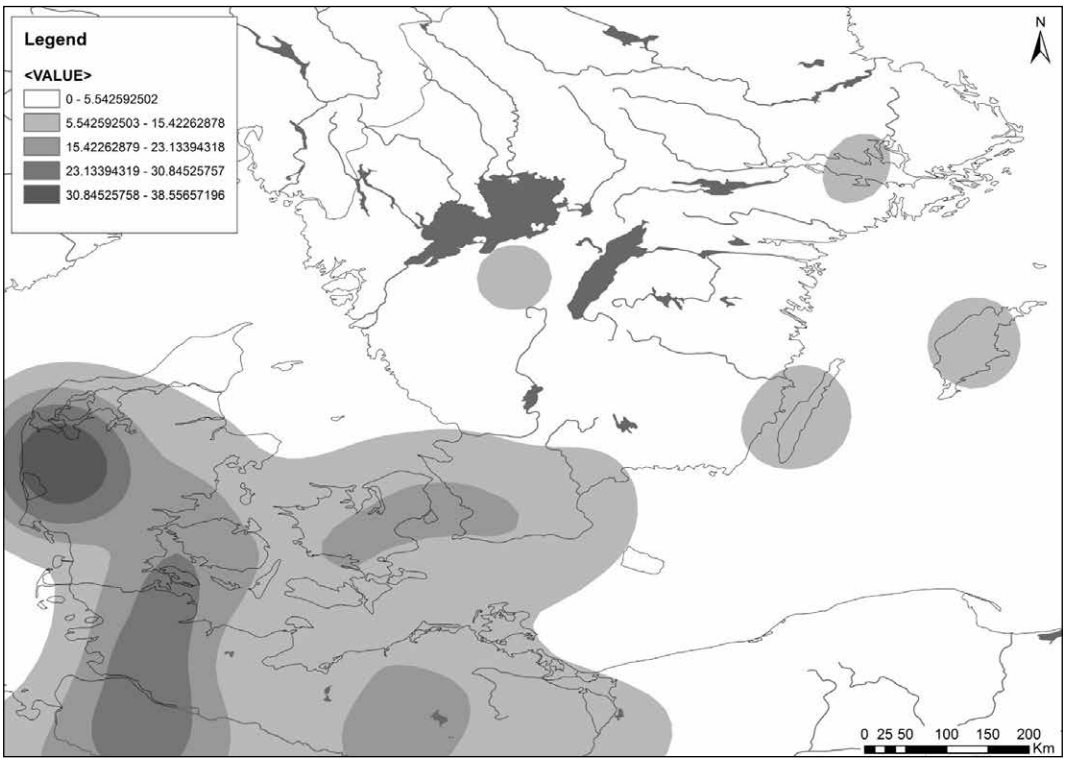

Figure 4: Kernel density estimate of EBA Period I weaponry in Southern Scandinavia (map: Christian Horn).

However, other people that may have been involved in similar activities did not leave pictorial evidence.

It is, as Olsen (2010, 77; emphasis original) argues, that "the directionality of our body and our experience of the world *is relative to landscapes and things*". Landscapes and things are constructed here to be on one side and human bodies on the other in a dual relationship. The whole discussion between Bender and Olsen represents another dual conception between the everyday bodily experience of things and landscapes and their perception and conceptualization through human minds in symbolism and ritual activity. Both only emphasize different ends of the spectrum represented by the above-mentioned dual relation[2]. In order to interpret micro-archaeological situations, such as the rock art panel in Finntorp, none of the views described above is inherently worse. Whether the body is relative to the world or the world relative to the body are just two sides of the same coin. Rather than claiming the importance of one over the other, we would argue that there is a need to combine them as the data demands, in order to get as much information for interpretation as possible.

2 Keeping with the philosophers Baker and Morris (2002), dualisms just represents extreme end members of a spectrum, i.e. a dual relationship. We use it as an analytical tool rather than as a claim pertaining to reality (see Vaisey/Frye in press).

Chronotopes

If we reinstate the ontological significance of landscapes and things, then any given landscape or thing constrains the variety of possible perceptions and streamlines experiences through their materiality (contra Bender). If that is so, should we argue – as has recently been done – for a symmetrical view on humans and material culture including landscapes (Olsen 2007; 2010; Shanks 2007; Webmoor 2007; Witmore 2007)? In other words, are humans and material culture both primary agents? The interplay of landscapes and material culture in terms of memory may highlight the problem.

Bender maintains that there is no opposition between time and space in landscapes. This notion has been theorized by the famous Russian literature professor Mikhail Bakhtin (1981) and was recently applied to rock art studies (Goldhahn 2015), as well as to heritage studies (Aronsson 2009) and contemporary archaeological studies (Guttormsen 2013). The interrelation between spatial and temporal relations through the concept space-time is mainly derived from the work of Albert Einstein in his theory of relativity, which was further developed by Hermann Minkowski. However, when applied in landscape studies the inspiration seems to come from how the concept was applied by Bakhtin:

> "We will give the name chronotope, (literally, "time space") to the intrinsic connectedness of temporal and spatial relationships […]. What counts for us is the fact that it expresses the inseparability of space and time (time as the fourth dimension of space)" (Bakhtin 1981, 84).

What is especially interesting for us is the possibility within the chronotope to shape narratives: "We cannot help but be strongly impressed by the representational importance of the chronotope. Time becomes, in effect, palpable and visible; the chronotope makes narrative events concrete, makes them take on flesh, causes blood to flow in their veins" (Bakhtin 1981, 250). This would call for an abolishment of the clear cut distinctions between past, present and future, since logically, several "pasts" are present through the physical environment that surrounds us. However, the concepts keep their general structure since they accumulate over time, which means relative terms, like earlier and later, are not abolished (Gell 1992). Furthermore, the space that surrounds us might form a narrative told to us through time, in other words, previous imagined or real events can be represented through the physical environment and in such a way motivate actions within us. The past, despite its pastness, is certainly not passive, but a strong force to reckon with which can and will be *used and misused* (see Wollentz 2014 for an overview). Furthermore, past events are sometimes physically manifested by the landscape, for instance, how previous rock art panels might have motivated and influenced new ones. We may see this active and engaging role of the past on the panel in Finntorp (RAÄ 184:1). The panel was transformed and added to over an extended period of time. Potentially, the carving of figurative rock art started with the lower of the two boats described above (in period I; 1800-1500 BC). The first boat on the other side of the channel may have been carved during period III (1300-1100 BC). Possibly in period IV (1100-900 BC), it was transformed and the human figures were added (see Ling 2008, 102-105). From the Early Bronze Age, the past was physically manifest on the panel and people returned to deal with it in an active manner.

The implications of the chronotope for landscape studies would entail a dynamic approach to the landscape, where we see the past as constantly present with the potential to influence our actions. As elegantly expressed by Timothy Ingold: "It [the landscape] enfolds the lives and times of predecessors who, over the generations, have moved around in it and played their part in its formation. To perceive the landscape is therefore to carry out an act of remembrance, and remembering is not so much a matter of calling up an internal image, stored in the mind, as of engaging perceptually with an environment that is itself pregnant with the past" (Ingold 2000, 189). Therefore, we need to approach the landscape as multi-temporal. Furthermore, the landscape cannot be studied as a "clean slate" which we, as humans, just project our world view upon, purely as visual ideology (for an overview see Dubow 2009) but as something that is, in itself, motivating actions in us, perhaps even first and foremost, based on previous incidents that have taken place within it (see Mitchell 2000). Importantly, this does not suggest that the landscape has the power to act "in itself", but only in relation to the material culture within it and the human beings inhabiting it, both now and previously, and to take it one step further, the human beings that *will* inhabit it (see Holtorf 2015). What rock art in the landscape does is to preserve a blurred and distorted memory of what humans were doing in the landscape and that may resonate with later generations and their engagement with the same or similar landscapes. With this we underline that the dialectic relation between landscapes, humans and material culture cannot only consider spatial relations, but also temporal ones. Otherwise, the dynamic and ever-changing role of landscapes will get lost. Both points need further study, which exceeds the frame of this theoretical discussion.

Memory studies

These concepts are thus related to the vast field of memory studies, which mainly originates from Maurice Halbwachs' influential study on collective memory (Halbwachs 1992). However, even if we consider it to be important to present and discuss these studies for the role of landscapes and material culture, there are also some pitfalls in many of them that we would like to address. Usually, these studies focus on "sites of memory", on "lieux de memoire", a concept that the French historian Pierre Nora developed. In short, he saw a necessity to maintain special sites in the landscape, to somehow bridge a division between "memory" (as in oral histories and traditions) and "history" (as in the official canonized national history). He feared that memory was disappearing in post-war France and was being replaced by history. Therefore, he saw a need to maintain "lieux de memoire" as special places in the local environment (as well as certain objects, texts, events or even concepts, which is of less significance for this argument), where individuals can create meanings out of the past. Since the role of memory was diminishing, according to Nora "lieux de memoire" served as "substitutes" for the real environments of memory. Quite often, these special sites were battlefield sites, perhaps since the memories from these were the ones most difficult to digest in post-war France (Nora 1989; Nora 1996). His definition of "lieux de memoire" is very broad (see Winter 2008 for a more narrow and focused definition), and his clear-cut division between history and memory is largely criticized in more recent studies. A more nuanced and layered approach is advocated by Jan Assmann (2008).

However, what we find significant to highlight is how "memories" or events leave traces in the landscape, and how these traces may be constantly reinterpreted and used by later generations. They can form chronotopes that are part of the narratives constructed through the landscape surrounding us, e.g., the art engraved on rocks in Scandinavia. This is especially true of places of war, as has been shown through the recent volume "War and Cultural Heritage: Biographies of Place" (Sørensen/Viejo-Rose 2015; see also Bevan 2006; Gegner/Ziino 2012), but it is also true on a smaller and more individual scale. After all, this argument is potentially highly relevant for any kind of landscape that has been subject to human actions. As Paul Connerton (1989) has shown, memory is shaped and maintained through our daily activities and routines, it is embodied. In such a way, the landscape (which in many ways informs and structures our daily activities) helps us to maintain and shape our memories. As a result, the landscape can also be used to alter and project our memories in certain directions. The landscape is thus not solely an arena in which we carry out our acts, nor a total social construction, a conceptualisation, it is both and more than that: it constitutes and shapes the way we see our world and our place within it. Furthermore, it shapes and structures our memories of the past, while it is at the same time open to a constant and active re-moulding and re-interpretation.

This does not mean that memories are stored in the landscape, a point that is sometimes missed in memory studies. In fact, Nora did emphasize that for sites of memory to function there must to be a will to remember (Nora 1989; Nora 1996). Due to the fact that memory is embodied through our routines and activities in the landscape, as argued above, the landscape is not an archive that may simply be accessed through our perception and engagement of the surroundings. Such an argument misses the dual relation between landscapes and humans, as well as ignoring the constant transformation and dissonance within both memories *and* landscapes. Furthermore, it gives the landscape the ability to freeze events, but an event does not simply occur in any given landscape and remain there unaltered throughout times. The landscape is *not* a testimony of the past (contra Sørensen/Viejo-Rose 2015). Memories are shaped and influenced by present-day experiences and engagement with landscapes and material culture, and in such a way they undergo constant transformation. The landscape does not store memories and it does not freeze specific events, however, crucially, it can give a powerful illusion of doing so.

Moving beyond linearity – Applying the chronotope in Mostar and Finntorp

The benefit of combining Bakhtin's chronotope with memory studies is that it may help us to find a middle ground between memories as something purely internal, disconnected from the physical reality, and the landscape as a passive arena for events. It provides a method of understanding the dual relation. The landscape projects the illusion that memories are stored within it through the traces of previous events, and that these traces motivate future actions through their role as chronotopes. However, the reactions that these chronotopes trigger are always rooted in the moment and context of experience. They are therefore not a testimony of a "real" past. This can be illustrated through one example taken from the post-war city of Mostar, in Bosnia and Herzegovina (Fig. 5).

Figure 5: The famous bridge Stari Most in Mostar (photo: Gustav Wollentz).

When conducting fieldwork there, it became clear that the pre-war city of Mostar existed as an imagined city within post-war Mostar[3]. You would perhaps assume that this "imagined city" was a non-physical entity existing purely in the minds and "internal" memories of people, but such an approach would reduce complexity. The city itself served as a memory bank of the past, and people were thus constantly "reminded" of pre-war Mostar through walking around in the city, and in such a way some people explained to me that they were rather living in the imagined city than in the "real" one, but perhaps with a little bit of sad irony. Here, we see how different parts (specific buildings, monuments or parks) of the city formed chronotopes, narratives that combined temporal and spatial relations. The famous bridge Stari Most is an obvious example of such a chronotope, but it is important to highlight that these chronotopes work differently for different people and what the bridge means for one person is not necessarily the same for the next, which somehow relates to the above-mentioned views of Bender. However, chronotopes should *not* be seen as some kind of "ghosts" from the past haunting the present (see Kaplan 1993). The imagined pre-war city of Mostar is not to be understood as the "actual" pre-war city: it is based on a constructed narrative that has been produced because of the present-day situation, a situation which it is being continuously contrasted against and understood in relation to the past. Thus, the landscape is not a testimony of a real past, but of an imagined/remembered past triggered by the present-day experiences.

3 The interview data is part of a PhD project ("The Wounded Landscape") conducted by G. Wollentz within the Graduate School Human Development in Landscapes.

Significantly, such a narrative of the past can be actively produced to challenge the current day situation and be used as a tool to envision an alternative future, which is to a large extent occurring in Mostar (see Wollentz 2017). These narratives can thus serve as an empowering function in situations of oppression and/or marginalization. Chronotopes can only form the illusion of eternity and they are always rooted in a specific moment, even though the links from that moment may go in many directions. Chronotopes are thereby multi-temporal and in order to be understood the links have to be traced in temporal and spatial directions.

This argument is highly relevant for rock art studies, since the symbols knocked in the stone certainly formed narratives that combined temporal and spatial relations as well. Of course, we cannot otherwise conduct interviews with those who carved, re-carved or engaged with the rock art panel in Finntorp. Nonetheless, the act of transforming the appearance of the rock left behind some information – it also elucidates decisions about what would be depicted and which images would be changed. It is interesting to note that the oldest canoe on the panel is close to the edge of the outcrop and was not subsequently changed. Conversely, the upper boat is closer to the panel's centre and received considerable transformative attention. The first ship may have been carved in order to give cultural memory of travels along streams and rivers a material symbol. The carving may have been curated by an elite organizing such travels, or by other actors. By period IV, the entire panel is transformed, focusing on a momentary interaction: the meeting on a border zone. The latter is conceptualized by natural features, i.e., the fissures and the depression. Potentially, the fissures symbolize more abstract divisions across land, while the stream – especially after rain and with the boats – is a more naturalistic representation. All humans look very similar to each other. The meetings across land are closer to the centre, and there are no weapons involved. Conversely, the meeting with the boats goes across a different medium, i.e., water, it is further away from the centre and weapons may be involved. The period I canoe, although recognizable, may have looked strange, which may have made it fit to be conceived as 'foreign'. The updating of the upper boat could then be read as a continued appropriation of this boat as belonging to the carvers group. We do not know what specific individuals thought about the panel when they viewed it, but we argue that the social conception changed. At its final stage, the panel may have been an ideological map of encounters between groups belonging to the wider social surroundings and foreign groups. The real landscape is abstracted, and conceived in a way that the foreigners, and potential deadly opponents, lived across the water. Local groups may have gathered at that panel upon departure for journeys, or before encounters, or after their return from travels to conduct rituals, because it served as a symbol and memory of past encounters. Certainly, a narrative of past events was told by the panel, but this narrative was far from frozen in time. Rather, it was open to constant transformation in meaning and deliberate updating in accordance to its present-day significance.

So far, we have argued for an approach that puts the dual relation between material culture, landscapes and humans in focus, and moves beyond a linear sequence of events. We also argue against any frozen perspective on landscapes or material culture, and instead advocate one that sees the relation in constant movement. Here, we see a great benefit in applying the concept of the chronotope as an analytical tool.

Finally, we would like to end this section with one example from Mostar that shows how a usually mundane natural feature can transform into a narrative combining spatial and temporal relations. The results from Mostar are published in more detail elsewhere (Wollentz 2017; Wollentz forthcoming), however, to underline the point of the chronotope we would like to add this quite remarkable quote. When conducting interviews in Mostar on the question of when normal life started again after the war, one man expressed:

> "When I heard the bird for the first time after the war. There were no birds during the war. Then we were having coffee and I heard a bird. For me it was like someone giving me ten million Euro. We were so happy! I have never heard it in this way. It was a completely new experience. We all had to cry. Even then we were feeling happy, because everything was behind us and we had survived".

On a first inspection, this quote may seem banal and a bit romantic, but with closer scrutiny it reveals something fundamental. As expressed by the man, the experience of hearing a bird for the first time after the war had such a huge impact on him that he finally realized that the war was over and he could move on. This may be exaggerated, but nonetheless, it highlights the significance of nature, especially in situations of war and trauma. This almost religious experience was also a shared experience: "*we all had to cry*", and possibly the sharing of the experience made it even stronger for those involved. Certainly, the bird here was not passive, but active in making a difference. It formed a chronotope, and told a narrative most likely connected to freedom (to be free like a bird) and possibly other connotations like a symbol of "life returning" to the city. The narrative told by the chronotope has the potential to move beyond a linear sequence of past, present and future events. The usually quite mundane sound of a bird suddenly became something eternal and religious for those involved. Possibly, the first sound of a bird after a terrible war is similar to a deadly sick patient seeing the sunrise for the first time after leaving the hospital. The usually mundane phenomena in a landscape might, within a specific moment always rooted in the time of experience, transcend as a symbol and become eternal.

The multi-dimensionality of landscapes

In terms of chronotopes, however, landscapes are not the same all the time and the events that have occurred within them are not always present or perceived continuously. The future is present only as an array of possibilities and not manifest or experienceable. Similarly, while the traces of the past are constantly surrounding us, it is not directly experienceable. Humans engaging in particular landscapes may not know what had previously been carried out in the settings, for example, soldiers on the Verdun battlefield (see Amat *et al.* 2015) may not have known that a group of Neolithic farmers may have crossed the field in the deep past. Memory tends to get blurred, twisted, obscured and lost. In an often futile attempt to conserve memory, monuments are erected or rock art is knocked into rocks. Material culture is used to serve as a container, carrier and conveyor of memories in or close to the landscapes where the events to remember took place.

Figure 6: A detonated monument built in remembrance of those who died during the war in the Bosnian army (ARBiH, Army of the Republic of Bosnia and Herzegovina) on the Croat-dominated western side of Mostar. The monument was detonated during the night in January 2013. It is not known who committed the act (photo: Gustav Wollentz).

Nonetheless, even with the high literacy rate in today's Europe and the proximity of events, these monuments trigger different though related memories and feelings.

This relates to Bender's approach to landscapes as an "open-ended, polysemic, untidy, contestational and almost infinitely variable", but rather than a vague and floating visual ideology, we would regard landscapes as something that are physically manifested, but might be interpreted in manifold ways. It means that each and every landscape holds a dissonance, paraphrasing Gregory John Ashworth's and John E. Tunbridge's work on heritage and conflict (Tunbridge/Ashworth 1996; see also Ashworth *et al.* 2007). However, this does not mean that every landscape is conflicted in the true sense of the word, because dissonance does not necessarily lead to open conflict (though it may), it only means that landscape is never singular but multiple (Fig. 6).

Arguably, the primary reason why a landscape unavoidably holds a dissonance is that its usage as a "memory bank" is based on a *selective process* of remembering and forgetting. The argument is very simple: even though the landscape is, as Ingold argued, "pregnant with the past", it never holds a representational selection of each and every event and experience of the past. Some events are not deemed worthy of "remembering", and some events might even be shameful. In terms of memory, forgetting is as important as remembering (Connerton 2008), and if we would see the landscape as a conveyor of memory, with all its inherent problems as argued above, it is certainly one that suffers from blackouts as well as pure distortions. This is partly due to the fact that human beings constantly use the landscape as a tool to influence and direct humans

in certain directions, but it is also because remnants from the past experience a natural process of decay and ultimate eradication. The multi-dimensionality of landscape is thereby both a human process connected to oral traditions and the transmitting of stories as well as a process happening because of molecules disintegrating within the material culture and because of wind and rain battering and changing the monuments. It is *not* one or the other: it is both.

This is especially true in cases of war, where the winner most often builds the monuments and projects them towards an indefinite future. The landscape is continuously constructed and maintained in order to outlast each individual inhabiting it, and to continue influence on future generations. Naturally, this might lead to conflicted landscapes. This was highly apparent during the above-mentioned fieldwork in Mostar, Bosnia and Herzegovina. Mostar is currently divided between a Bosnian Muslim dominated eastern side and a Croat Catholic dominated western side. The post-war monuments in the city reflect this situation (see Makas 2007). On the western side, most post-war monuments are connected to the Christian Catholic faith (usually through the use of crosses), while the monuments on the eastern side reflect the Muslim community. The landscape is therefore used to manifest and further increase a division between two communities that had lived together for centuries before the war. It can be understood as an attempt to distort the past through the usage of the landscape, whereby the reasons behind this are mainly politically motivated. The landscape is consciously worked with here as a tool to highlight certain time periods and the values connected to them, while forgetting other ones.

However, forgetting is not necessarily negative and certainly not passive (Connerton 2008). Sometimes we might feel the *need to* forget certain events. The landscape can potentially help us to forget. When interviewing people in Mostar, the post-war ruins (that are still present in the city) served as an especially sensitive topic. In the interviews, a majority of those who experienced the war expressed the desire to have all the ruins reconstructed so that they did not have to be constantly reminded of the war. Here, the landscape was filled with unpleasant memories that they did not want to remember. But will memories be *erased* only because the material remains are removed? For example, even voids in the landscape carry meanings (see Bille *et al.* 2010; Holtorf 2014; Gonzalez-Ruibal/Ortiz 2015). When interviewing younger people who grew up after the war, the complexity of the ruins became apparent. For them, the ruins were sometimes used as arenas for spending time together, doing art and other public events and the walls were used for painting graffiti (usually related to football, politics, or love; see Fig. 7).

Sometimes, they were used for political activism. For example, one ruin close to the Old Gymnasium (Gimnazija Mostar), which was used as a university library before the war, was created into a "fascist free zone" through the use of graffiti. As expressed to G. Wollentz, these varied activities at the ruins were not primarily carried out due to the ruins being connected to war and trauma, but because they served as zones, where they could meet without interference (see Wollentz forthcoming for a more detailed analysis). This is associated to how children started using Second World War ruins in Britain and Germany as playgrounds (Moshenska 2014).

Similarly, to the transforming role of these war ruins, the continued carving at the panel in Finntorp indicates that it kept meaning in a very general sense. During the

Figure 7: Ruin with football-related political graffiti (photo: Gustav Wollentz).

interspersed periods without carving, we do not know if the panel was still perceived with the same kind of importance or if it intermittently fell out of ritual use and became a place of more mundane tasks. What we can glean from the carving events is that the panel may have changed meaning and that the landscape was conceived differently over time. By the time the first carving was made close to the stream on the rock in period I, waterways seem to have been conceived primarily as a means for travel. Possibly, streams were perceived mainly in a longitudinal axis. When the boat on the other side was first carved, a change in the emphasis of perception is recorded. The context added is that of encounters across the river in a perpendicular axis to the stream. By period IV, a pronounced sense of multiple levels of an "us" and "them", i.e., identity, is perceived through, and structured by the landscape (for an analysis of such identity construction to violence see Bowman 2001; *cf.* Sen 2007). Potentially, at that stage the panel and the idealized landscape it reflected served a local group to remind and reinforce social relations and identity; as a materialized image of cultural memory (*pace* Assmann 2011).

In conclusion, meanings change quickly from one generation to the next. In the process, the landscape might be used to help us to remember and/or to help us to forget, but in reality, the meanings and feelings that landscapes convey are impossible to completely control, no matter how hard we might try. We only know that the landscape will continuously be reinterpreted, but we inevitably streamline these interpretations, while in our futile attempts we try to control the interpretations of them and encapsulate a particular interpretation in the impossibility of eternity.

Material culture, landscapes and humans – A symmetry?

With all the theories that we reviewed: What could we say about the relationships of people, landscapes and material culture? How can we integrate these seemingly unruly entities? Does this mean that the bird in Mostar, the rock in Tanum or the weapons in the Nordic Bronze Age had agency? Yes, perhaps they did, but *only* in relationship to both the physical war-torn city of Mostar and the people experiencing the sound of the bird; to both the physical environment of Southern Scandinavia and the experience of waterborne travel as well as the practice to engage in violent conflict. Consider if people had been having coffee in a different city and had heard the bird? Naturally, for the above-mentioned experience it had to take place in Mostar amidst ruins and bullet holes and nowhere else. Similarly, it had to be a landscape of streams and fjords and ships travelling along them with friendly or hostile crews possibly brandishing weapons to produce the described rock art.

Does this call for a symmetrical archaeology? No, it does not, because it was not the bird itself that caused the change. Neither does the rock of rock art, nor do the weapons cause the memory of a hard-fought victory or a crushing loss. Human activity and engagement causes memories. Human experience, perception and practice make material symbols and landscapes. A stream or a bird do, of course, possess significance in their own right for the natural environment, but they are not meaningful for human societies and individuals by their sheer presence. The key here is not a moral hierarchy, i.e., humans are inherently "above" or "better" than things. Instead, we emphasize difference, non-identity and dependency.

Landscapes, material culture and humans are not identical. Any influence that landscapes and material culture may hold over humans is gained. The art historian Alfred Gell called it "secondary" agency (Gell 1992), but the concept is much older. Sigmund Freud maintained that humans project their own agency into things. In turn, this "ghostly" agency affects humans (Freud 1999, 65-67). This idea is part of Freud's concept of the return of the suppressed. As we have attempted to argue above, landscapes and material culture become agents and chronotopes through human engagement with their natural environment, materials and each other. What that means may be illustrated by a thought experiment. Suppose no one in Mostar had ever seen a bird before their difficult times, but then they see one. The bird would not immediately represent, in its own right, a symbol of freedom. If people in Bronze Age Scandinavia would not have engaged with or experienced the landscape, or better seascape, with their boats, the rock formation in Finntorp would not have made them carve boats as if it was a fjord or stream. Finally, if no one would have ever experienced or heard stories of what a sword or a spear could do, they would not have become material symbols of power just by themselves. It could even be argued that the selection of any given object as a symbol is arbitrary as long as it is related at some point to the living or lived reality. It would be more fitting to say that agency lies in and is created by *the relation* rather than the things or the landscapes *themselves.* As we have tried to show through this paper, the relation is dialectic and it goes in both spatial and temporal directions, even though an event is always rooted in a specific moment.

Once humans experience and are engaged with environments, landscapes, and material culture they become chronotopes and symbols. From that point forward, they may influence human action without being directly engaged or experienced by said

humans. But again, landscapes and material culture do not do that on their own accord, but because stories contained in images, such as those of rock art, and knowledge about experiences are exchanged and transmitted. There is no symmetry to be found.

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Urban Landscapes and Urban Networks

Some Thoughts on the Process of Writing within the Mediaeval Urbanization of Central Europe

Gerhard Fouquet and Gabriel Zeilinger

Abstract

Mediaeval cities comprehended themselves as monads in terms of their legal, economic and social constitution. However, they always had to relate to the outside world by external communication. They were thereby integrated into spatial rasters of other cities, urban landscapes or networks. They also participated in and shaped their more immediate surroundings in villages and hamlets, hospitals, collegiate churches and monasteries, in cultivated meadows and forests, in traffic and transport routes, in fairs and exhibitions, generally in the broader regional and supra-regional communication infrastructure. In the course of the (later) Middle Ages, cities developed an advance in scribality and its archival tradition when set in relation to rural settlements. This advancement is not only a feature of bigger cities but is increasingly a feature of small-towns as well – as is shown here for the southern regions of the Empire north of the Alps. Scribality in the city was, on the one hand, a service offered to the environs and, on the other hand, also and ultimately a means of (partial) self-administration and detachment from the town lords. On a larger scale, mediaeval urbanization also indicates the adoption of practices of public and private life, which contemporaries perceived as 'urban' from then on.

Introduction

August 1321: A privilege is executed for the powerful Archbishop of Trier, Balduin of Luxembourg, by King Ludwig 'the Bavarian'. With this privilege, the King of the Romans frees the newly built castle "*Baldinstein super Lonam fluvium*" (Balduinstein above the Lahn Valley at Diez), which was erected for the protection of the Trier archbishopric, as well as the houses, buildings and fortifications that Balduin intend-

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ed to build in the valley beneath the castle. The future population of Balduinstein should gain free rights of settlement and movement, a free market and all liberties and privileges that Frankfurt and other imperial cities benefited from (Lamprecht 1886, 123-124, no. 102).

The founding of Balduinstein portrays the general perception of the emergence of European towns: a lord places his castle and thereby his residence in a landscape shaped by serfdom and seigneurial dependence. He founds a settlement and attracts people by promising liberty. In Central Europe, these "*libertates*", as they are called in Ludwig the Bavarian's privilege, could only denote 'city' since the end of the 12th century, meaning cooperative civilization within a system of political power dominated by aristocracy and dynasty. For a long time, this contemporaneous political-urbanistic will had been the prevalent perception of modern historical urban research – the seigneurially overpowered town (Escher/Hirschmann 2005, 11-61; Isenmann 2012, 26-63)[1].

However, this notion only covers one aspect of urbanity in the Middle Ages. Since the beginnings to the south of the Alps in the late 11th century, urban life was moreover characterized by various constellations and balances of power between lordship and commune (with regard to the different stages of development and various peculiarities)[2]. The town privilege given to Balduinstein had little in common with the privileges of most other towns – either smaller or bigger in size. If such a document was given to a settlement, it usually possessed a more "declarative than constitutive character" (Hermann 1999, 200) and primarily served seigneurial strategies of securing possession (Hermann 1999; Girardot 1992, 125-128). In Northeastern France, Southern Belgium, the Duchy of Luxembourg (as in the 'Loi de Beaumont') and in many other places, these freed settlements did not evolve into cities (Pauly 1993, 143-146; Escher/Hirschmann 2005, 13-14).

Urban development was a complex process differentiated by space and time. In the German research tradition, everything that constitutes a mediaeval city is summarized with the term "*kombinierter Stadtbegriff*" (combined concept of city). This term was established by Carl Haase (1975, 72)[3] and since then has been continually refined. Generally, research has refrained from the assumption of a particular point in time of town origination. The latter is now understood as a dynamic process (Escher/Hirschmann 2005, 52). Not law and seigneurial rationale, but negotiation processes determined the relationship between a lord and the commune with regard to proximity and distance in a spatial sense as well as to subordination and parallel hierarchies on a socio-political level. This took place in highly differentiated temporal, social, economic and legal municipal stages[4]. According to more recent research, e.g., on residential cities, as pursued in Kiel by the long-term project "*Residenzstädte im Alten Reich* (1300-1800)" ('Residential Cities in the Old Empire (1300-1800)') of the Göttingen Academy of Sciences since 2012, the social formations denoted as 'city' and 'noble court' were, in spite of all contestation, less antagonistically than in fact rather complementarily and integratively oriented even in the residential towns with temporary or

1 See also Johanek (2010) and the excellent overviews of Nicholas (1997a and 1997b). The translation of the following text from German is by Lisa Leiber and Gabriel Zeilinger.

2 About numerous attempts to define towns and cities in the Middle Ages cf. Johanek/Post (2004).

3 For the early history of the phenomenon "city" see Opll (2005).

4 Exemplary for one region cf. Zeilinger (2013).

permanent proximity of the town lord (Fouquet 2008; Hirschbiegel/Zeilinger 2009; Hirschbiegel/Rabeler 2015).

Therefore, mediaeval cities comprehended themselves as monads according to their legal, economic and social constitution and are characterized by their individual features. However, the way of life of a city's population was always related to external communication. They were, as shown in recent studies on towns and hinterland, integrated into an environmentally affected, culturally influenced, seigneurially preformed or by city leagues initiated spatial rasters of other cities, therefore of urban landscapes or networks (Irsigler 1999, 32)[5]. They participated in their surroundings, in the villages and hamlets, hospitals, collegiate churches and monasteries, in the cultivated meadows and forests, in traffic and transport routes, in fairs and exhibitions, generally in the regional and supra-regional communication infrastructure (Fouquet/Gilomen 2010; Pauly/Scheutz 2014; Scott 2004).

Characteristics of urban space dimensions and urban actors

The liberties that Balduinstein held did not attract too many people to the vicinity beneath the castle. The settlement with its town charters and encircling walls was and remained of minor importance (Michel 1910/11). Small towns such as Balduinstein, however, occupied a specific significance within the urban structure of their respective region. The myriads of minor medium-sized towns (population of 2000-5000), the small and even minute towns right down to town villages, of which urban qualities can only be analyzed in traces, constituted 90 to 95 % of Central European mediaeval cities (Ennen 1987, 228; Isenmann 2012, 62-63). However, urbanity did not only occur in the cathedral cities that existed since Carolingian times, such as Regensburg, Mainz or Cologne, not only in the truly large cities of Northern Italy of the 12th century, not only in Paris, the outshining European metropolis, not only in the 'boom towns' of the 13th century such as Ghent, Bruges, Augsburg, Nuremberg, Erfurt and Lübeck, and not alone in the Prague of Emperor Charles IV, which expanded massively in the 14th century. All of these cities were exceptional forms of cities – ideal models of communalism that could only be implemented imperfectly in the smaller towns of the vicinity compared to a model, which was unneeded or too costly to be realized (Fouquet 2003). The dialogue between Gayus and Menius about the emergence and essence of 'the' city, a text by the lawyer Nikolaus Wurm, which was inserted as article 2 in the so-called "Liegnitzer Stadtrechtsbuch" in 1399, can only be seen as a master narrative influenced by a Roman legal model in this context. It referred little to the realities of Liegnitz or most other towns of the age (Leuchte 1990, 23-33; Schiewer/Leuchte 1999).

More intensive research on smaller forms of urban settlement, which started about two decades ago, is linked to a new interest in the survey of a space that was newly constituted due to the massive urbanization of the 13th century and newly cen-

5 The differentiation of 'cityscapes' (regional abundance of urban centres as a surpassing feature) and 'urban landscapes' (spatial entities of medium size with a differentiated degree of urbanization) developed by Franz Irsigler might not be practicable with regard to the often quite problematic, i.e., limited stock of sources.

tralized in relation to the traditional seigneurial order (Irsigler 1978; Kiessling 1989; Fouquet 1993, 70-120; Flachenecker/Kiessling 1999; Escher/Hirschmann 2005, 17-18; Kiessling 1999, 35-36; Huggle/Zotz 2003; Knittler 2006; Teuscher 2014). The initial methodology for the research of urbanity and centrality of urban landscapes, mainly developed in the historical sciences of German-speaking countries, has been criticized lately (Zeilinger 2007)[6]. Recent studies about urban networks in England, France and Germany emphasized the "heuristic difficulty of central terms such as 'space' or 'region' and the resulting problem of the determination of urban landscapes by aspects of lordship, politics, economy or the evolution of settlements" (Zeilinger 2013, 93). As Walter Christaller's theory (1933) about central places, which constituted German-speaking research about towns and their environs[7], is now perceived in geography as outdated, Winfried Schenk (2004) rightly proposed the term "*Städtenetz*" (urban network) in order to measure factual spaces or constructed large or super-spaces more variably. Within Anglo-Saxon and French urban history, the theoretical-methodological concept of 'urban network' serves as a terminological and methodological bridge between disciplines. Certainly, the analytical notion of a space-constituting urban network cannot be level or equally coordinated, but has to assume central-space functionalities or 'nodes in the network', too[8]. Additionally, in recent years a focused interest in space-related aspects of communication developed. Therefore, small towns and smaller medium-sized towns are now considered within their individual spatial embeddedness and their mutual interconnection. This includes urban-rural relations, central-space structures or urban networks, as well as their utilization by princely powers in processes of territorialisation. Thus, Martina Stercken (2006) analysed the small territorial towns of the counts of Habsburg, respectively the (Arch-) Dukes of Austria, in what is Northeastern Switzerland today, between 1250 and 1350, and Christian Hagen (2015) examined medium-sized and small towns in the county of Tyrol. For Habsburg, the acquisition of small towns as fortificatory, administrative, fiscal and participatory nuclei of power was a crucial element of the seigneurial configuration of spaces. At the same time, small towns were changing from "objects of seigneurial politics of space" to "actors" (Stercken 2006). This aspect has not yet been addressed sufficiently and consistently. In Tyrol, the privileging of towns did not even originate from the comital reasoning of territorial policy. The initiative rather lay with the urban actors, as the analysis of municipal documents verifies. Furthermore, the process of scriptualization reveals that money from the city persuaded "city founders", such as Count Meinhard II (1257-1295), to adopt communal interests (Hagen 2015).

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6 For an extensive presentation of literature (until 2000) see Heit (2000).

7 On the history of reception cf. Schöller (1972); Irsigler (1979); Irsigler (1991). Cf. the exemplary work by Petersen (2015).

8 Thereto, despite all criticism of Christaller see Scott (2004), here: pp. 53, 57 and 61–62 as well as, e.g., the portfolio of the contributions in: Socio-environmental Dynamics over the Last 12.000 Years: The Creation of Landscapes II. Open Workshop 14th–18th March, 2011 Kiel, Gemany, Abstract Volume (Terra Nostra, 2011/1), Berlin 2011, therein Session 4: The creation and dynamic of urban landscapes – Networks and interactions within towns, around towns and between towns from the 12th to the 16th century, 54–59.

Scribality and urbanization

In today's examination of mediaeval urbanization, the degree of scribality to be detected in the written records functions as an impressive heuristic tool in the analysis of these systems of urban networks and their preceding urban microforms. Scribality highlights the permeable border between town and countryside, notwithstanding overlapping processes as, e.g., communal alliance systems. Two examples will be presented here in order to clarify this methodological approach of more current research in analyzing urban networks: the communalization of Central Switzerland by means of network formation and confederations and secondly the urbanization of the Upper Alsace. The history of Central Switzerland is – just as many historic landscapes in Europe – initially a history without towns or comparable entities of early cooperative communal nucleation (Sablonier 2009). In the comparably late urbanization of this region, the emerging "confederation was only one element […] amongst many others" (Marchal 2009, 132). These many other elements can be observed in the typical melee situations of principalities and counties, baronial, lower noble and ecclesiastical or monastic lordships, imperial cities and rural towns, as well as in dependent peasants in the respective valley communes. Much lay open, such as the formation of territories, considering the biological coincidence of dynasties, and many developments were unfinished, just beginning or had not been considered yet, such as the process of communalization in the valleys around St. Gotthard. What in a long-term perspective eventually became the ideological core of narration about an aggressively defended autonomy since the end of the 15th century was based on the faults of the seigneurial substrate of the regional high nobility, as can be seen in many other cities at the beginning of the 14th century. Thus, the decay of the barony of Rapperswil, whose possession extended widely into Central Switzerland, as well as the aggressive policy of the House of Habsburg after 1309 towards the heir of the barony, Werner of Homberg, turned into central events for the history of the region and for the formation of a communal network. The '*Waldstätte*' Uri, Schwyz and Unterwalden, which are traditionally labelled as "valleys" and seldom as "communities", became "lands" after the bestowal of the Imperial bailiwick in 1309. They were therefore brought nominally closer to the imperial cities of the region around Lake Constance and were then gradually included in their alliance system. The Covenant Letter of the *Waldstätte* of 1315 already refers to the acting groups as "confederates", which also marks the starting point of a process of communalization. However, only after 1332, as the small Habsburg territorial town of Lucerne joined the association of the *Waldstätte*, and particularly around 1350, communal outlines of the valley communities became apparent, encompassing the whole population and all of Central Switzerland's space to a rural municipality with a '*Landamman*' (chief magistrate) elected by the community. This development can also be seen in the entire southwest of the Old Empire.

The peculiarities of the increasing scriptualization of these processes that led to a development of a new communalized spatial structure in Central Switzerland have been demonstrated by Roger Sablonier with his 'discussion of scribality', in which he argues against the national myths of state formation of the Swiss Confederacy. Sablonier (2009) applied this 'discussion' consequently to all documents by implementing a his-

torical-critical approach and scientific analysis (radiocarbon dating)[9]. Scriptualization itself was simultaneous in Central Switzerland and in the semi-urban villages of Ober- and Nieder-Ingelheim (in the Middle Rhine region) – in which the social practice of scriptualization of communication is presented by well-preserved tribunal records constituting a distinct urban feature (Marzi 2011; Marzi 2012; Marzi 2014; Schäfer 2012; Fouquet 2016). Here and anywhere, scripturalization serves as an expression of the communicative intensification processes that were essential for communalization and urbanization in the development of dissociation from the respective lords mainly in the 13th and the early 14th centuries (Zeilinger 2013, 224-225; Hagen 2015, 131-162). It goes without saying that terms such as 'commune' and 'lordship' are neither to be understood as monolithic entities nor as synonyms of an identical evolutionary degree and equal constitutional importance. Openness and incompleteness rather mark these two partially overlapping entities of the social order in the research timeframe.

While Central Switzerland already belongs to the third generation of mediaeval regions of urbanization in Europe, Alsace is, after the relatively early and particularly distinct process of urbanization in Northern Italy as well as between the Seine and the Lower Rhine, a product of its second stage. Furthermore, Alsace belongs to the quite dynamically and as a result particularly densely urbanized regions of the continent[10]. Its urbanization was accomplished – as in other places – in several stages that were each affected by seigneurial and economic peculiarities: up to the 12th century, the old Roman and episcopal city of Strasbourg, which, along with its evolutionary twin towns at the riverbanks of the Rhine and the Mosel, had been at least partly preserved and recultivated. The western side of the Upper Rhine was mainly characterized by rural forms of settlement. Members of the Hohenstaufen dynasty were the first ample sponsors of towns in Alsace und thereby probably the primary driving force for the urbanization of this region: apart from their centre of prestige in Alsace, the royal palace and later the city of Haguenau, they founded or rather privileged nine further cities. However, other secular as well as clerical lords within the region had partly begun to expand and endow central places themselves – in considerable quantity and partly even before the end of the Hohenstaufen dynasty in the mid-13th century. Around 1400, most of the approximately 60 to 70 urban settlements in mediaeval Alsace had developed. Still, Upper Alsace and Lower Alsace – apart from all links and interdependencies – displayed individual urban structures of their own: Lower Alsace was characterized by the strong dominance of the metropolis of Strasbourg and Upper Alsace, especially in its northern part, by the specific density and, in fact, the concentration of medium-sized and small towns.

Recently, the urbanization of the northern parts of Upper Alsace during the 12th, the 13th and the beginning of the 14th century has been analyzed exemplarily with special regard to the dimensions of its social and political history (Zeilinger 2012). The studies designed for this investigation primarily take into account the interactions tangible in written records between lordships and communes, relating to the questions of

9 For the Federal Charter of 1291, the 'Morgartenbrief' of 1315 and the many early royal letters that are mainly not preserved as originals but were copied shortly after or in appropriation of the myth of city formation and then revised by Aegidius Tschudi (see Stettler 1980).

10 For historiographical outlines and as overviews cf. Zeilinger (2012); Metz (2002/2008); Kammerer (2001).

function and quality of certain places. Since the examination of central-place functions as well as the early urban forms of commune-building predominated in the research of urban development for a long time, it appears appropriate to combine these aspects with such an interaction analysis in order to understand the process of mediaeval urbanization more deeply and comprehensively.

As the subject of investigation is linked to various aspects and problems both in contemporary events and in the history of research – not least to the linguistic representations of space, dominion, city, and community in the written sources – at first, the relationship between town and countryside is displayed by the spatial indications of the written sources, by the methodology and results of previous research concerning Alsace and by a comparison with neighbouring regions. Subsequently, the postulated programme of renewed research on mediaeval urbanization unfolds by means of exemplary studies regarding the northern stretches of Upper Alsace. Thereafter, the older and therefore bigger cities of this region, namely Sélestat, Colmar, Mulhouse and Kaysersberg, are presented in their early developmental stages with regard to their relationship to the Hohenstaufen dynasty and their successors as well as to other (local) lords. The territorial towns of the bishops of Strasbourg in the Obermundat follow and subsequently selected towns of the Habsburgs in the examined region, the central places of the barony of Rappoltstein and ultimately the small town of Turckheim as a community between the Abbey of Munster, the Habsburgs and the Empire, thus set between several lords.

The overall results of this examination can be subsumed as follows: even in Alsace of the High and Late Middle Ages there are only towns to be found that reveal – not solely in their early development towards urbanity – a distinct seigneurial character. It is striking that in many places of eventual towns several lords with substantiated manorial rights and consistent representations were present. Moreover, aristocratic or clerical allodial possession was not a stronger foothold for urban expansion than, e.g., a bailiwick or a lien. The importance of "mediators between lordship and commune" (Gruber *et al.* 2013), i.e., the reeves, stewards, sheriffs and city councils, for the formation and development of urban settlements and their communes is as valid for the Upper Alsace as for many other places. Several and occasionally competing lords in one place sometimes meant more agency and thereby more liberty for these mediators and/or the communes that still were no monolithic blocs. This is impressively shown by intra-urban power struggles, as can be found, e.g., in Colmar and Mulhouse during the 13th century.

The local communities mostly had two starting points and continuous reference points for their communalization and their public life: the parish church and churchyard as well as the common land and their power of control over it. Most of the early written documents of active communal actions refer to at least one of these places. This alone does not constitute a specific circumstance, which singles out the early urban communities against rural communities. However, for the first-mentioned reference point cooperative appropriation (especially of the churchyard) and the cooperatively transacted disposal (especially of the commons) emerged particularly early and often yielded 'urban' consequences. Nevertheless, particularly these early transactions can hardly be perceived as entirely cooperative operations of equals. In Colmar, e.g., the local representatives of the Hohenstaufen apparently pocketed the commune against

other local lords. At the same time, communities, confraternities, guilds but also the neighbourhoods of people adhering to different jurisdictions but belonging to the same parish have to be interpreted as fundaments of the commune from which they indeed emerge. However, a spelled-out municipal law usually occurred only at the end of urban development in this region.

Yet, at least for the older urban communities in the bigger cities of Upper Alsace the reciprocity of the city council and the municipal court of law was of major importance: here, the above-mentioned seigneurial functionaries were – as was often the case – key persons who introduced administrative knowledge, political self-confidence and a (quasi-) aristocratic social prestige into the city – but still remained, in some cases, 'commuters' between the two social spheres. These and other transformations occasionally proved to be more conspicuous in bigger spatial systems than in a single city. Documents resulting from negotiations of different rulers indicate impressively that there was a widespread interest to settle in cities and to live "more civium" (in the custom of townspeople)[11]. The successive dissemination of this way of life is even to be found in many attestations of noble provenance,[12] as, e.g., in the 14th century Habsburg rent-roll. Also, the communicative, political or even familial networks of regional seigneurial representatives and early urban elites, which led, amongst others, to intercommunal alliances since the middle of the 13th century, display the spatial effect of urbanization (*cf.*, e.g., Schmitt 2008).

The interaction between lordship and commune analyzed in the presented analysis shows that the processes of negotiation and their scriptualization are often essentially richer in content for an understanding of a settlement's development towards urbanity than the mere central-space factors comprised in such documents. Hence, the analyzed communication processes – with their chronological sequence, their spatial transitions and their changing forms and subjects of negotiation – can – at least in some aspects – portray and explain the process of urbanization in a more precise way than the undoubtedly indispensable question of central spaces or the urban appearance of a settlement. Furthermore, in this study there was deliberately no decision made as to whether a settlement was still a village or already a town at a definite point in time within the study era- not only because the process itself is so interesting and so significant, but because this differentiation could block the insight that urbanization embraced more or less the whole natural landscape as well as the entire social landscape. This very dynamic of various facets is – understandingly – hardly suitable to be catalogued or cartographically represented (Zeilinger 2013).

Conclusion

However, urban advances are approximately quantifiable in scribality and its archival tradition when set in relation to rural settlements – not only in Upper Alsace but generally in the European Middle Ages. This advance is not only a feature of older and younger bigger cities but increasingly a feature of small-towns as well. This finding and with it the essential conclusions of recent research of urbanization and urban

11 Winkelmann (1880–1885, vol. 1, no. 603, 483) with the quote.

12 About this, cf. also Zeilinger (2016).

networks might appear trivial at first. Nevertheless, with this result – modernization by means of scriptualization – essentially all communicative intensification processes of that time are encompassed. Scribality in the city was, on the one hand, an offer to the environs and, on the other hand, also and ultimately (partial) self-administration and detachment from the town lords. Yet, this is not necessarily to be equated with autonomy. Urbanization manifests itself in the single city as well as in the entirety of space – not least in the increasing density and dispersion of legal, administrative and written practice. The cities increasingly detracted the elements and notions of 'order' from the old monopoly of the church and the aristocratic courts, adapted them and thereby subsequently reshaped the last-mentioned social spaces in turn. On a larger scale, urbanization also means the widespread, though not unlimited adoption of practices of public and private life, which contemporaries perceived as 'urban' from then on. Therefore, urbanization is not least the (preserved) writing about the interactions between lordship and commune of a town – within its inner space and its respective region (Zeilinger 2013, 224-225).

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Visual Concepts of Human Surroundings

The Case of the Early Greek Polis (10th – 7th century BC)

Annette Haug

Abstract

"[…] Every society […] produces a space, its own space. The city of the ancient world cannot be understood as a collection of people and things in space; nor can it be visualized solely on the basis of a number of texts and treatises on the subject of space […]. For the ancient city had its own spatial practice: it forged its own – *appropriated* – space" (Lefebvre 1984, 31)[1]. In reference to this concept of a produced space, Henri Lefebvre distinguishes three interrelated categories of space: perceived space, conceived space and lived space[2]. The following contribution describes the diverse forms of spatial appropriation between the 10th and the 7th centuries BC and relates them to visual conceptualizations of human surroundings.

Lived space: The Dark Ages and the rise of the Greek polis

The post-Mycenian period experienced the end of a centralized settlement system, whereby settlement density declined and large-scale or stone architecture was almost totally lacking. It was not until the 9th or the 8th century BC (depending on the region

1 In the following, the multilayered, polyvalent term ‚landscape' is avoided as too many modern concepts would be implied (see Davidovic, this volume). Instead, I'm referring to the term 'surrounding(s)' to refer to the environment and setting of human agents. Surrounding(s) thus designates the physical surrounding of human settlements as well as the visual surrounding of pictorial figures within images. The contribution builds on a more detailed discussion of body and role images of Geometric and Archaic Athens (Haug 2012) as well as on the relation of image and ornament on early vases (Haug 2015). Most recently, I have published a more detailed theoretical reflection of the argument (Haug 2017). The contribution of Ursula Mandel (Oxford 2018) has been published after the final drafts of this paper so that I could not take it into consideration.

2 In his words, he distinguishes "spatial practice", "representations of space" and "representational spaces" (Lefebvre 1984, 33).

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under consideration) that new forms of spatial appropriation arose[3]. Usually, one region possessed only one prominent settlement agglomeration[4]. Nevertheless, in the hinterland of such prominent settlement agglomerations (the region belonging to the polis), settlement density also increased[5]. During the process of polis formation, these settlements became strategically and politically connected to a respective central city – a process well-known for Athens. It is also the internal organization of the new settlement foci – the poleis – that changed. This signalized a new 'demarcation of space', in which places for the living, for the gods and the dead became distinct (Whitley 1991, 42; Hölscher 1998). The necropoleis became spatially separated from the lived space, lying at the borders of the built space. These changes went hand in hand with the establishment of a new cultic geography. Cities usually possessed a main *poliadic* sanctuary, which could be located within the built city space but also in the hinterland at the edges of the *chora*, and an important number of subordinate sanctuaries (De Polignac 1984). In Athens, for example, from the 8th century onwards the acropolis became the sacred centre of Attica. In the hinterland, a large number of sacred places are archaeologically tangible from the late 8th century onwards (De Polignac 1984, esp. 23). Some of these assumed the role of cultic 'sub-centres', for example, Eleusis and Sounion (Haug 2012, 431-468).

This new polis settlement structure has been visualized by Tonio Hölscher (Hölscher 2000, 13; Hölscher 2015, 21) as a concentric spatial model[6]. The built space of the main settlement agglomeration (ἄστυ) lies in its centre, surrounded by cultivated agricultural land (χώρα) which is itself surrounded by wild nature (ἐσχατιά) (Fig. 1)[7].

Of course, the *asty* does not lie in the exact geographic centre of a region, and *chora* and *eschatia* do not exist in the form of surrounding circles but usually overlap to some extent. Thus, the scheme represents an idealized abstraction of 'real' geographical situations. It visualizes the idea of a centre-periphery model with decreasing human influence at the 'borders'. As a consequence, this model not only represents an idealized geographic situation but also an ideological 'concept' of the city that has been used for the explanation of visual concepts (Dietrich 2015, 66). The conceptual centre of the images is then conceived to be the built space of the *asty*.

In comparison to this more recent model, scholarly research usually sticks to more simplified models to describe the relationship between the lived polis and its 'natural' surrounding. A long tradition, commencing with Alexander von Humboldt, sees hu-

3 For a regionally and chronologically differentiated discussion of settlement patterns, see Osborne (1987, 53–74).

4 In early Greece, the polis model with a centralized settlement is only one option of settlement organization. Alternatively, a region can also be organized in small villages (komai) scattered over the territory (see Osborne 1987, 24, 53–74). Whitley (1991, 6) points out that there are not only stable settlements (that become poleis) but also unstable settlements such as Zagora or Emporio. The visual testimonies discussed hereinafter originate from poleis (Athens, Corinth, Argos). Perhaps it is not by chance that especially the densely settled poleis developed specific forms of visual communication (Haug 2012, 3).

5 For the relevance of surveys, see Osborne (1987, 56–74), and for the Dark Age decrease of population especially p. 57.

6 Implicitly referring to ideas of de Polignac (1984).

7 See in a similar way Dowden (1992, 123–129), who distinguishes between four spheres – polis / cultivated / pastoral / wild – on the basis of literary sources.

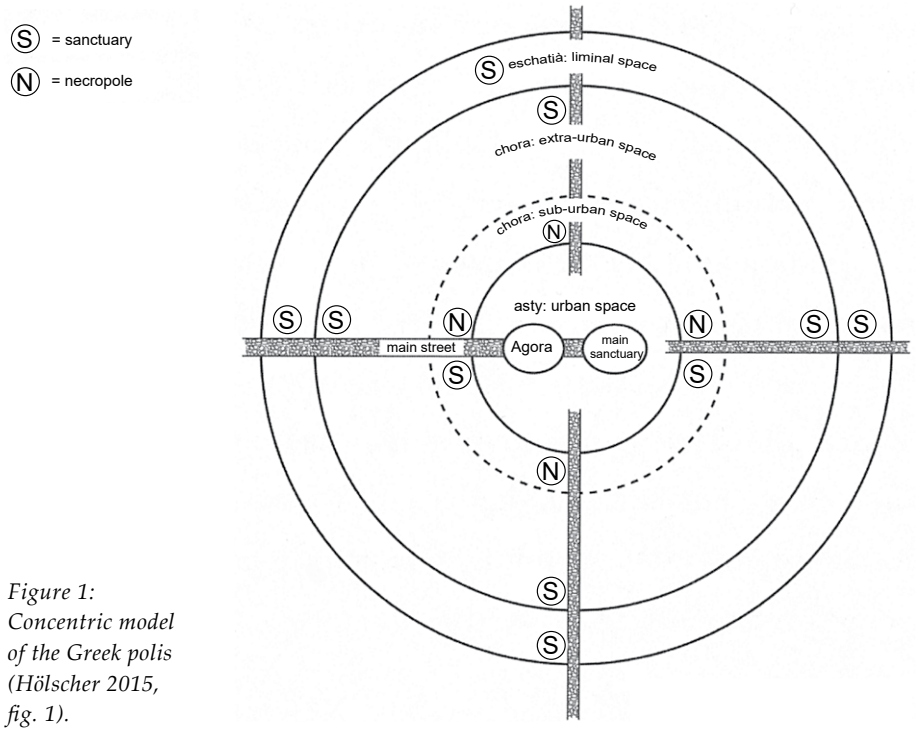

Figure 1: Concentric model of the Greek polis (Hölscher 2015, fig. 1).

man beings in the centre of Greek life – the human figure is conceived to constitute the main subject of Greek iconography and literature:

> "*Beschreibung der Natur in ihrer gestaltenreichen Mannigfaltigkeit, Naturdichtung als ein abgesonderter Zweig der Literatur war den Griechen völlig fremd. Auch die Landschaft erscheint bei ihnen nur als Hintergrund eines Gemäldes, vor dem menschliche Gestalten sich bewegen.* […] *ja den physischen Erscheinungen wurde immer eine Beziehung auf die Menschheit beigelegt, sei es in den Verhältnissen der äußeren Gestaltung oder der inneren anregenden Thatkraft. Fast nur solche Beziehungen machten die Naturbetrachtung würdig unter der sinnigen Form des Gleichnisses* […] "[8].

This understanding has been repeated up to now. Jan Bouzek sees the human figure in the centre of the world and describes it as "the measure of other things" (Bouzek 2011, 985). Jeffrey Hurwit specifies this concept by claiming that the natural world is conceived to be the 'other', strange, dangerous world outside the human world (Hurwit 1991, 34-35). This world is thought to be largely neglected by written and visual sources – left unmentioned or unseen (Osborne 1987, 16 and 197). Moreover, Susan Langdon contributes the assumption that rural life is also "surprisingly" underrepresented in early Greek images (Langdon 1993, 44). However, the opposite has also been stated. Lyvia Morgan focuses on the centrality of animals and assumes that they "[…] are there for a purpose: to aid, demonstrate and reflect aspects of human life"

8 von Humboldt ([1847] 2004), 191–192.

(Morgan 1995, 171). Here, the world of animals and the world of men coincide. The reconstruction of the Early Greek world is apparently disputed. Monocentric, dualistic and concentric models have been suggested. And usually, it is not specified if the models represent the 'real' lived world or an imaginative concept.

At this point, I would like to return to Henri Lefebvre's general statement: Every society produces its own space. This applies for the lived as well as for the perceived and conceived space[9]. Nevertheless, Lefebvre does not specify how the lived and the conceived world refer to each other. In the following, I would like to trace some crucial steps of the visual and real changes of the human world between the 10th and the 7th centuries BC. Attica will serve as a prominent case, which is then compared with two other early poleis: Argos and Corinth. One important result becomes apparent in the insight that there is no "Greek" way of conceptualizing nature, but that there are numerous regionally and chronologically variant options.

The Dark Ages (11th – 8th century BC)

The representational world of Dark Age Athens was very limited. Between the end of the Mycenean period in the 11th century and the rise of the Greek polis in the 8th century BC, non-representational 'geometric' ornaments dominate the visual appearance of ceramics. Only on very rare examples, such as a Protogeometric amphora from the Kerameikos (Fig. 2), are single representations of animals – most often horses – inserted into the geometric décor (see Haug 2015, 31-45)[10].

This thematic choice reflects a specific worldview of the early society. The members of the (hierarchically structured) society do not represent themselves and their social practices within the built space, neither do they refer to animals that are relevant for subsistence nor do they visualize wild nature outside the settlements. None of the spatial categories of *asty*, *chora* and *eschatia* are relevant for these images. Instead, the representations refer mainly to those animals that are important for the social standing of the horse breeding elite[11]. The image of the horse becomes a 'natural' carrier for human (elite) representation. And this visual concept does not relate to spatial categories of an urbanized society. In fact, the social groupings of the Dark Ages (from the 11th to the early 8th century) live within a spatial context that is only sparsely settled.

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9 For representations of nature (animals and plants) considered as world concepts ('theatres of human action') see Schnapp (2015, 24).

10 In the 9th and the 8th centuries, horses are also represented more often than any other species amongst terracotta and bronze figurines (Osborne 1998, 24–27). However, this general assumption needs to be differentiated. From Olympia, there are not only horses but also bulls amongst protogeometric votive figurines (see Kyrieleis 2006, 86). From Athens, separately worked horses (which are not part of a cauldron) are relatively seldom (Rolley 1992, 43 hints to the lack of Attic finds in Olympia; for the Athenian acropolis see Scholl 2006, 47 and 65). Instead, Argive horses appear in enormous quantities in Olympia (Rolley 1992, 44–45). From the 7th century onwards, horses generally lose their prominent role in plastic media. On geometric bronze horse figurines in general cf. Zimmermann (1989).

11 Horse representations are especially frequent in Argos (see below). Horse breeding as an elite activity is discussed in Morgan/Whitelaw (1991, 93) and Osborne (1998, 28). Benson (1970, 20) hints to the burial of horses and chars in the context of elite graves, but concedes that such burials are very seldom. However, his conclusion that horses may connote the funerary world (p. 25) is anything but compelling.

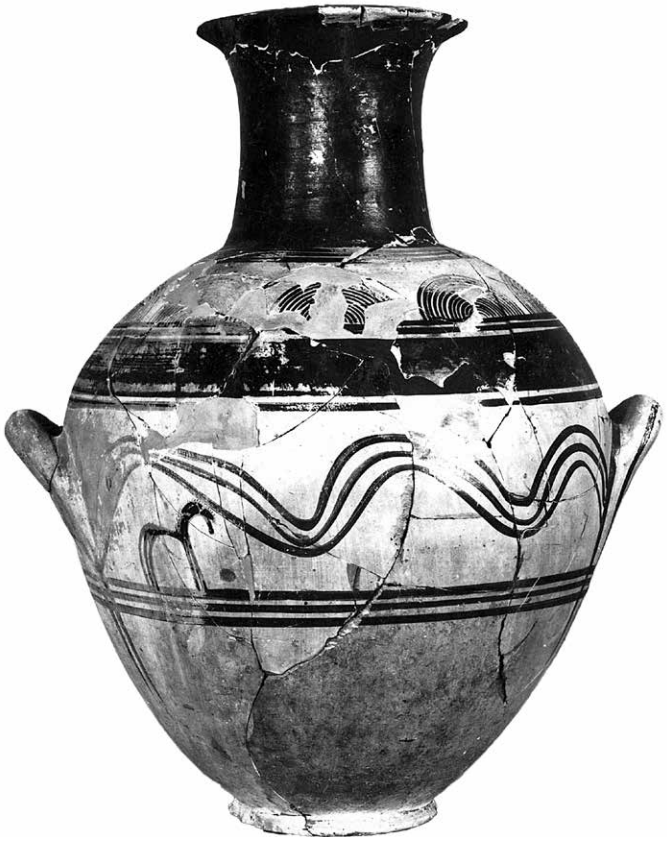

Figure 2: Protogeometric amphora Athens, Ker. 560 with the representation of a horse (Kiel, Photothek).

The mid-8th century in Attica (760-740/30 BC)

The situation changes profoundly during the 8th century. During this timeframe, polis formation processes not only accelerated but some cities also developed a differentiated image culture[12]. Athens is the first among the traditional mainland cities where complex images reappear. Within a very dense, non-representational geometric décor, image zones are cut out. The subjects of these early representations (760-740/30 BC) refer to human action contexts that are highly relevant for the self-definition and identity of the early polis: funerals (Fig. 3), chariot parades (Fig. 3), warrior parades, battles, sailing, and males presenting or leading horses.

These images refer to two opposed spheres of acting: civil vs. military role concepts (Haug 2012, esp. 530-531). Homer conceptualizes these two forms of agency as aspects of the city when he describes the shield of Achilles. In this ekphrasis, Homer contrasts a city at peace with a city at war (Iliad 18, 490-496). Early Athenian images can thus be considered to represent 'the polis'. Nevertheless, they do not refer to the polis as a built space – architecture is never represented. Instead, they imagine the polis as a (dominantly male) action context[13].

12 In a few regions, the differentiated image culture of the Bronze Age continued into the Dark Ages, *e.g.*, Cyprus (see Karageorghis/Gagniers 1974).

13 This corresponds to the notion of polis in Greek texts. They tell us "that the polis consisted not of houses, stone walls, timber, roads, and dockyards, but of men" (see Hurwit 1985, 73 with reference to Alkaios, Z 103 (Lobel/Page); Aeschylus, Persions, II. 348–349; Thucydides, VII.77.7).

Figure 3: Late Geometric Attic krater in New York, Inv. MMA 14.130.14 (mid-8th century) with a prothesis scene, charioteers and warriors; birds and ibexes within the morning scene taking place within the house (Mertens 2010, 53).

With regard to the body of the vessels, these 'polis images' occupy the very centre positions on the handle or belly zones. Thus, human action is situated in the centre of the visual world. Nevertheless, natural elements intrude into these human scenes. A key role is played by the horse, which is not only used as an image-ornament *per se* (as before) but is now part of human action. Horses appear in the context of chariot parades, they accompany males in the context of processions or they are presented by a horse tamer. In such representations, the cultural value of the animal becomes particularly evident. Other animals, such as birds and ibexes, play a minor role, as they are not part of the action. For example, in the context of prothesis scenes (as in Fig. 3), which must be conceived of as taking place within closed rooms, birds and ibexes can appear close to the bier. Nevertheless, there are some significant indicators demonstrating that these animals do not belong to the spatially defined logic of the scenes (Haug 2015, 63-68). The birds on the krater in New York (Fig. 3) do not 'fly' but they 'sit' with closed wings and without any contact to the ground between the feet of the bier. This spatial detachment is even more evident for the ibexes. Their calm rest in the vicinity of human actors is in any case unlikely, but even more striking is the fact that they 'hover' in the empty area under the

bier without any contact to the ground. This detachment from the spatial logic of the representation favours a visual function of these animals as attributes. This hypothesis becomes stronger when the combination rules of image elements are considered. Birds and ibexes loosely 'sitting' in the image field are only combined with male role images (and male deceased), not with females. As a consequence, they might connote and indicate the male action context – outdoors or even abroad[14]. Such a qualification is not only chosen when it fits to the scene (men acting outdoors) but also in order to characterize their potential action fields. Moreover, beside this attributive characterization of actors, birds can also be used to characterize the spatial surroundings (Haug 2015, 68-69). Often enough, both aspects overlap. Nevertheless, there are some instances when they do not. On the mentioned krater in New York (Fig. 3), for example, the mourning personnel of the indoor prothesis scene are augmented by women approaching the laid out deceased person from the liminal zones under the handles. These women 'outside' the prothesis space are accompanied by birds sitting on the ground (!). Here, the birds do refer to the spatial logic of the image and indicate the character of the surrounding: the space outside the house. To conclude, all animals appearing within human scenes indicate that the images do not strictly separate the world of human action from the world of the animals. Nevertheless, in this early period, their correlation remains loose.

This may serve as a starting point for a closer look at the images. They can be analysed with regard to the question how the concrete 'ambience' – the factual 'surroundings' of the human actors – is visually organized. At a first glance, it is directly perceptible that the space between the figures is filled with geometric 'ornaments' (Fig. 3). It has been intensively disputed if these ornaments possess a referential significance, if they 'mean' something. Nikolaus Himmelmann (1968, 32 and 59-60; 2005, 17) has suggested an interpretation of the chains of chevrons as vegetal elements since they resemble vegetal branches. On the krater in New York (Fig. 3), the women sitting and standing on either side of the bier hold such a branch towards the deceased and, in fact, the form resembles the chains of chevrons. Nevertheless, there are also significant differences. The branch is visually marked as a branch by a line that connects the 'chevrons' and it is handled by an actor. Because of such very prominent differences, I suggest to interpret the 'filling ornaments' as self-referential elements that constitute a 'neutral' (semantically and spatially not defined) surrounding of the acting figures[15]. This is an important detail as it means that apart from some animals, 'natural' elements do not (yet) intrude into the world of the acting humans.

Beyond animal representations that appear within human action contexts, animals can furthermore appear in separate image fields and they also appear as the subject of pure animal friezes (Stähler 1983, esp. 55)[16]. As early as the late 9th century, the number of displayed animal species increased. Apart from horses, also birds, deer, and

14 In contrast to this result (which is elaborated in detail in Haug 2015), Langdon (2008, 153–154) claims that it is the female who is surrounded by animals and plants. She ignores the difference between 'cultivated' plants, which can be handled by female (but also male!) dancers as a sign of elegance and 'uncultivated' nature that intrudes into the human action space.

15 See in detail Haug (2015).

16 Within a critical discussion of symbolic meanings, he suggests that animal representations possess allegorical meaning (as they do in Homeric texts). But not a single image alludes to such an allegorical level. In my opinion, the find context (e.g. grave context) cannot support an allegorical reading.

Figure 4: Late Geometric Attic amphora in Munich, Inv. 6080 (mid-8th century) with animal friezes on liminal zones of the vessel (Antikensammlung, München).

wild goats/gazelles are included among the frequently represented animals[17] (Fig. 4).

Bred animals relevant for daily subsistence are rarely shown. As a consequence, the choice of animals does not directly reflect their social relevance. Or in other terms: the cultural relevance of the animals may refer to different symbolic horizons. The horse has already been explained as an elite animal, whereas birds, deer and gazelles represent 'wild' nature. They connote the space outside the action context of the polis (ἐσχατιά) and may constitute a counter-world[18]. Agricultural land in the neighbourhood of the city is apparently not of interest for the early images.

Animal representations embody a world concept not only with regard to the chosen species but also with regard to their relation to human scenes and their placement on the bodies of the vessels. Usually, animal friezes and single animal images (mostly within metopes) are rarely combined with human scenes on one vessel. As a consequence, vessels show either the 'wild world' of the animals (*eschatia*) or representations of the lived space (*asty*). While the representation of human action occupies the central zones of prominent vessels, animals are usually presented in friezes of limited size in 'liminal' zones (Stähler 1983, 54; Whitley 1991, 141): on the lip, the shoulder, the lower belly or – on oenochoe – the small neck zone. This is even the case, when no human figures are shown.

As a consequence, the medium itself – the vase as the carrier of the images – is perceived in its spatial qualities with central and liminal zones, whereby this spatial logic is used to express the conceptual relations of the conceived world. The human world is assigned a central role, while animals occupy an associated, liminal position. This hierarchy becomes distinctly evident when human and animal friezes are shown on the same vessel (*e.g.* Athens, NM 804). In such cases, the representation of polis life occupies the centre of a vessel, whereas animal friezes are marginalized.

With respect to the semantic structure, it is relevant that both topics (wild nature/polis life) underlie the same formal, symmetrical, 'ornamental' – und thus cultural – structuring. As a consequence, it is the human structural order which organizes both the civilized human and the wild animal world.

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17 But horses continue to retain their specific importance. Plastic horses, for example, are produced as handles for the lids of pyxides (so-called horse pyxides). They appear at the end of the 9th century and are produced until the mid-8th century.

18 Cf. Hölscher 2000 for the concept of '*Gegenwelten*'; applied to early 'monster' representations cf. Winkler-Horaček 2000.

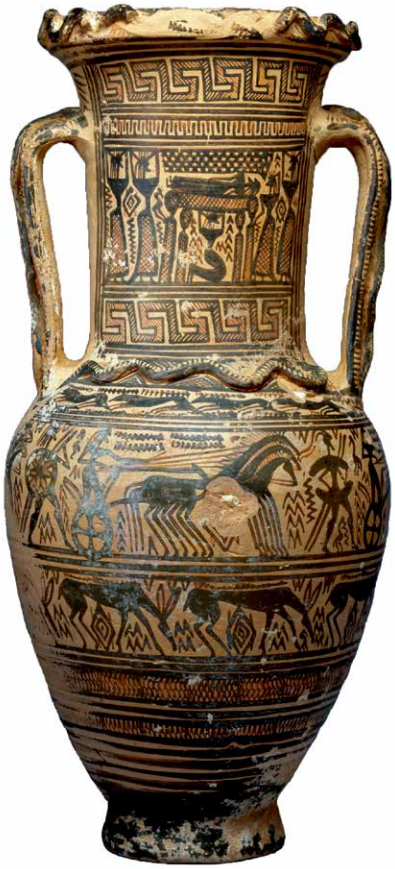

Figure 5: Late Geometric Attic amphora in Baltimore, Walters Art Gallery 48.2231 (end of the 8th century) with scenes of humans acting in the context of the polis, animal friezes and plastically attached snakes (Wikimedia Commons, Workshop of Athens 894 - Amphora with Funerary Scenes - Walters 482231, Walters Art Museum).

The late 8th century in Attica (740/30-700 BC)

In the later 8th century BC, the visual world of Athens shifts gradually. The iconography of the human world underlies changes. New subjects, such as dancing scenes in which women play an important role, appear, while others, such as brutal fighting scenes, disappear (Haug 2012). For the visual conceptualization of the relation between the human and the natural world, three new topics are indicative: riding scenes (in which male actors are in direct physical contact with horses), fighting against lions and hunting small animals. Especially the latter two characterize the extension of the male action space into the wild surroundings of the polis. This thematic change goes hand in hand with a certain conceptual change. A relevant number of vases now combines human and animal scenes (Fig. 5) – the lived space of the humans and the wild space of the animals are more frequently set in relation to one another.

As before, this relationship is articulated in a systematic way. The scenes of human action usually occupy the central zones of the vessels, i.e., on the neck and the belly zones, while animals are shown in friezes or panels on the shoulder and the lower belly zones. This liminality of animals applies especially to a new category of animal décor appearing in the later 8th century: plastic snakes. Their placement is reduced to the lip zone, the handles and the shoulder[19]. Just as the other animal friezes, the snakes also represent elements of the wild, dangerous nature that is now visually present at the borders of the lived space. As a consequence, vase decorations of the later 8th century follow a bipolar spatial model. The polis life at the centre is 'surrounded' by and confronted with the wild nature of the *eschatia*.

So far, we have noticed that contact between the human and the animal world becomes a visual topic in the later 8th century – on the one hand in the choice of specific iconographies that bring male actors and animals into physical contact and, on the other hand, by the combination of human and animal friezes on the same vessel. Nevertheless, the new relevance of 'nature' for the visual conceptualization of lived space goes far beyond these two issues.

19 The question if they connote a specific funerary meaning can be omitted here (see Haug 2015, 77).

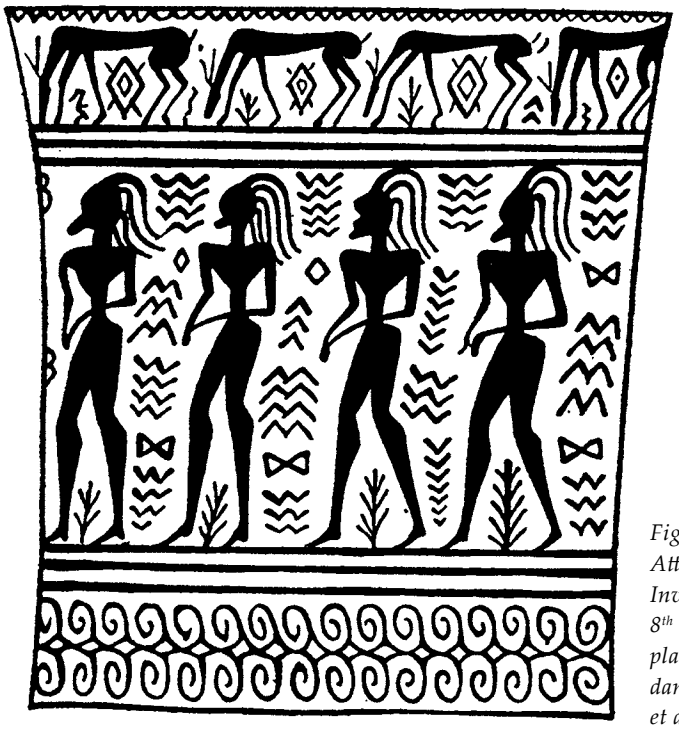

Figure 6: Late Geometric Attic amphora in Toronto, Inv. C 941 (end of the 8th century) showing plants within the space of dancing males (Robinson et al. 1930, Pl. 101).

Now, attention will be focused on the 'ornaments' that occupy the areas between the acting figures. Many of them are still characterized by older geometric forms and are transformed only slightly. The lozenges on the amphora in Baltimore (Fig. 5), for example, represent a traditional ornamental form which is now designed in a more opulent way with small hooks along its long sides. The regular zigzag-blocks are dissolved in zigzags that adapt to the space between the figures. In other cases, the ornaments are formally and syntactically transformed so that they become recognizable as vegetal elements. This is, for example, true for some 'ornaments' on an amphora in Toronto (Fig. 6).

Between the legs of the dancing males, small stems 'grow' out of the base line. Not only are they in contact with the ground and thus follow the spatial logic of the image but their form is also transformed so that they resemble plants at least to a certain degree. This means that the human (male) action space is now permeated by natural elements – plants as well as animals. 'Wild' nature is present within the polis space. Architecture, in contrast, is not yet represented.

This new prominence of natural features is also reflected by the fact that increasingly more vessels exclusively focus on the representation of natural elements: animals and plants. These representations of 'landscape' elements can even occupy central zones of the vessels. A cup in Munich (Fig. 7) shows several prominent features of this new interest in nature.

Figure 7: Late Geometric Attic kantharos in Munich, Inv. 6409 (end of the 8th century) focusing on 'natural' elements (München – Staatliche Antikensammlung und Glyptothek; photo: Renate Kühling).

The central field flanked by the handles shows two birds sitting on the base line of the image. They are oriented towards a plant/tree in the very centre of the image that is constructed by a combination of several 'geometrical' elements. On its branches, smaller birds are resting. This image waives any form of action. It is reduced to the presentation of natural elements, specifically plants and birds.

To sum up, it can be stated that 'nature' obtained a prominent place in late 8th century Athenian images. The world of human action is intruded by 'wild' elements, new forms representing plants are implemented and increasingly more images focus solely on the wild natural world. In the 7th century, this tendency will lead to a totally new visual concept of the world (Haug 2015). Especially in the late 7th and the early 6th centuries, plant and animal friezes dominate the Athenian visual world for some decades.

A comparison of the changes within the lived (built) space and shifts in visual concepts yields unexpected results. The polis formation process that starts in the 8th century and steadily continues through the 7th and the 6th centuries is accompanied by visual concepts of the 'world' that do not reflect an increasing degree of urbanization. On the contrary, images of the beginning 6th century, which are historically localized in the context of an important monumentalization of the Athenian acropolis, mainly display animal friezes. Lived space and conceived space apparently do not change in a homologous way. This insight into the loose, often antithetical relationship between '*Lebenswelt*' and '*Bilderwelt*' becomes even more obvious when image concepts of different poleis are compared. In the following, two further cities, whose urban development of the 8th and the 7th centuries compares well with that of Athens, are selected – Argos and Corinth (De Polignac 1984, 32). It will be shown that their decorative preferences clearly differ.

The second half of the 8th century: Argive images

Argos ware shows only few figural scenes and the overwhelming majority includes horses[20]: horses without human actors[21], but also riders[22], horse leaders[23] and males flanked by two horses[24]. The horse as the traditional animal of the elite, bred and cultivated, thus becomes the central form of representation within the rising polis[25]. In many scenes, the horses (with or without human actors) are combined with fish

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20 For a brief history of research on Argive Geometric pottery, see Pappi 2006; for a regional discussion of iconographies, see Foley 1988, 56–69; other representations cover a wide range of themes which are often only supported by few representations: dancing women Argos, Inv. C 153 (Courbin 1966, Pl. 145,1); Argos, Inv. C 210 (Courbin 1966, Pl. 41,1); Argos, Inv. C 229 (Courbin 1966, Pl. 40,2); Argos, Inv. C 583 (Courbin 1966, Pl. 145); Argos, Inv. C 2441 (Courbin 1966, Pl. 63); Argos, Inv. C 3863 (Courbin 1966, Pl. 145); Argos, Inv. MA 566 (Krystalli-Votsi 1980); Argos, Heraion (Waldstein 1902–05, Pl. 57,15–18; Courbin 1966, Pl. 145–147); Corinth, Inv. T 2545; Nauplion, from Mykene A 3 and A4 (Foley 1988, Pl. 9b); Harvard, Inv. 1954.33 from Argos Heraion (Langdon 1993, 150, no. 52); Harvard, Inv. 1935.35.17 (Langdon 1993, 152, no. 53); dancing men Argos, Heraion (Waldstein 1902–05, Pl. 57,7); Langdon (2008, 161–162) lists more than 50 dancing scenes which are not all listed here); procession of female mourners Argos, Inv. C 2546 (Courbin 1966, Pl. 144); Argos, Inv. C 2551 (Courbin 1966, Pl. 144); Argos, Inv. C 2562 (Courbin 1966, Pl. 144); Argos, Inv. 2563; C 2556; C 2566 (Courbin, 1966, Pl. 144); a funerary cult scene from the 7th century Argos, Inv. C 2661 (see Hägg 1992); chariot procession Argos, Inv. C 4178 (Courbin 1966, Pl. 142); Tiryns, DAI 75/1352 (Foley 1988, Pl. 7b); armed warriors (JdI 14,1899, 85 Abb. 44); Argos, Inv. C 599 (Courbin 1966, Pl. 142); Argos, Heraion (Waldstein 1902–5, Pl. 57,8); battles Argos, Heraion (Waldstein 1902–05, Pl. 57,10); Nauplion, Inv. 9290 from Tiryns; boxer Argos, Heraion (Waldstein 1902–05, Pl. 57,11); wrestler Argos, Inv. C 209 – beneath the handles (Courbin 1966, Pl. 100–104); ship scene: Argos, Inv. C 10320 (Pappi 2006, 233 fig. 2–5); Argos, Danaou street (Pappi 2006, 232); Nauplion, Inv. 17167 from Tiryns (Foley 1988, Pl. 7c).

21 For more than 200 representations, not listed here, see Courbin (1966, 403); the lists of other topics are not complete either, but shall provide an impression of the quantities.

22 Nauplion, from Tiryns Inv. 17068; Nauplion, from Tiryns Inv. 715Z (Foley 1988 fig. 7); Athens, NM from Argos, Heraion (Courbin 1966, Pl. 8,1) from the beginning of the 7th century.

23 Argos, Inv. C 4 (Courbin 1966, Pl. 61,3); Argos, Inv. C 201 (Courbin 1966, Pl. 43); Argos, Inv. C 210 (Courbin 1966, Pl. 41); Argos, Inv. C 871 (Courbin 1966, Pl. 57); Argos, Inv. C 928 (Courbin 1966, Pl. 6,2; 7); Argos, Inv. 1017 (Courbin 1966, Pl. 36,1); Argos, Inv. C 1020bis (Courbin 1966, Pl. 141); Argos, Inv. C 1022 (Courbin 1966, Pl. 138,1–2); Argos, Inv. C 1146 (Courbin 1966, Pl. 65,3); Argos, Inv. C 1235 (Courbin 1966, Pl. 142); Argos, Inv. C 3944 (Courbin 1966, Pl. 142); Argos, Inv. C 4463 (Courbin 1966, Pl. 138); Argos, Heraion (Waldstein 1902–1905, Pl. 57,3–6); Amphora from Asine (Courbin 1966, Pl. 12); Nauplion, from Mykene (Courbin 1966, Pl. 83); Nauplion, from Mykene (Coldstream 2008, Pl. 30c); Nauplion, Inv. 1973, from Mykene.

24 Argos, Inv. C1 (Courbin 1966, Pl. 28); Argos, Inv. C 210 (Courbin 1966, Pl. 41); Argos, Inv. C 1018 (Courbin 1966, Pl. 35,1); Argos, Inv. C 1239 (Courbin 1966, Pl. 138); Argos, Inv. C 1263 (Courbin 1966, Pl. 141); Argos, Inv. C 2362 (Courbin 1966, Pl. 37,1); Argos, Inv. C 3282 (Courbin 1966, Pl. 141); Argos, Inv. C 3286 (Courbin 1966, Pl. 141); Argos, Inv. C 3462 (Courbin 1966, Pl. 141); Argos, Inv. C 4210 (Courbin 1966, Pl. 138); Argos, Inv. C 4313 (Courbin 1966, Pl. 141); Argos, Inv. C 890 (Courbin 1966, Pl. 64,3); Argos, Inv. C 10320 (Pappi 2006, 233 fig. 2–5); Argos, Heraion (Waldstein 1902–1905, Pl. 57,1–2); Athens, NM 877; Nauplion, from Mykene (Courbin 1966, Pl. 81,2); Nauplion, Inv. 1915, from Mykene (Courbin 1966, Pl. 62,3); Nauplion, Inv. 9226, from Tiryns; Nauplion, Inv. 9138 from Tiryns; Nauplion, Inv. 1976 (all three: Foley 1988, Pl. 7[a]); Würzburg (Courbin 1966, Pl. 78,5).

25 As noted above, horses appear amongst the earliest figural representations. As a consequence, their popularity cannot be linked to the establishment of the Olympian Games, whose foundation is (fictively) recorded for the year 776 BC (Kahane 1975; again: Foley 1988, 58). Moreover, it has not even been proved that horse racing is one of the oldest contests in Olympia (see Haug 2012, 372– 373). But the opposite argument is nevertheless interesting: The appearance of horse races as an important spectacle in early Greece proves the relevance of this species.

Figure 8: Argive Late Geometric pyxis from Tiryns, Inv. 1065 representing horses, birds and fish (Deutsches Archäologisches Institut; © Ephorate of Antiquities of Argolida, Nafplion Archaeological Museum).

and/or birds[26] placed under the belly or to the sides of the horse bodies (Fig. 8) (Courbin 1966, 297)[27].

In some other cases, the space under the belly or in front of a horse is filled with flowers or leaves[28]. This prioritisation suggests that the main topic of the Argive visual world is the horse. While some images visualize the relation between the horse and male protagonists[29], others conceptualize the horse in the context of other significant elements of nature. These floral and faunal elements are not meaningless 'decoration',

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26 Fish (are the most common motif appearing beneath the horses, see Boardman 1983, 19): Argos, Inv. C 1 (Courbin 1966, Pl. 28); Argos, Inv. C 214 (Courbin 1966, Pl. 84,1); Argos, Inv. C 645 (Courbin 1966, Pl. 36,2); Argos, Inv. C 870 (Courbin 1966, Pl. 62,2); Argos, Inv. C 871 (Courbin 1966, Pl. 57); Argos, Inv. C 928 (Courbin 1966, Pl. 6,2; 7); Argos, Inv. 1019 (Courbin 1966, Pl. 49,1); Argos, Inv. 3959 (Courbin 1966, Pl. 54,3); Argos, Inv. 4029 (Courbin 1966, Pl. 51,1); Argos, Inv. MN 231 (Courbin 1966, Pl. 32,2); Argos, Heraion (Courbin 1966, Pl. 8,1); Amphora from Asine (Courbin 1966, Pl. 12); Mykene (Courbin 1966, Pl. 83); Mykene (Courbin 1966, Pl. 62,3); birds: Argos, Inv. C 14 (Courbin 1966, Pl. 29); Argos, Inv. C 209 (Courbin, Pl. 100); Argos, Inv. C 242 (Courbin 1966, Pl. 48,2); Argos, Inv. C 2666 (Courbin 1966, Pl. 85); Mykene (Courbin 1966, Pl. 83); Birds in separate fields: e.g. Argos, Inv. C 201 (Courbin 1966, Pl. 43); birds and fish: Argos, MN 231 (Courbin 1966, Pl. 32); Argos, Inv. 1023 (Courbin 1966, Pl. 33,2); Argos, Inv. C 3462 (Courbin 1966, Pl. 141); Argos, Inv. MN 231 (Courbin 1966, Pl. 32,1); Mykene (Courbin 1966, Pl. 81,2); Argos, Inv. C 1 – fish under horses, birds in a separate frieze (Courbin 1966, Pl. 28); Nauplion, from Mykene (Coldstream 2008, Pl. 31a).

27 Coldstream (2008, 130) hints to the fact that it is not until LG II that fish are found under the belly of horses.

28 Argos, Inv. C 11 leaves or fish? (Courbin 1966, Pl. 137,1); Argos, Inv. C 14 (Courbin 1966, Pl. 29,2); Argos, Inv. C 280 (Courbin 1966, Pl. 34,2); Argos, Inv. C 890 (Courbin 1966, Pl. 64,3); Argos, Inv. C 1146 (Courbin 1966, Pl. 65,3); Argos, Inv. C 10320 – leaves and fish? (Pappi 2006, 233 fig. 2–5).

29 For Athens, I have argued extensively that there is no reason to see a mythological content in such representations as suggested by Schweitzer (Haug 2012, esp. 326). Nevertheless, the representation of fish under the belly of horses appearing on Argive ware requires explanation. Schweitzer (1969, 64–65) interprets them as "determinatives" of the god Poseidon Hippios, whereas Langdon (1989) suggests a religious interpretation. But in fact, horses are combined equally often with birds, sometimes also with leaves. For this reason, it is by far more likely to interpret these representations as visualizations of different 'natural' categories (see below). For further critical arguments, see Kahane (1973, 132).

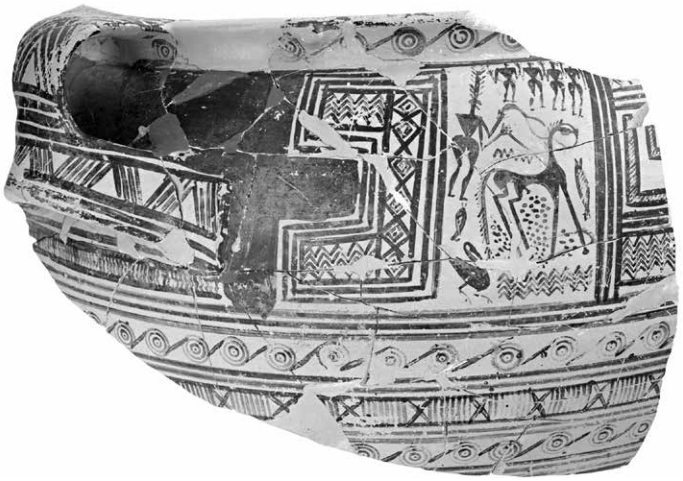

Figure 9: Late Geometric Argive krater in Argos, Inv. C 240 (middle of the 8th century) showing a horse scene in the centre (Ecole Française d'Athènes; © Ephorate of Antiquities of Argolida, Argos Archaeological Museum).

but are designed with great care and a high level of differentiation. As a consequence, they express a specific worldview[30].

Nevertheless, research has usually gone far beyond such a general understanding of Argive images. A significant example for archaeological interpretation is represented by an exceptional krater in Argos, Inv. 240 (Fig. 9).

The central scene shows a horse tamed by a male wearing a helmet. It is framed by a row of four nude dancers (above the scene), two fish (one to either side of the horse) and a duck (below the scene). The dancers at the top are smaller in size than the horse leader. In addition to the figures, there are further elements within the image that have been ascribed with a representational meaning. The quadruple zigzag-line beneath the horse was interpreted as 'water' due to the nearby fish and the bird (Boardman 1983, 19). As a consequence, the dots beneath the belly of the horse also required interpretation. John Boardman (1983, 19) asserts a situational reading and interprets them as a 'stony bank'[31]. This understanding has two important and also problematic implications.

First, abstract elements are provided with a hieroglyphic figurative meaning. Boardman interprets zigzags here and elsewhere in Argive imagery as water – an interpretation that has been repeated in research until today[32]. This would imply that

30 Bommelaer (1980, 64) and similarly Foley (1988, 57) note that around 750 BC different bird species are depicted in a detailed and differentiated ("naturalistic") way. In the later 8th century, when they are shown with less care, he interprets them as "*de simples motifs ornementaux même s'ils continuaient à occupier un emplacement majeur dans la composition*". In my opinion, the quality of design is no (at least not the only) indication for the decision that pictorial elements possess a meaning. Moreover, the animal representations of the later 8th century can be understood as expressions of a specific worldview.

31 This is probably the reason for his statement that this image could be "the first real picture in historic Western art". For the reasons mentioned below, I do not consider this image to be more or less 'real' than others. Hurwit (1991, 43) interprets the scene as a landscape representation: "But it is precisely the combination of these natural forms, however discrete, that makes the scene, for its time, almost as remarkable as the Priam Painter's grotto. There would be nothing quite like the Argive scene again for over two centuries [...]".

32 Courbin (1966, 475) already rejected the interpretation of zigzags as 'water', but his argument was relatively weak: He explained the appearance of this motif with a special painting technique – the comb. In a second article (Courbin 1992), he discusses further arguments which have been neglected in later research. Some of them are repeated in the following.

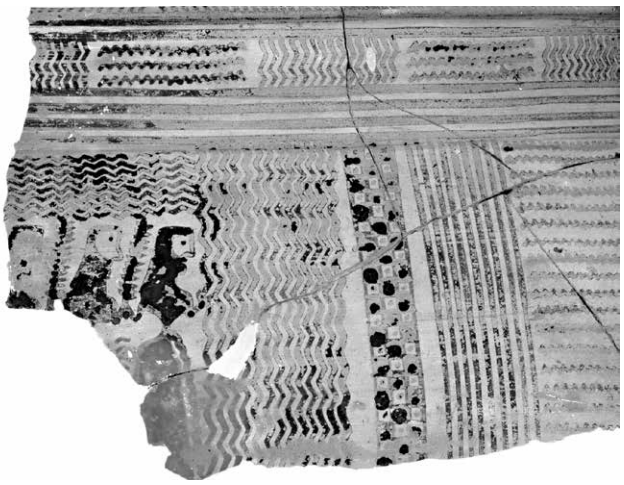

Figure 10: Late Geometric Argive krater in Argos, Inv. C 208 with dancing women surrounded by zigzags (Ecole Française d'Athènes; © Ephorate of Antiquities of Argolida, Argos Archaeological Museum).

Argive images possess a visual formula to represent a landscape element – a fact that would be highly significant for the visual conceptualization of the human surrounding. Boardman (1983) founded his interpretation of the Argive zigzags on a comparison with the Egyptian (!) hieroglyph for water. This has important consequences:

1. An Egyptian principle of script (from which Egyptian representations of water clearly differ!) is transferred to a reading of Greek images. Except for the presumed water zigzags, there is no other evidence for the use of abstract hieroglyphs connoting specific figurative meanings. The reading of zigzags as hieroglyphs would demand a reformulation of the concept of Greek visual syntax.
2. If the zigzags indeed represented water, the Argive potters would have implemented a visual formula for a landscape element. On Athenian pottery, landscape elements, such as water or rocks, are not represented before the 6th century. They are only represented implicitly – water, for example, by the presence of ships or fish. Argive zigzags would then constitute a revolutionary concept for the visualization of 'landscape'.

To reproduce Boardman's argument correctly, we have to introduce a further distinction. In his view, single chevrons or zigzags are mere filling ornaments, while only "piles of zigzags" can be understood as water. In the image under discussion (Fig. 9), the zigzag inserted above the back of the horse and below the whip of the horse tamer would not represent water despite its resemblance to "piles of zigzags". Instead, only 'isolated' prominent multiple zigzags, such as the pile of zigzags in the lower part of the image, are seen as water elements. Boardman postulates this interpretation even for those zigzags that appear within separate fields as 'ornaments'. Nevertheless, the interpretation has to start from those (very few) multiple zigzags that are part of a figural scene. Only in these cases can their figurative meaning be analysed.

In the scene under discussion (Fig. 9), such a contextual interpretation is based on the juxtaposition of the zigzag with water bird and fish. However, neither fish nor water birds come in direct contact with the presupposed water element (Courbin 1992, 60). In some other cases, the 'water' zigzags occupy a very prominent position within the image.

Figure 11: Late Geometric Argive krater in Argos, Inv. C 695 with horses and fish touching a pile of zigzags (water?) *(Ecole Française d'Athènes; © Ephorate of Antiquities of Argolida, Argos Archaeological Museum).*

This is true for a fragment from Argos, Inv. C 208 (Fig. 10), where the zigzags occupy an important part of the image field by surrounding a group of dancing women[33].

However, the leading dancer seems to touch the outer water 'line' with her hand. The risen arm seems to hint to the fact that this 'contact' is not accidental. In this case, zigzags do not constitute a mere filling ornament, but they possess a form of materiality with which interaction is possible. By this, a figurative meaning is insinuated even if the interaction is not specific enough to connote a specific meaning. Nevertheless, the zigzags receive a 'spatial' quality as they virtually 'surround' the dancing women. Thus, an association with 'water' is at least possible.

On an Argive krater, Inv. C 645 (Fig. 11), two horses facing each other stand with their hooves on a bulk of multiple zigzags. Underneath the bodies of the horses, two fish are represented. Their caudal fins also touch the uppermost zigzag line. Another bulk of zigzags is inserted vertically between the two horses. Neither the horses nor the fish interact with these zigzags. Boardman's conclusion that the horses drink from the water is not provable – they do not touch the zigzags with their snouts. Nevertheless, here again, the zigzags surround the animal scene. Once again, a figurative meaning cannot be excluded.

This associative attribution of meaning relies on the combination with other significant actions or image elements. As a consequence, the zigzags 'lose' any figurative quality if they are detached from a figurative context. This becomes evident for the zigzags on Argos, Inv. C 645 (Fig. 11) that flank the main scene. They constitute a self-referential 'ornament' without any hieroglyphic meaning, but contribute to an at-

33 See also a similar fragment from Tiryns (Boardman 1983, 23 fig. 2.14). The interpretation of the zigzags as water has given rise to the assumption that the image may show a feast celebrating the gift of the Danaides who dug wells in Argos. But in the majority of the dancing scenes, the determinative 'water' element is missing (Courbin 1992, 60). It can thus be excluded that the images have a mythological content. No pictorial element specifies the place or situation of the action; the images (as C 208 fig. 10) just show 'a' dance.

mospheric framing of the image. In Argos, as in Athens, figurative meaning of abstract elements can only be produced by a significant combination of image elements, by a syntactic logic and/or a formal plausibility.

Nevertheless, the detached zigzags in separate fields hint to another aspect. One reason for their intrusion into the image field might lie in the fact that they possess a striking aesthetic form. In the case of the Argos krater, Inv. C 645, this aesthetic 'game' becomes especially evident: On the other side of the vase, the zigzags do not frame dancing women but surround a star motif.

On this basis, it becomes evident that in Argive pottery there is no hieroglyphic use of visual elements as Paul Courbin has already stated (Courbin 1992, 59). Nevertheless, the zigzag element can assume a figurative meaning if this is specified by the image context. While in late 8th century Athens, plants are detected as a visual 'landscape element', Argive potters seem to refer to water as such an element that 'surrounds' human and animal 'actors'.

Boardman's interpretation of the Argive krater fragment (Argos, Inv. C 240) has a second problematic implication with respect to the visual conception of the human surrounding. It presupposes an understanding of the image as a coherent scene and a logical 'landscape' representation. As the dancers are represented in a smaller scale than the horse-tamer, they have been interpreted to be "in the distance" (Courbin 1966, 418 note 7; Hurwit 1991, 43). Such a coherent reading leads Courbin (1966, 492) to the assumption that the 'relation' between dancers and the horse-tamer suggests a religious setting. Langdon goes even further (1989, 198; see also 2008, 165-166): "[…] a man drives a horse to the seashore in the company of dancers, fish, and a water-bird […]. The dancers give the scene a sacred air evocative of the recorded practice of horse sacrifice to Poseidon at Argos […]". Mark Stansbury-O'Donnell (1995, 329) refers to this understanding and retells a complex narrative starting from this image: "The dancers have accompanied the central figures to the shore, but now appear to stand to the side as observers." As Langdon, he interprets the fish as an indicator, which refers to Poseidon and thus concludes that the horse will be sacrificed. Such readings neglect some very important aspects that speak against a coherent spatial and temporal logic.

The different visual elements (dancers, horse tamer and animals) are represented within a frame, but that does not imply that they constitute a coherent scene. Instead, there are important clues that speak against a spatial and temporal logic. First, the fish 'float' in the 'air' at the sides of the horse. This supports an additive reading of the image. Second, the dancers are represented in smaller size as they are less important than the horse tamer. This phenomenon is known as status perspective. As a consequence, I would like to 'read' this representation in a more general way. In this image, the world of elite warriors with their horses occupies the centre position, while polis life (dance) and nature (fish, bird) are organized around it[34].

34 On a further vessel, this setting of priorities is even more obvious (Argos, Inv. C 209): Horses occupy the main image fields while the representation of the human body – two pairs of wrestlers – is confined to the space below the handles (Courbin 1966, Pl. 100-104). Interpreted as an Argive 'choix culturel' by Coulié (2013, 95).

Thus, the arrangement of visual elements does not follow a spatial (and narrative) but a semantic logic[35].

What does this imply for the majority of Argive images that are much simpler and usually only show horses with or without men? Earlier research has usually related the visual prominence of horses to the specific conditions of the natural surroundings in Argos. Argos is conceived as a "traditional pastureland of horses" (Coldstream 2008, 129, see also Pappi 2006, 230) and in fact, Argos is also referred to as a horse nourishing land in the Iliad (ἱππόβοτον; Iliad 2,287; 6,152). As argued before, horses are not relevant for the subsistence of a society, but represent a highly significant cultural elite 'product'[36]. Images on Argive Geometric pottery refer to this traditional social 'sign', which appears long before the polis formation process starts. Nevertheless, in addition to this focus on horses, there is also a relevant number of images depicting birds and/or fish (Fig. 8)[37]. This issue reveals that Argive (as other) images cannot be read as literal (unfiltered) expressions of social values[38]. While horses may fit into this interpretative scheme, this becomes problematic for birds and fish. Indeed, it is difficult to reconstruct a dense symbolic meaning for fish and bird on the basis of written sources. For this reason, it is appropriate to base interpretation on their basic natural qualities as aquatic animals and flying animals whose habitat is outside the polis sphere. Nevertheless, the form of their presentation is highly significant: They often appear beneath the belly or to the side of a standing horse (Fig. 8). If we apply the additive understanding developed for the horse tamer scene (Fig. 9), such images can be understood as 'holistic' visions of nature: aquatic animals (fish), land animals (horses) and birds. Each of them fulfils a specific function in relation to the polis (cultivated/wild animals). As a consequence, their social significance refers to different semantic levels. In Argos, this visual concept of the world disappears in the 7th century. Figural representations are then almost totally lacking (Morgan/Whitelaw 1991, 93-95).

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35 For the same reasons, I reject the interpretation of horse representations in combination with fish and birds (see Langdon 1989) as ritual scenes (the Near Eastern parallels that she introduces as an argument cannot be used as an explanation for Argive pottery as the motive is transmuted here). A further complex scene is found on Argos, Inv. 10321 (Pappi 2006, 234–236 fig. 6–11). Here again, I would suggest that the image rather conceptualizes the relationship of civilized (horses) and wild (scorpion, fish, birds, lion, deer, fawn) nature and men. Again, land, animals and air are evoked (see also Pappi 2006, 236). But here, nature is represented as a dangerous context. The funeral connotations stressed by Pappi are not comprehensible to me.

36 The quantity of horse scenes can, of course, not be set in relation to the actual economic relevance of horse breeding, in contrast Foley (1988, 58): "[…] horse-breeding was the major occupation of the Argives […]".

37 For a critical discussion of the various symbolic interpretations of these animals (which is not repeated here once again), see Courbin (1966, 478–483).

38 But Coldstream (2003, 141) has not only explained the visual relevance of horses by the 'real' qualities of the surroundings but also the representations of birds: "Argive birds are more varied than Attic; perhaps the marshlands between Argos and the sea allowed the painters more scope for first-hand observation". And Coldstream (2003, 141) for fish: "No less various are the fish – a variety for which the local cuisine is still renowned". But the lands of Argos cannot be described as rich in water in general as several parts are quite dry (see e.g. Osborne 1987, 29).

Figure 12: Corinthian Late Geometric kotyle of the late 8th century showing birds, Athens, NM 14476 (Deutsches Archäologisches Institut).

The second half of the 8th century: Corinthian images

Corinth renounces the use of representational images almost entirely. Late Geometric and Early Protocorinthian pottery (thus pottery of second half of the 8th century) relies on a visual organization of vessels through a linear ring décor (Payne 1931, 3 and 7; Williams 1981) which is enriched by other non-representational motifs. The only representational elements are single animals, mainly birds (Fig. 12) that are often inserted in metopes or image fields interrupting the linear décor[39].

Horses that refer to an elite horizon and representations of polis life are almost lacking on Corinthian ware[40]. As on Argive images, birds – which are quite often identifiable as aquatic birds – flank an 'ornamental' motif consisting of piles of zigzags[41].

In the 7th century, only very few Corinthian vases refer to the human body. Instead, the main decorative elements are ornamentalized plants, animals and hybrid creatures (Payne 1931, 10; Payne 1933, 15-17). The most prominent decorative feature is represented by animal friezes including tamed, wild but also 'fantastic' animals (sphinxes, etc.). A statistical analysis of such friezes verifies that the placement of animals follows a cultural logic (Winkler-Horaček 2000, 222-234; Winkler-Horaček 2011, 118-121; Winkler-Horaček 2015). It is usually the strong, wild and dangerous animals that flank the weaker, less dangerous animals – sometimes attacking them. The hierarchy ranges from very dangerous animals (lions, panthers) to less dangerous (sphinxes) and finally to the least dangerous species (birds, goats, deer, sirens). This conceptualization is not centred around the human world but on wild nature, whereby fictive and concrete perceptible elements overlap. Nevertheless, the visual order that refers to the strength of different animals species represents a cultural (thus 'human') value.

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39 See, for example, Late Geometric: Athens, Benaki 26; Corinth, Inv. T 2713; Athens, NM 14476; Early Protocorinthian: Thera, Pfuhl K 67; Corinth, Inv. C 40.366.

40 For Geometric exceptions, see Devries (2003, 142–144); for a discussion of representational décor on Early Protocorinthian vases, see AMYX (1988, 365–366) and Coulié (2013, 111–112).

41 As for Argive pottery, their combination with birds has led to interpretations of 'water' (Anderson 1958–59, 139, again Coldstream 2008, 100): "[The pile of zigzags] seems to place them [the birds] in their natural habitat by an expanse of rippling water". The discussion need not be repeated here.

Conclusion

To conclude, early visual culture has been analysed with regard to the question how the (built or natural) 'surroundings' of the human actor are conceptualized. The comparison of the images from different regions – Athens, Argos, and Corinth – has revealed that each region developed its own representational mode[42]. While the human agent on Athenian ceramics is displayed in a large variety of different scenes connected to polis life, Argive pottery focuses on horses and human scenes related to horses, while Corinthian Geometric and Early Protocorinthian ware renounce the presentation of human figures. Its main décor is abstract, whereby in reference to the geometric pattern, simple figurative elements, such as birds, are inserted.

This comparison of image concepts leads to an important conclusion. In the late 8th and the early 7th centuries, all three cities are characterized by a similar degree of urbanization. In Corinth and in Argos, 'monumental' temples (for Apollo / Hera) are attested, whereas on the Athenian Acropolis a building for Athena is also to be assumed. The booming force of the early polis becomes especially visible in the founding of a large number of colonies in the Mediterranean. As a consequence and following the presented argumentation, similar degrees of urbanization can lead to totally different forms of visual imagination. While in Athens the focus lies on the conception of human action fields, Corinth is interested in birds.

At this point, one could assume that the visual cultures of the different poleis might have had different starting points, but that they increasingly focus on the lived and built space as polis formation processes continue. But this is not the case. In Athens, nature starts to intrude into scenes of civic life as early as the late 8th century. In the later 7th and the early 6th centuries, nature dominates the scene; animal friezes are preferred over human action scenes. In Argos, figural scenes are almost totally lacking in the 7th century, while in Corinth animal friezes dominate the spectrum. The traced iconographical changes have a very prominent consequence. Between the 8th and the 6th centuries, the main tendency in 'real life' leads to increasing human impact on nature. City space itself is increasingly architecturally structured, whereas outside the city 'wild' elements tend to disappear as more land is cultivated. This tendency does NOT correspond to the changes in iconography[43].

Does this mean that images are to be understood as inventions detached from social realities? Perhaps it is not by chance that Corinth – the polis with the most intense contacts to the outside and oriental world – is most interested in images of the 'wild' world. Lorenz Winkler-Horaček (2011; 2015) rightly interprets Corinthian animal friezes as the conquest and 'taming' of the unknown, strange world that confronted Greek colonists. As a consequence, the foreign, dangerous world is visually

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42 Coldstream (1983, 24) posits the plausible assumption that in the 8th century "the sudden divergence of local styles from a previously existing koine might reflect the growth and consolidation of autonomous city-states".

43 It is very fashionable to relate iconographic changes to changes in the lived environment (see, e.g., Hurwit 1991, 52). He asks if it is possible "that changes in the polis, especially the Athenian polis, had something to do with the minor eruption of landscape elements, rural genre scenes, and sympathetic palm trees […]." He then makes some suggestions how such relations between the real and the imagined world may be conceived.

transformed into representations of 'nature'. Natural elements become metaphors for a specific experience of the world.

With regard to the posed introductory question, the preceding considerations have shown that images cannot be reduced to a mere reflection of lived space[44]. Lefebvre's categories – perceived space, conceived space and lived space – are certainly interrelated. Nevertheless, it has become evident that the relation between perceived, conceived and lived space is not static but underlies changes.

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44 In contrast, Junker (2012, 4): *"Bilder herzustellen bedeutet in seiner elementarsten Form, eine Spiegelung der eigenen Lebensverhältnisse vorzunehmen. […]. Bei aller Abwandlung im Einzelnen geben die Bilder doch im Wesentlichen etwas wieder, was die Menschen der Zeit aus der Seherfahrung kannten […]".* I hope to have demonstrated that the relationship between the lived world [Lebenswelt] and the imagined world is by far more complex.

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The Cultural Significance of Plants

Wiebke Kirleis

Abstract

Plants are a formative constituent of human life. As such, plant use leaves imprints in landscapes and food identities. The establishment of cultural landscapes is directly linked with changes in plant use, the perception of plants and the natural environment. In different archaeological periods, humans have interacted with the environment in an enduring way, adding new socio-spatial elements to landscapes. This is particularly evident when early farmers open the woodlands to establish arable plots and gardens for crop growing. Furthermore, wild plant use also has to be considered when landscape change is discussed. Next to a "sustainable" gathering of plant resources in the wild, the use of wild plants is a further measure that implies accidental as well as intentional management strategies. Which socio-spatial landscape elements relate to the management of wild fruit plants in the Mesolithic, the Neolithic and the Bronze Age is discussed here for the three fruit trees hazel, apple and oak.

Introduction

Plants are the primary producers of biomass. Therefore, plant existence is, in general, the main precondition for life. Throughout human (pre-)history, the use and the consumption of plants constituted the basis for the sustenance of everyday life. Thus, plants are a formative constituent of human societies. They serve as food and fodder; they provide clothing and fuel. Plant use has left imprints, so-called cultural residues, in plants, in food and in landscapes. Each used plant has its own identity and ascriptions with a variety of connotations. Each plant food component requires specific growing conditions, treatment and protection. With respect to the emergence and further development of the cultural landscape, which has evolved since the transition to farming in the Neolithic, new socio-spatial elements have been added to the landscape in the form of small-scale plots for crop growing, large arable fields, gardens, groves, etc. These are the imprints of "Human Development in Landscapes" and at the same time represent constituents of the cultural landscape.

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Dynamics of plant use

Food security is an urgent societal matter and a factor that enables the achievement and maintenance of economic and social stability. As societies are highly dynamic and a basic constituent of humankind is the propensity to be inquisitive and adventurous, plant use, plant production and plant processing have undergone manifold transformations in prehistory in order to broaden food variety, improve food quality and maintain food security. These processes have been continually linked with ideological/ritual meaning and securing beliefs. Therefore, the component of the material culture, which is related to food acquisition processes, including plant gathering and crop cultivation, and the primary sources of past plant economies – the plant remains – come into the focus of archaeological and more so, archaeobotanical research (*e.g.* Bogaard 2004; Bogaard 2011; Jacomet *et al.* 1989; Jacomet 2014; Kreuz 2012; Kreuz *et al.* 2014; Kühn/Heitz-Weninger 2015; Out 2009; Stika/Heiss 2013).

Different parts of the plant economy and processes of plant cultivation are subject to transformations: e.g., the choices of crop plants, the modes of plant production, the energy input into plant processing, the importance of wild plant use and the way in which natural resources were exploited (*e.g.* Chevalier *et al.* 2014; Fuller *et al.* 2014). Ethnographic and archaeological case studies on agricultural technology show the relatedness of changes in plant use and technological innovations (*e.g.* van Gijn *et al.* 2014; Cappers *et al.* 2016; Ertug-Yaras 1997; Kerig 2007; Kirleis/Fischer 2014; Rösch *et al.* 2002). A conceptualization of human behaviour related to natural resources is provided by Thomas Knopf (2017). Supported by a profound database on archaeological and ethnographic information, in a qualitative way he tries to infer the general behavioural trends of human-environment interaction in past economies. He puts forth a description of highly diversified economic strategies that are interdependent with socio-cultural decision-making processes and ritual traditions.

Human land-use activities have recurrently changed the natural environment and over time they eventually formed a cultural landscape. In the process, land-use strategies were regularly adapted to changing natural environmental conditions and to recurrently modified social requirements. Decisions, which further transformations of land-use strategies and crop growing, underlie cultural influences from neighbours and are linked to cross-cultural developments, technological innovations, and challenging environmental conditions, such as soil degradation or climatic change. Such developments also affect farming societies in their choice of crop plants. These choices underlie regional, cultural and chronological differences, as revealed by archaeobotanical macro remain studies (*e.g.* Colledge/Connolly 2007; Connolly *et al.* 2008; Gyulai 2010; Jacomet 2006; Stika/Heiss 2013).

Intentional crop growing

The transformation of the plant economy towards intentional crop growing as a main economic component is part of the Neolithisation process and is closely linked to cultural developments and social differentiation (Colledge *et al.* 2005; Kirleis/Fischer 2014; Whitehouse/Kirleis 2014; Müller *et al.* 2013; Sørensen/Karg 2014). Within farming societies, transformations in food production are manifold and occur on different scales. They commence with individual to societal choices about which crop

plants are to be grown. These are, in turn, related to different modes of crop growing, including different techniques, such as the use of fire, (intentional) manuring, and the application of different soil preparation methods and weeding modes that, of course, differ between regions and are transformed over time.

Restrictions pertaining to cultivation can be due to natural environmental conditions, but preferences can also depend on socio-economic factors and cultural traditions. For the Neolithic, for example, it is not yet fully understood why only a reduced variety of crop plants reached Central, Northern and Western Europe (Bieniek 2007; Connolly *et al.* 2008; Kirleis *et al.* 2012; Kreuz *et al.* 2005; Kreuz *et al.* 2014; McClatchie *et al.* 2014). This observation cannot simply be a matter of climatic differences, but also of decision making by individuals or societies. Different priorities, which are set between crop cultivation and animal husbandry, have also influenced agricultural practices (Kreuz *et al.* 2005; Kreuz *et al.* 2014). Whereas the cultivation of free-threshing wheat (*Triticum turgidum/durum*) during the Early Neolithic in the Funnel Beaker North group obviously points to cultural contacts with the southwest, the disappearance of this cereal species during the Middle Neolithic can be discussed in connection with internal social requirements as well as climatic deterioration (Kirleis/Fischer 2014).

At the transition from the Late Neolithic to the Bronze Age and within the course of the Bronze Age, the introduction of new cereal species – the hulled wheat species spelt (*Triticum spelta*) and broomcorn millet (*Panicum miliaceum*) – begins in the northern alpine foreland (Akeret 2005). The late and stepwise introduction of these species in Central and Northern Europe, lasting until the Late Bronze Age, is a result of distant cultural contacts between widely separated European regions (Effenberger 2017; 2018; Hunt *et al.* 2008; Miller *et al.* 2016; Stika/Heiss 2013). The broadening of the crop spectrum is a kind of transformation process that was recently defined as a third food revolution, which is accompanied by cultural change (Kneisel *et al.* 2015).

Managing the wild?

Obviously, the deepest change in the prehistoric plant economy was related to the basic mode of plant acquisition. At what stage did people start with intentional plant management and plant cultivation? As the existence of domestic pigs is now proven for Late Mesolithic societies of Northern Europe (Krause-Kyora *et al.* 2013), the previously often neglected presence of domesticates in the Mesolithic (Behre 2007; Rowley-Convy 2013) should be revisited, here for the early occurrence of crops. Possible imports or the exemplary storage and planting of domesticated species without economic value, but possibly with prestige value, should also be taken into consideration (*e.g.* Jennbert 1988; Jennbert 1992).

An important part of the plant economy – beyond crops – is represented by wild plants. A wide spectrum of wild plant food dietary components is traceable with archaeobotanical methods (Colledge/Connolly 2014). For different time periods, regions and species, the management of wild plants has been discussed (*e.g.* Anatolín *et al.* 2016; Anatolín/Jacomet 2014; Klooß *et al.* 2016; Roehrs *et al.* 2013; Vanhanen/Pesonen 2016), showing that plant gathering fluctuates in its intensity and diversity through time. The reasons for these variations and the social relevance of wild plant

use in different archaeological contexts are under discussion (Kirleis/Klooß 2014; Kirleis *et al.* 2012). Individual as well as cultural preferences play a role in wild plant consumption. Moreover, wild food plants provide nutrients, vitamins and minerals in high concentrations (Kreuz 2012, 116-212) and wild plant use implies subsistence diversification as a strategy for risk-management (Jacomet/Schibler 2010, 116). From a socio-political point of view, wild plant use is interesting as it can be related to particular social statuses and social groups (*e.g.* Setalaphruk/Price 2007). In parts of the modern world, the use of wild plants is stigmatized as a symbol for poverty and backwardness (Cruz-García 2006). Thus, groups that partially build their economy on plant gathering, such as tribal groups like the Adavasi in India, are stigmatized for this reason (Cruz-García 2014), although plant gathering is a fully sustainable and effective subsistence strategy, particularly in forested regions with high biodiversity. On the other hand, recent developments in star-cooking revalue the use of wild plant gathering for the establishment of a new fashion putatively rooted in the evolutionary history of humankind.

Archaeobotanical investigations at Kiel have regularly examined wild plant use; be it in the frame of the SPP 1400 on Early Monumentality and Social Differentiation (Kirleis *et al.* 2012; Klooß *et al.* 2016; Roehrs *et al.* 2013) or within the frame of dissertations at the Graduate School Human Development in Landscapes (Effenberger 2018; Klooß 2016). In the following, the three fruit trees hazel, wild apple and oak and the impact of their utilization in relation to the landscape are discussed.

*Mesolithic wild plant use: hazel (*Corylus *sp.)*

From an economic point of view, hazel is an important species with high yields of a) hazel rods and b) of hazel nuts with high nutritional value (> 60 % fat, 16 % protein which correlates with 610 kcal per 100 g according to FAO food composition tables; see: [http://www.fao.org/docrep/x5557e/x5557e07.htm#]). Regarding timber production, yields are increased through coppicing. This has led to the establishment of hazel groves as a new landscape element (Fig. 1-2).

Experimental coppicing of 3-5 year old hazel shrubs in Bradfield Woods, Suffolk, yielded 10-36 rods for a single shrub. From a shrub that grew on a Schleswig-Holstein hedge bank coppiced on a rotation cycle of six years, the growth of even 107 rods of an average length of three meters is reported (Weisheit 1990; von Stamm 1992, cited after Klooß 2015, 332). With this data in mind, when did coppicing become an intentionally conducted subsistence strategy? As Ulrich Willerding (1996, 27) states: "The new shoots that develop after wood extraction must have nearly forced the utilization concept of a coppice on humans at a very early time"[1]. Indeed, the availability of hazel is given from the Mesolithic onwards, when hazel was an important component of the mixed oak forests. Its Holocene migration from the glacial refugia to Central Europe and further north already took place during the Boreal, when it dominated the deciduous woodlands, and also continued during the Atlantic period when it reached is northernmost distribution (Lang 1994, 155-58). In particular, Mesolithic fisher-hunter-gatherer communities living at the coastal border of the Southwestern Baltic needed

1 German text: *"Die nach der Holzentnahme erneut austreibenden Stöcke dürften dem Menschen das Nutzungskonzept Niederwald schon sehr früh förmlich aufgedrängt haben".*

Figure 1: Hazel with young shoots, Jomfruland, Norway 2012 (photo: W. Kirleis, UFG, Kiel).

Figure 2: Hazel grove, Jomfruland, Norway 2012 (photo: W. Kirleis, UFG, Kiel).

hazel rods to build fish fences. Calculations by Stefanie Klooß (2015, 331) show that about 200 hazel rods of straight shape are needed to build a fish fence with a height of 1.7 m per 10 m length. Thus, for a fish fence of 100 m length, 2000 rods constitute the main fish fence resource. If a medium amount of 10 rods grown naturally per shrub are considered sufficient to build such a fish fence, rods of 200 hazel shrubs would have to be cut. Thus, Klooß (2015, 331) concludes that this estimate seems to adequately account for Mesolithic woodland management and coppicing. With respect to woodland composition, a natural patchiness of species distribution has to be considered for the Atlantic mixed oak forests. Areas with a natural agglomeration of hazel shrubs would be the preferred areas for fisher-hunter-gatherers to cut the rods. Re-visited on a regular basis, these natural hazel plots were transformed into early managed shrubberies.

*Neolithic wild plant use: wild apple/crab apple (*Malus sylvestris*)*

The fact that there are numerous apple findings recorded for Neolithic times leads to the hypothesis that 1) crab apple trees, in particular, have occurred in the surroundings of Neolithic settlements and 2) that they must have been protected against damage caused by game and domestic animals that were grazing and browsing in the vicinities (Fig. 3).

The endemic European *Malus sylvestris* ("wild apple" or "crab apple") was a rare inhabitant of ancient, pre-agricultural, temperate forests in Europe, the Caucasus Mountains and Iran (Juniper/Mabberly 2006). Atlantic woodlands in Central Europe have mainly consisted of deciduous tree species that were spread in mosaic-like patterns with small-scale openings due to a mixed age structure (Kreuz 2008). The deciduous broadleaf tree *Malus sylvestris* is listed as an animal-dispersed and insect pollinated species with a pan-European distribution (Lang 1994, 355). Ecological indicator values describe *M. sylvestris* as a light-demanding to half-shade species that has a low ability to produce shadow in a population (Ellenberg 1996). As such, its dispersal is scattered across floodplain woods, hedges and thickets. These are the favourite stands for apple trees. But due to human-induced woodland opening and the establishment of hedges (Kreuz 1992), the number of possible stands for crab apple increased in Neolithic times.

From pollen and macro-remain analyses, Ulrich Willerding (1986) states that: "[…] the accumulated appearance of wild fruit remains always has to be considered as an indicator for the existence of large cleared areas because heavy fruit production in particular of wild fruit trees is dependent on relatively bright habitats like wood edges, thickets, hedges, areas alongside tracks, […]"[2]. However, as Helmut Kroll (2007, 323) states: "Why is there so little fruit in the Iron Age and subsequently in the Early Middle Ages; […] 'Normal' pomatius fruit, apple for instance, is missing for long time periods"[3]. A compilation of analyses, which provide information about remains of *Malus* sp. in different archaeological periods from three databases (Schultze-Motel; Kroll; Kroll online database *archaeobotany.de*), indeed shows a decrease of evidence for apple remains in the Pre-Roman Iron Age (Fig. 4).

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2 German text: *"[das gehäufte Auftreten von Wildobstbelegen muß stets als Indikator für das Vorhandensein größerer bereits stark aufgelichteter Flächen angesehen werden, weil insbesondere Wildobstarten nur an relativ hellen Standorten reichlich fruchten (Waldränder, Gebüschgruppen, Hecken, entlang von Wegen…)]".*

3 German text: *"Warum gibt es in der EZ, und in der Folge, im frühen MA, so wenig Obst; […] Das "normale" Kernobst, der Apfel als Beispiel, fehlt über weite Zeitstrecken".*

The results of the compiled publications are not necessarily representative for apple use, but may be biased as not all archaeological periods were uniformly investigated. Nevertheless, they show a tendency within the dynamics of past apple consumption. For Neolithic times, 90 out of 417 investigations deal with apple findings. For the Bronze Age, the number of papers decreases to 26. This tendency also continues for

*Figure 3: Charred half of a wild apple (*Malus sylvestris*) from the Neolithic site of Oldenburg LA 77, northern Germany ca. 3100 BCE (photo: A. Jagiolla, UFG, Kiel).*

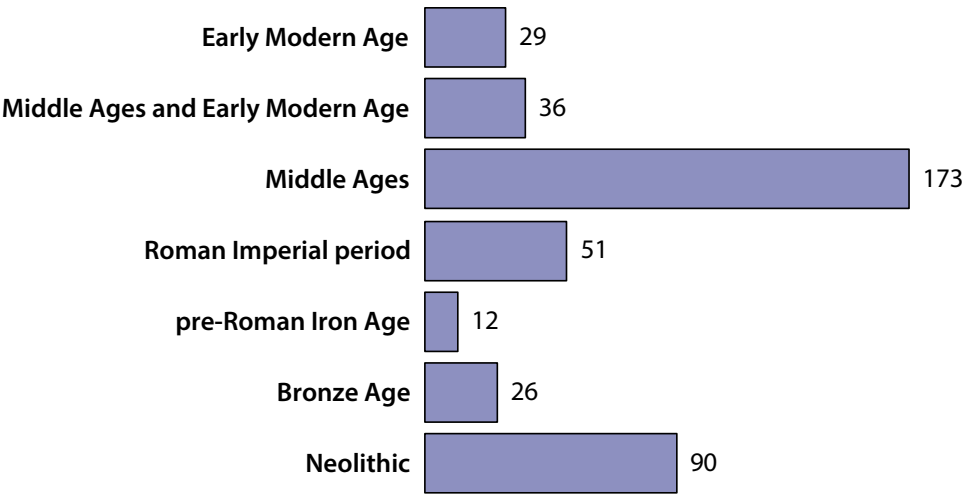

Figure 4: Diachronic view of apple finds. Number of papers providing evidence for apple finds. Compilation based on 417 papers from the databases "Literature on archaeological remains of cultivated plants" published by Schultze-Motel in "Die Kulturpflanze" and published by Kroll in "Vegetation History and Archaeobotany", supplemented by entries from the Kroll online database "Literature on archaeological remains of cultivated plants 1981-2004" (archaeobotany.de).

the Pre-Roman Iron Age with only 12 papers. A turnaround takes place for the Roman Iron Age and the medieval period for which the number of analyses finally reaches 173. The latter reflects the introduction of *Malus domestica* in the Roman Iron Age. The cutback towards modern times may be due to the late discovery of this period for archaeological studies and just may show the deficient state of the art up to 2004 (latest entries in the Kroll online-data base).

To secure human consumption of wild apples in prehistory, it was necessary to hinder domestic and wild animals from browsing the sweet twigs and fruits. Although wild apple trees have sharp-pointed modified branches, they do not have thorns like blackthorn (*Prunus spinosa*) and, in contrast to other Pomoideae species, they usually do not produce root suckers that ensure the survival of the tree as a clone. All wild fruit trees are resistant to the browsing of large herbivores as they all form shoots from a stool and have new growth from roots, or display both – only wild apple does not seem to have these qualities (Vera 2002, 341-342). Thus, wild apple trees need protection. A careful management of apple trees has to be considered to have been conducted since Neolithic times, when apples were a much welcome dietary supplement. This is discussed, for example, for the northern Funnel Beaker group (Brozio *et al.* 2014). In addition to field systems for crop growing, apple groves and orchards were possibly established from Neolithic times onwards as a new landscape element that helped to secure the plant food supply against domestic livestock and wild ruminant browsing.

*Bronze Age wild plant use: oak (*Quercus *sp.)*

From the mid-Holocene onwards, oak is a wildly available resource in Central Europe that is well-known for its high quality of timber and thus regularly used for wood constructions throughout prehistory. However, the intensive use of oak fruits, the acorns, is restricted to particular archaeological periods. In the archaeobotanical records, acorns occur as already processed peeled fruits that fall apart into the two seed leafs each. This energy investment in processing activities accounts for the human consumption of acorns. Numerous studies are available for the use of acorns arising at the Neolithic-Bronze Age transition (*e.g.* Karg/Haas 1996; Mason/Nesbitt 2009; Primavera/Fiorentino 2013). However, evidence is rare for Mesolithic times. Thus, it is not clear why the introduction and later abandonment of this fruit are first verified for the Bronze Age, although the Mesolithic woodlands were already dominated by oak. Acorns of *Quercus robur/petrea* have a nutrition value that is comparable with cereals (70-80 % carbohydrates, about 5-8 % protein and 5-8 % fat) (Mason/Nesbitt 2009, table 9.3). However, a high amount of tannin agent accounts for a further specific processing strategy before consumption. Thus, acorns acquire a high input of energy to be transferred into human food and therefore may have served as fallback food in times of food shortages. Did people have to compensate during a food crisis at the transition to the Bronze Age? Were the acorns used as animal fodder, when animals were increasingly hosted indoors? Did cultural influences from Southern Europe trigger this transformation in plant use? These research questions are still a matter of debate in the field of archaeobotany. If compared to the aforementioned hazel and crab apple, the use of oak as a fruit tree tells a different story. For oak, the existence of managed groves to harvest acorns can be negated. While in Southern Europe, *Quercus virgiliana* is a species that in general produces sweet fruits, further to the north only single trees

are known to produce edible fruits – independent from species affiliation. In the latter case, knowledge transmission on how to discover the specific tree bearing the sweet acorns in the landscape is crucial for the successful harvest of the sweet acorns for human consumption (Pignone/Laghetti 2010). As children as a social group often are in charge of acorn gathering, knowledge transfer from adults to children is particularly important (personal communication, Helmut Kroll, Kiel). Harvesting the fruits from single trees randomly distributed in the woodlands is a strategy that most probably takes into account the slow growth of oak and the late onset of the age of reproduction, which makes this species less suitable for growing in orchards.

Conclusions

From the three examples given, we learn about the cultural significance of wild plants. Woodland management and gathering in the wild is an important measure to maintain food security in prehistory. Plant gathering usually is an effort incorporated in the natural environments according to seasonal cycles, hardly leaving anthropogenic imprints. Nevertheless, woodland management may have already occurred unintentionally at an early stage of human development in landscapes in Mesolithic times and can be traced by means of archaeobotany. The onset of the creation of the cultural landscape, however, clearly has to be related to Neolithisation. The first farmers shaped the landscape according to their needs. They opened the woodlands to build settlements, create gardens, establish arable fields and as discussed above, introduce orchards and groves. In this way, new specific socio-spatial elements were added to landscapes in association with societal transformation. It is highly probable that these physical changes of the environment have influenced the perception of landscapes, changing at this stage from interacting with nature in a sustainable way towards becoming an actor intentionally intervening and shaping the environment and thus, as a side effect, establishing new habitats for flora and fauna which have led to an – at least transitional – increase of biodiversity.

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III: Past Landscapes

Concepts, Space and History

Mid-Holocene Environment and Human Interaction in Northern Central Europe

Mara Weinelt

Abstract

Past environment and human interactions are the subject of current climate and archaeological research alike, aiming at a better understanding of how these domains have shaped themselves mutually, and more specifically, to disentangle to which extent external disturbances may have destabilized past societies and triggered or modulated major steps of human development. Climate change is attributed a highly influential role and abrupt climate change, in particular, is considered to be a threat to economies and thus a risk to social stability. Moreover, the potential impact of abrupt climate change on societal development depends not only on the intensity and predictability of a disturbance but also on how prone or vulnerable a societal system may be to the disturbance. In this way, abrupt climate and environmental change may also be a promoter of societal change in the sense that it requires adaptive strategies to cope with transitions, thus fostering innovation and the rapid spread of new strategies – in the case of ancient societies educible from their material record. This article reviews recent advances in deciphering the Holocene climate history to overcome a longstanding climate deterministic dilemma, aiming at a more realistic assessment of the potential role of climate in societal transformation. Examples are discussed, focusing on the socio-environmental changes, which took place in Northern Central Europe over the course of the mid-Holocene. A case study serves to disentangle climate change and possible responses of Early Neolithic societies in Northern Central Europe to abrupt climate change.

Introduction

While both climate and human development have always been subject to change, the Holocene has long been considered a period of fairly stable climates, thus not least boosting rapid human developments, like the spread of agriculture and the develop-

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ment of civilizations in particular. This view has been rectified with the recognition of Holocene climate variability in ever more precise archives and sensitive proxies. The current debate on global warming and its consequences for human communities has strongly stimulated research on the causes, dynamics, and regional manifestations of (preindustrial) Holocene climate change, and it increasingly focuses on the role of human activities and responses of human communities to past climate change. As a result, it has also initiated a longstanding interdisciplinary dilemma, where culture and climate determinism collide with each other according to partisan perspectives, thus hampering a more objective reconstruction of a detailed history of socio-environmental change, which pays adequate tribute to the role of both.

Over the past decade, our understanding of Holocene climate change has greatly improved, but also underpins the complexity of the system with interfering effects of climate variables and under increasing human influence. With the availability of ever more detailed high-resolution regional reconstructions and sensitive proxies, it became evident that the Holocene was also punctuated by a series of abrupt climate change events *sensu* Paul A. Mayewski *et al.* (2004). While it is neither possible, nor the scope of this paper to comprehensively summarize the results of Holocene climate reconstructions and model simulations in relation to the background of current climate debates, an array of syntheses have tackled these issues and have provided supra-regional reconstructions and modelled scenarios (Wanner *et al.* 2008; Wanner *et al.* 2011; Wanner *et al.* 2014; Jansen *et al.* 2007; Davis *et al.* 2003; Braconnot *et al.* 2011). Here, we focus on major Holocene episodes of climate deterioration, which should have been of high relevance for societies in Northern Central Europe.

In terms of its societal consequences, the most efficient (or most widely accepted) mid-Holocene climate change was a shift of the Intertropical Convergence Zone (ITCZ) controlling precipitation patterns in the subtropical and tropical realms and here strongly challenging the versatility of human economical strategies. This shift was caused by the redistribution of solar energy due to orbital forcing on a millennial timescale, and caused a progressive southward shift of the Northern Hemisphere (NH) summer position of the ITCZ. The diminished contrast in land-sea temperatures resulted in a decrease of monsoon intensity. In Northern Central Europe, the long-term redistribution of solar energy as driven by Milankovic forcing at mid- to high latitudes on a millennial timescale generally effected a continuous decrease of surface temperatures with a transition from warm and moist conditions towards colder and perhaps drier conditions (in a Nordic view this period is often labelled thermal optimum or maximum, and roughly corresponds to the Atlantic Period, which merged into the Subboreal sometime around 5000 cal BP, a period also referred to as neo-glaciation). A long-term cooling trend is well depicted in vegetation records of Southern Scandinavia and Northern Central Europe alike (Seppä *et al.* 2009; Davis *et al.* 2003), as well as in marine records from the temperate North Atlantic (Kim *et al.* 2004), and is simulated in climate models (Renssen *et al.* 2012). This transition, however, did not occur in different regions coevally, thus limiting the stratigraphic value of the formerly used terms.

The view of stable Holocene climates was first challenged by the cognition of pervasive disturbances marking Holocene climate archives in the northern North Atlantic realm, and at least in a northern hemisphere view, with Bond events probably constituting the most important ones (Bond *et al.* 1997; Bond *et al.* 2001). These publica-

tions provided evidence of pervasive disturbances through iceberg advances to lower latitudes, recorded in northwest Atlantic sediments quasi periodically, about every 1500 years. These are related to a weakened North Atlantic thermohaline circulation through the northern North Atlantic, resulting in prominent cooling events at high and mid-latitudes, which possibly had remote effects of hemispheric or global extent. Imprints of corresponding episodes of climate deteriorations are found in different climate archives across Europe, among them in Lake Ammer, Bavaria (Von Grafenstein *et al.* 1999) and in Maar sediments, Eifel (W-Germany) (Sirocko *et al.* 2013); yet these events are not distinctly reported in the Greenland ice records (*e.g.* Grootes *et al.* 1993).

The main controlling factors influencing abrupt mid-Holocene climate change are attributed to the North Atlantic temperature field, to insolation changes, volcanic eruptions and cryosphere changes, as well as to changes in land cover and in atmospheric greenhouse gasses, the latter arguably influenced by human induced CO_2 emissions from the mid-Holocene onwards (*e.g.* Wanner *et al.* 2011; Mayewski *et al.* 2004). Observations are supported, on the one hand, by marine and terrestrial climate archives and, on the other hand, by results from General Circulation Models (GCMs) and Earth System Models of Intermediate Complexity (EMICs) (*e.g.* Braconnot *et al.* 2007). Yet, the regional patterns and intensity, which are shaped by interferences with differential forcing, remain open for investigation, thus hindering proper linkages between climate events and major societal / cultural upheavals on regional scales. In the Holocene, episodes of natural climate change occur above the baseline of the long-term trend following the insolation, which is linked to large-scale reorganization of atmospheric circulation patterns, and natural variability can no longer be separated from ever increasing human activities on environments. Moreover, the latter have strongly biased terrestrial climate archives making it difficult to individually identify the contributions of either variable.

Extensive studies have revealed that single Bond events (BE) are structurally different and need to be individually explored with regard to their regional manifestations. Different intensities and durations of these events are suggested, for instance, by differential imprints in the Greenland ice oxygen isotope archives (*e.g.* Grootes *et al.* 1993). Due to their excellent continuous and well-dated time series, these records are a favourite archive of Holocene climate environment change to which all sorts of Northern hemisphere records are compared. In a global evaluation of high-quality climate records, Heinz Wanner *et al.* (2011) identified 8 to 10 multi-decadal to centennial scale cold relapses generally related to glacier advances and to tropical aridity, punctuating phases of fairly stable Holocene climates. Importantly, according to this study it is an inherent feature of Holocene climates that disturbances do not synchronously occur on a large-scale, nor are they cyclic, but rather tend to concentrate in certain frequency bands, namely centring around 8200, 6300, 4700, 2700, 1550 and 550 years BP. Centennial-scale Holocene climate events seem to be intimately linked to the dominance of mode changes of high frequency climate oscillations (NAO (North Atlantic Oscillation), AMO (Atlantic Multidecadal Oscillation), ENSO (El Niño Southern Oscillation)), leading to substantial change in seasonal temperature precipitation patterns, shifting storm tracks and thus impacting human environments and economies. Interestingly, only some of the 6 BEs are highly correlated to these global relapse episodes, and this is particularly less the case in the mid-Holocene.

These findings may have important implications for archaeological considerations seeking to evaluate the role of environmental change on past societal development: a) Even synchronous archaeological changes co-occurring in different cultural entities across different regional settings are not necessarily responses to the same external climate constraints; b) While predictability of recurrent disturbances over temporally distant events (>1000 yrs) are unlikely to have played a role in subsistence strategies, regionally differential expressions and altered gradients resulting from rapid changes in dominant modes must have been well perceptible for contemporary societies and thus enabled active responses. These patterns include, for instance, changes in dominant wind directions and/or storm tracks, altered seasonal patterns, and frequency of severe winters. It is thus conceivable that communities made use of the options to actively search less affected areas and/or fostered the testing of novel ideas paying tribute to altered conditions; c) In a practical sense, the need of regionally valid, representative climate reconstructions is underscored.

The case of the Little Ice Age – the latest of the Bond events (BE0) which well coincided with a widespread cold relapse phase (*sensu* Wanner *et al.* 2011) – in the range of historical sources has been extensively studied by palaeoclimatologists and historians alike. Far-reaching socio-environmental implications, including „cascading" and amplification effects culminating into a crisis of this comparatively subtle climate event (corresponding to an overall cooling of 0.6 °C; *e.g.* Crowley/Lowery 2000), are well documented for this event. Consisting of a series of regional climate deterioration events at the hemispheric scale, it particularly marked the high and mid-northern latitudes from about 1300 to about 1850 AD (with some alternative datings pending on regional evidence; *e.g.* Matthews/Briffa 2005). This disturbance brought particularly harsh and long winters to Europe and to North America with glacier and sea-ice advances consistent with patterns of a dominant negative NAO phase (Luterbacher *et al.* 1999). For Middle Age societies, it had severe consequences. Crop failure, economic decline, and famine are reported from across Europe and are well evidenced in written sources (*e.g.* Jordan 1996), including cereal price explosions and bread riots, the abandonment of settlements on Eastern Greenland, a general population loss at high latitudes (up to 50 % on Iceland) and in highland and mountain ranges, in particular (Österberg 1981). Not least, diseases may have played an important role in spreading and amplifying this supra-regional crisis into the New World, leading to fatal population shrinkages there (Nevle *et al.* 2011). Flexibility in economic processes with a diversified agriculture and the access to trade networks proved to provide key advantages, which strongly controlled the capability to counteract and mitigate unfavourable conditions, and to determine the regionally very differential consequences of this climate disturbance.

The Early Holocene BEs were still strongly controlled by remnant ice-sheets through meltwater discharges, destabilizing North Atlantic thermohaline circulation and heat transport into the high latitudes, resulting in strong temperature declines in Western Europe, in particular. In the case of the 8.2 ka event, its timing, the causes for it (Kleiven *et al.* 2008) and influences on a global scale are well explored (Morrill *et al.* 2013; Wanner *et al.* 2011). Accordingly, the 8.2 ka cooling event (corresponding to BE5) was triggered by a large meltwater pulse from the final collapse of the Laurentide ice sheet of Northeastern North America, most likely when the glacial lakes Ojibway

and Agassiz suddenly drained into the North Atlantic Ocean, which led to a weakening of North Atlantic thermohaline circulation (Kleiven *et al.* 2008) that lasted for about 150 years, whereas the shift occurred in less than 5 years (Fleitmann/Matter 2009). As a consequence of the decreased heat transport, cold and wet conditions marked the high northern latitudes of Northwestern Europe, whereas decreased precipitation accompanied by cooler conditions particularly mark the climate archives of Southeastern Europe (Morrill *et al.* 2013). Correspondingly, a 1 °C cooling marked vast areas of the northern hemisphere and a decrease in precipitation (-17 %) was found in parts of Southeastern Europe, whereas increased precipitation (+12 %) marked the Western European realm. Carrie Morrill *et al.* (2013) have further narrowed down the duration of this event, which is to have lasted for about 100-150 years.

An array of disruptive archaeological evidence and human responses in ancient societies have been related to this event, not only in Central Europe under the direct influence of North Atlantic climate disturbances, but also in the present warm temperate to subtropical area, i.e., from the Iberian Peninsula to Southeastern Europe and the eastern Mediterranean region (*e.g.* Weninger *et al.* 2006). Changes in Near East sites under drought and into China are also associated with the 8.2 ka event. In contrast, pollen data from Tenaghi Philippon, NE Greece show evidence for a massive, climate induced turnover in terrestrial ecosystems of the Aegean region associated with the 8.2 ka event. The reconstructed winter temperature corresponds to a dramatic cooling of >4 °C (Schemmel *et al.* 2017).

A key hypothesis in this context is that the changes in climate and environment caused people to move westwards into Western Anatolia and the Eastern Mediterranean – and eventually across Europe. Knock-on effects of this socio-environmental disturbance have been traced well into Southeastern Europe following routes from western Asia into the eastern Mediterranean region and across Greece and the Balkans, not at least fostering the spread of agriculture (*e.g.* Weninger *et al.* 2006).

BE4 is less well-known, punctuating Early Holocene climates around 5900 years BP (Bond *et al.* 2001), heralding the end of the African humid period, and in Northern Central Europe roughly marking the end of the regional climate optimum. Here, it paralleled fundamental transformations of societies in the process of adopting Neolithic practices. A related archaeobotanical event appears to be a longer lasting double event that is well-known from the alpine record (Piora and Rotmoos oscillations, Patzelt 1977). However, in the Greenland record and in a global context according to Wanner's compilation, this BE appears to be spurious and distinctly postdates a cold relapse phase between 6400 and 6200 BP. Northern Central European records for that time show rather indifferent temperature levels or even moderate warming, under however mostly drier conditions (Wanner *et al.* 2011). BE4 coincides with the 5.9 ka event, an intense subtropical aridification event here considered to have triggered broad migration. In a recent study, Clarke *et al.* (2016) systematically compared societal transformation and environmental evidence in Near East and Eastern Mediterranean areas. They corroborated rapid and high amplitude climate changes acuminating towards the end of the 4th millennium with a culmination between 3600-3700 BP. They found nuanced human-climate interactions strongly pending on context-specific resilience and adaptation strategies. Changes in Neolithic land-use practices on the Iberian Peninsula in the western Mediterranean region have been tentatively linked to abrupt

climate change related to BE4 (*e.g.* Pereira/Carvahlo 2015). Based on stable isotope and zooarchaeological evidence, the authors report an economic shift from sheep and goat itinerant pastoralism to wild food source subsistence coinciding with the onset of megalithism in Portugal around 5900 BC.

BE4 is, however, one of the BEs only weakly related to a northern hemispheric cold relapse phase between 6200 and 6400 BP (Wanner *et al.* 2011), predating the North Atlantic BE by about three centennials, in turn a time of minor climate change manifestation in Northern Europe. Regional climate reconstructions, superimposed to the thermal optimum as generally most distinct for the northern latitudes (Davis *et al.* 2003; Renssen *et al.* 2012; Wanner *et al.* 2014) during that early interval, show minor temperature declines and even some warming along with drier conditions.

Including the 8.2 ka event, two major BE climate events have been recently suggested as chrono-stratigraphic markers to subdivide the Holocene: the 8.2 ka event marking the Early-to-mid-Holocene transition (Walker *et al.* 2012), and the 4.2 ka event marking the Mid-to-Late Holocene transition. This stratigraphic subdivision indicates global consequences and manifestations of these events. Both events mark transitions between different climate states and are at the same time related to major societal upheavals, including collapses of ancient civilizations and human responses across a variety of cultures, which have been interpreted in terms of direct responses to abrupt climate change (as to be distinguished from "cascading" effects) and underpin wide-spread, supra-regional effects of these disturbances.

Generally, the younger BEs – in light of the wide absence of ice-sheets from the mid-Holocene onwards and under differential forcing – are considered to have been less intense. In consequence of the mid-Holocene reorganization of atmospheric circulation, wide areas previously under the influence of intense monsoons became significantly drier. The 4.2 ka event, probably with regard to its archaeological consequences the best explored climate event, roughly occurred towards the end of this long-term transition with an estimated precipitation decrease in Mesopotamia of up to 30-50 % (*e.g.* Weiss 2014). This sharp transient aridification event lasted ca. 200-300 years. Given the large and well-documented changes and robust chronological framework, wide consensus exists on its severe consequences for food security of densely populated urban centres in Mesopotamia and in the eastern Mediterranean area (Finné *et al.* 2011). An array of collapses is attributed to a combination of aridity with a series of monsoon failures linked to the 4.2 event, which appears to be the most severe Holocene climate event with regard to social upheaval.

In contrast, contemporaneous implications for mid- and high latitude climates in the North Atlantic area coinciding with BE3, and its possible implications for communities there, are still less well documented. Based on a compilation of Central Mediterranean climate records from different archives in the Central Mediterranean, Michel Magny *et al.* (2013) have postulated a climate divide situated roughly at 45° N, separating arid conditions to the south from more humid conditions to the north. The extension of this pattern into the Western Mediterranean has been recently shown by Mara Weinelt *et al.* (2015), thus supporting a large-scale atmospheric pattern change.

High-resolution reconstructions based on testate amoebae provide no compelling evidence for a 4.2 ka event signal in Great Britain and Ireland (Roland *et al.* 2014). Despite intense data mining in diverse Central European archives, a conference dedi-

cated to this event in Halle/Saale in 2014 collected only weak evidence for the occurrence of such an environmental event in the temperate climate realm. Vegetation reconstructions suggest more subtle climate changes here (Dörfler *et al.* 2012). Arguably, an indeed striking accumulation of cultural change across Central Europe (Kneisel *et al.* 2012), which mark the onset of the Early Bronze Age (EBA), falls into this interval and may be related to secondary stress factors, namely to human induced "pressure" generated through the climate induced changes in the subtropical domain rather than to a climate deterioration in Northern Central Europe.

Progress in linking environmental and archaeological archives

The short duration implied by well-dated BEs underlines the high requirements that environmental and societal archives have to meet in terms of temporal resolution and the position and frequency of absolute tie points in order to fully record and assess their regional manifestations and to detect sequential causalities. In fact, temporal resolution of archives only rarely allows a true distinction between causes and effects of abrupt climate change and societal upheaval. Nevertheless, the increasing availability of more precise chronologies and time series in both environmental and archaeological domains increasingly enables us to properly compare sequences of change across differential archives on sound timescales. They enable more objective approaches to formulate questions about how former societies may have responded to abrupt climate change, and how abrupt climate change may have contributed in shaping transformation over the course of the Holocene, thus helping to overcome the dilemma of climate or culture determinism. Against the background of the contemporary climate debate, it is tempting to view climate as the primary driver of past cultural change. Such assumptions need to be critically assessed.

Weninger *et al.* (2009) have addressed the issue of ^{14}C chronology accuracy with regard to the 4.2 ka event, here hindered by a ^{14}C plateau resulting in a condensed record and thus pretending concurrence of temporally more distant events. In particular, Reinhard Jung and Weninger (2015) explored the evidence for a potential occupational gap related to the 4.2 ka event in the Eastern Mediterranean. They found indicative evidence for an occupational gap in the case of the well dated archaeological Troy sequence around 2160 cal BC and thus synchronous with the climate event within dating accuracy. Yet they stress a general need for more well dated EBA sequences in the eastern Mediterranean and the Aegean. In Northwestern Europe, a prime example of potentially climate induced societal collapse is that of the end of the Northwestern European Bronze Age. By analysing this transition in Ireland with Bayesian methods based on archaeological ^{14}C data, Ian Armit *et al.* (2014) could rule out abrupt climate change as a trigger for the societal collapse. They could demonstrate that a dramatic population collapse preceded climate deterioration as deduced from a high-precision proxy climate time series, providing evidence for a rapid climatic transition only at ca. 750 calibrated years BC. Their results demonstrate the nondeterministic nature of human responses to past climate change and require alternative explanations for abrupt population decline. They argue that the adoption of iron technology may have rendered the long-established networks of Late Bronze Age societies superfluous, resulting in social destabilization, which may well have been the cause of the population collapse

at the end of the Bronze Age. High-precision chronologies thus help debunk spurious and thus misleading correlations between unrelated events.

Over the past decade, quantitative archaeological reconstructions of palaeo-societal activities and related processes in differential domains (economic, ritual, settlement, social differentiation) have also become increasingly available to empirically test causal linkages between changes in environmental and archaeological archives through proxy time series (*e.g.* Gronenborn *et al.* 2013; Hinz/Müller 2014; Hinz *et al.* 2012). Material culture provides rich archives of societal variables and powerful tools to gain insight into past responses of early societies to environmental external disturbance (Hofmann/Brandstätter 2016). Although caution is indicated because of potentially differential meanings of material culture across different cultural entities and over the course of time, and bias through regional research traditions is unavoidable (Furholt 2016), such approaches bear a unique chance to disentangle and to trace socio-environmental variables on a broader supra-regional scale and across different cultural entities. A major challenge here is to identify and quantitatively calibrate proxies to pertinent archaeo-sociological variables, which then enable us to trace the effects and spread of socio-environmental changes. Regional inter-comparison and supra-regional reconstructions enable a wider view on socio-environmental dynamics, the spread of potential cascade effects of external disturbances as well as potential remote effects.

Based on a structural comparison of major socio-environmental breaks punctuating the Holocene course, Malcolm H. Wiener (2014) has pointed out that there are many examples, where climate events have caused social problems as well as contrasting samples, where climate deterioration was even related to social boom. Novel research approaches in climate-archaeological studies on socio-environmental dynamics go beyond mere documentation of coincident changes in either domain and enable us to test more sophisticated hypotheses. Questions are posed that explicitly address issues of coping strategies as a possible impetus for social change. Strategies that buffer agricultural risk by fallback economies are considered to be a potential response to environmental instability. Wiener (2014) stresses the importance of the resilience of societies to handle problems related to abrupt climate change. Detlef Gronenborn *et al.* (2013) have tackled the question of recurrent cycles as an inherent feature of climate and societal change with periods of increased vulnerability and trends towards increasing social complexity. Customizing concepts of resilience theory for ancient scenarios, they could show that simple farming societies of the LBK (5600-4900 cal BC) in Western Central Europe were not immediately and devastatingly affected by most climate fluctuations.

Sharp cultural transitions are often linked to major demographic changes and changes of population density. These may result from enhanced mobility and population displacements, eventually cascading effects spreading responses to environmental change, as well as from changes in absolute population size. Not only epidemics and plagues but also warfare, variables only sporadically demonstrated in the prehistorical record, may have caused rapid population decline, acting as potential catalysers of socio-environmental change. A well-explored example of population change is the Irish Bronze Age to Iron Age transition around 2500 years ago, roughly coinciding with a population decline (*e.g.* Armit *et al.*, 2014). Around 3600 BP during the transition from the Middle to the Late Bronze Age, vast areas in Central and Southeastern Europe became temporarily depopulated (Kneisel *et al.* 2012): an occupational gap also marks

mid-Bronze Age settlement patterns on the Baldur Plain in Anatolia (Vandam *et al.* 2013). The role of plagues and epidemics, which shape demographic changes, has been addressed by various studies (*e.g.* O'Fallon/Fehren-Schmitz 2011).

Taking a pan-European perspective and based on lacking coherency between demographic and climate records, Stephen Shennan *et al.* (2013) excluded a linkage of climate with the Neolithic population decline subsequent to the initial agricultural boost of these records with population reconstructions across Northern, Central and Western Europe. Interestingly, their compilation shows the widespread coincidence of a boost and decline sequence across Central and Western Europe and thus emphasizes demographic responses to a common forcing.

The role of hydroclimatic variations on economies, which controls the patterns of precipitation on agriculture in water-limited regions, appears plausible, and aridification events related to precipitation decreases have often been cited to have provoked or at least strongly exacerbated the risk of collapses. The coincidence of drought with major societal upheavals, evident in the archaeological record, has been widely accepted to explain collapse and decline. Published sources provide multiple examples of societal collapses that occurred during the last 6000 years, on local and regional scales, synchronous with abrupt shifts to drier and/or colder climate regimes (McGhee 1981; Weiss *et al.* 1993; Hodell *et al.* 1995; Dalfes *et al.* 1996; Weiss/Bradley 2001; deMenocal 2001).

The formulation of climate hypotheses with socio-environmental implications appears to be generally less straightforward for the temperate regions of Europe and Eurasia, where climate change is expected to have been more subtle, and economies are rarely water-limited. Here, cascading effects of abrupt climate deterioration, which may be of relevance for economies of the Neolithic and later societies in Northern Central Europe, include the shortening of vegetation and culture periods under differential climate regimes, the occurrence of severe winters, altered storm tracks, the increase of strong precipitation events, enhanced soil erosion and degradation, as well as the vulnerability of crops towards diseases. Bad year hypotheses have focused on explaining environmentally induced economic decline by unpredictable climate deterioration and related environmental stress and unexpected resource fluctuations (Winterhalder 1990).

The case of Funnel Beaker climates

The emergence of the Funnel Beaker Culture (FBC) in Northern Central Europe and Southern Scandinavia around 4000 BC / 6000 BP marks a major step of social differentiation of communities in Central Northern Europe and is linked to profound economic and ideological change (*e.g.* Furholt/Müller 2011; Müller *et al.* 2012), namely the introduction of agriculture. Falling towards the end of the Holocene thermal maximum and roughly coinciding with a North Atlantic Bond Event (BE4), this important transformation is a good example to explore the potential role of abrupt climate change for that transition. The FBC North Group initiated agrarian food production in Southern Scandinavia and on the North German Plain. A particularly outstanding legacy of the later TBC phase are ca. 30,000 megalithic monuments erected between 3200 BC and 2900 BC, witnessing profound ideolog-

ical transformation and increasing social differentiation of mid-Holocene societies (Furholt/Müller 2011). These important transformations roughly coincided with the culmination of the BE4 at 5900 BP (Bond *et al.* 2001). Regional climate reconstructions remained rather arbitrary during the earlier interval, showing minor temperature declines and even some warming along with drier conditions (Wanner *et al.* 2014). Detailed multi-proxy reconstructions of climate and environmental change related to the Funnel Beaker Societies were therefore established within the Priority Programme "Early Monumentality and Social Differentiation" (SPP 1400) in addition to detailed and extensive archaeological reconstructions.

They provide new socio-environmental insights into a time when agriculture was first adopted and rapidly gained momentum in the Northern Central European regions. In addition to core archaeological questions of ideological changes and the role of social differentiation, questions were addressed about the nature, timing and intensity of regional climate changes and how these may have affected and shaped neolithisation processes, including the adoption of Neolithic economies and subsistence strategies, demographic changes, and potential feedbacks among these variables. Combining evidence from climate reconstructions, which include ultra high-resolution records from varved lacustrine sequences, vegetation records from the vicinity of FBC sites with both interfering imprints of natural climate variability and human activities, and more regional climate archives, including marine records reflecting large scale shifts in atmospheric circulation, provides a robust and more comprehensive picture of rapid climate change and its environmental implications acuminating around 6200 to 5900 BP in that region. Against this background, Funnel Beaker activities can be elucidated in terms of potential responses to abrupt climate and environmental change.

Climate and environmental constraints

Regional environmental and climate records from Northern Germany (Fig. 1), established within the Priority Programme from lacustrine and marine archives, are summarized in figure 2.1-2.6.

Lake Belau and Lake Poggensee, both located in the core area of FBC North Group occupation (Fig. 1), provide excellent palynological archives revealing a detailed regional vegetation history, reflecting environmental changes and highlighting the varying intensity of human activities (Fig. 2.5-2.6) (Dörfler *et al.* 2012). Their robust chronologies, in particular for the exceptionally well-laminated sediments of Lake Belau, combining varve, ^{14}C and tephra chronologies, and further supported by ^{137}Cs measurements (Zahrer 2012; Zahrer *et al.* 2013), have enabled multi-proxy comparison, including climate and environmental variables, as well as providing a solid target for interlinking terrestrial and marine archives.

The synchronicity of regional climate and vegetation changes (Feeser/Dörfler 2015; Feeser *et al.* 2012; Feeser *et al.* 2016; Dörfler *et al.* 2012; Butruille *et al.* 2016; Rohde Krossa *et al.* 2015), as jointly evidenced across various palynological archives (Lake Belau, Lake Poggensee, and Lake Woserin, Fig. 1), suggests that on a regional scale the fluctuations may at least partially be explained as responses to natural climate change. Successive land opening at Lake Belau is indicated by a rapid decline of arboreal pollen from 6000 BP onwards. Micro-facies analyses of sediments from Lake Belau calibrated

with limnological and meteorological data have proved to be a powerful tool to trace past regional climate change beyond the reach of the instrumental record at annual resolution (Zahrer *et al.* 2013; Zahrer 2012). Micro-facies reconstructions and changes in diatom assemblage composition from Lake Belau and Lake Poggen (Dreibrodt *et al.* 2012) have evidenced alternating sequences of cold summers with repeated frost incursions and sequences of warm summers (Fig. 2.3). Winter conditions are additionally traced through detrital input. Accordingly, the FBC appears to have developed under

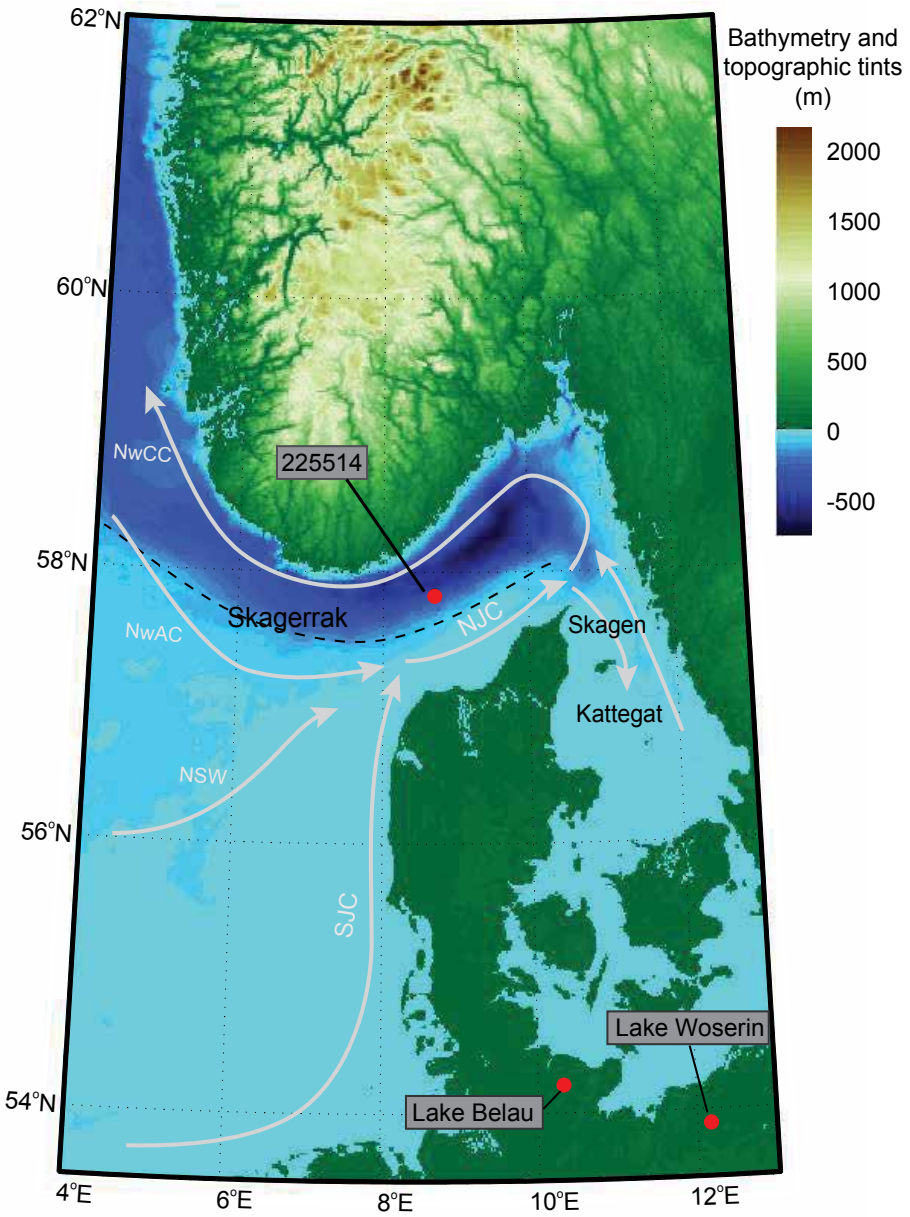

Figure 1: Regional environmental and climate records from Northern Germany.

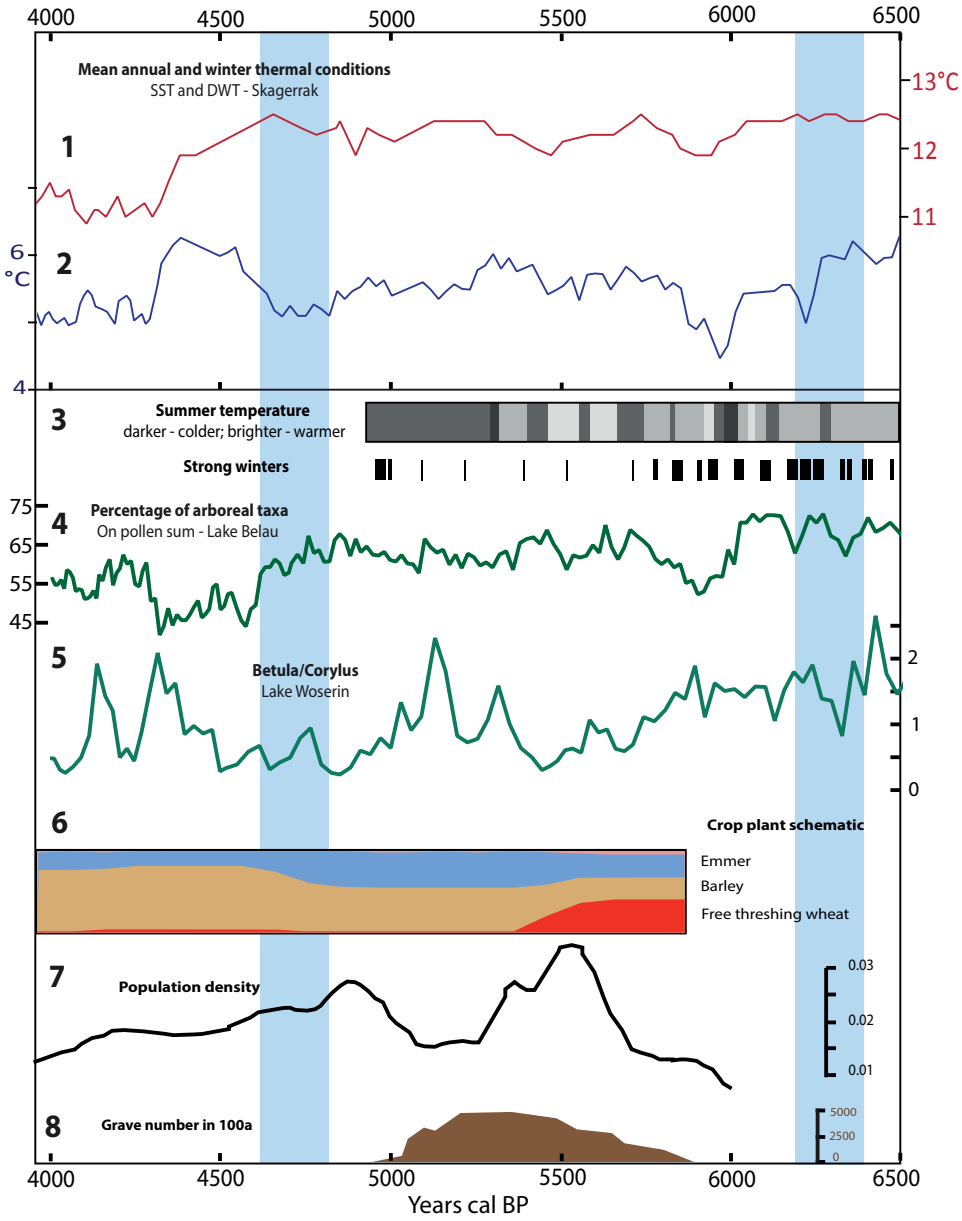

Figure 2: Comparison of time series from marine and terrestrial climate archives, vegetation and subsistence changes, and archaeological records from the core area of Funnel Beaker North Group in Northern Germany and Southern Scandinavia spanning the mid-Holocene (compare map in Fig. 1). 1: Sea surface temperature reconstruction from the Skagerrak core IOW225514 using Uk´37 proxy (after Rhode Krossa 2014); 2: The Mg/Ca record of core IOW225514 (after Butruille et al. 2016); 3: A varve based assessment of winter and summer conditions from Lake Belau (after Dreibrodt et al. 2012); 4: Arboreal pollen record from Lake Belau (Dörfler et al. 2012); 5: Betula record from Lake Woserin (Feeser et al. 2016); 6: Compilation of main cereals cultivated by Funnel Beaker North Group (Kirleis/Fischer 2014); 7: Population density based on sum calibrated ^{14}C data (from Hinz et al. 2012); 8: Megaliths (Furholt/Müller 2011). The blue bars mark major cold events described in Wanner et al., 2011 as based on a variety of high-resolution climate records and on a global scale.

fairly favourable climate conditions with warm summers and less severe winters, a phase ending only around 5275 cal BP with a cooling of summer temperatures, in particular. In addition, a series of cold winters are reported for that time (centring at about 6000, 5830, 5750, 5620 BP), as suggested by the occurrence of detrital layers in the lake sediments, which indicate prolonged frost periods and subsequent diatom blooms in response to phosphate retained in the lake. The cooling of warm season temperatures is well consistent with biomarker (Uk´37) reconstructions of sea surface temperatures in the Skagerrak, displaying a coeval (within dating accuracy) major cooling step around 5200 years BP (Fig. 2.2). Yet, no major cooling episode related to BE4 is indicated in this record. Marine records from the adjacent Skagerrak Basin contribute a new piece of evidence elucidating the potential role of seasonal variability as a considered highly relevant factor influencing agrarian economies. These have been recently amended by palaeoceanographic reconstructions from the deep Skagerrak. Temperature reconstructions at mid- to high latitudes are generally strongly biased towards warm seasons, since the underlying biotic proxy carriers mainly grow during the summer. Consequently, cold seasons are strongly underrepresented and so far rarely considered. Using stable isotope and trace metal concentrations of benthic foraminifera, Butruille *et al.* (2016) found recurrent periods of enhanced deepwater renewal linked to cold deepwater temperatures that occurred in relation to North Atlantic BEs (Fig. 2.1). They argued that Skagerrak deep-water records preserve a surface signal produced during severe winters, when surface waters cool and increase density to the point of cascading into the deep basin. Intermediate waters at shallower depth, in contrast, well match the summer surface temperatures. This signal is well constrained in the instrumental record of the last 50 years with deep-water temperatures closely matching the density driven renewal. With regard to the FBC period, such a phase of severe winters is generally reported for an interval from about 6400 BP onwards, lasting to about 5800 BP, and is marked by high instability with coldest temperatures occurring at about 6300 BP and 5800 BP. Thus, this phase of climate deterioration predates the onset of BE4 as well as overlapping it. Based on these results, a more dominant NAO-mode may also be postulated for the mid-Holocene phases with severe winters, which may have led to the dominance of atmospheric patterns with relatively weak westerlies pushing Siberian cold air into Central and Northern Central Europe, and also resulting in relatively lower precipitation.

Considerable effort has been made to directly link the observations from regional marine and lacustrine archives on harmonized time scales, and thus to more precisely delimit the regional patterns of climate reconstructions from different archives. Unfortunately, the identification of tephra layers in the marine sediments, originating from well dated Icelandic eruptions with plumes eventually passing the Skagerrak (and well established in various Northwestern European, Scandinavian and Northern German peat and lake archives), which would have allowed us to unambiguously tie marine and terrestrial archives, failed to provide robust identification of single Icelandic eruptions in the marine sediment cores (Butruille 2015). Yet wiggle matching of XRF profiles of two marine sediment cores and a high number of radiocarbon data enabled robust age models for the Skagerrak cores still hampered by uncertain reservoir ages, which may yield higher ^{14}C ages as compared to terrestrial archives (Butruille 2015).

The changes in marine and terrestrial sedimentology as well as vegetation archives within dating accuracy appear to have occurred synchronously. They support robust evidence for a major double-phased climate disturbance within current dating accuracy lasting from about 6300 BP to about 5900 BP (Feeser *et al.* 2016; Butruille *et al.* 2016). In detail, two particular phases of severe winters are revealed in the deep Skagerrak record at 6300 BP and 5900 BP, respectively, as well as in the sedimentological and pollen records of Lake Belau.

Socio-environmental changes

Figure 2.6-2.8 summarizes major results of archaeological studies in this context. The comparison of environmental and societal variables reveals a succession of profound changes in both the environmental and societal domains concentrating between 6500 and 5000 BP. Initial climate deterioration around 6.3 ka BP is well evidenced by various proxies in both lacustrine (2.3) and marine deepwater climate archives (2.2), however, lacking evidence in the sea surface temperature record from Skagerrak (2.1). Thus, this event well precedes the earliest regional evidences of the FBC on the Northern German Plain and in Southern Scandinavia. According to revised periodization chronologies, the FBC substituted the Ertebølle Culture in the region at ca. 6000 BP (Müller *et al.* 2012). Successive land opening and enhanced human agricultural activities at Lake Belau are indicated by a rapid decline of arboreal pollen from 6000 years BP onwards, whereby first evidence of cereal cultivation date to 6000 BP (Kirleis/Fischer 2014) and a first step of still inert demographic growth in the region also started briefly after 6000 BP (Fig. 2.7). A second and perhaps stronger climate deterioration of almost 300-year duration, this time beyond severe winter conditions, is also marked by cooler summer conditions (Fig. 2.1 and 2.3). The Skagerrak SST record, showing a 1 °C cooling as supported by a sequence of about 40 consecutive cool summers with eventual frost incursions in the lacustrine record, occurred at 5950 BP. This episode (Fig. 2.3) well coincides with the climax of the North Atlantic BE4, and slightly postdates the first archaeological changes related to the onset of the FBC by about 50 years. In contrast, mild and thus presumably economically more favourable conditions appear to have accompanied the later FBC developments. Subsequently, after a halt lasting until 5700 BP population density underwent large changes boosting until 5600 BP and thereafter a stepwise decline with minimum levels lasting from 5300 to 5100 BP. The construction of monuments first evolved inertly and then gradually increased until 5500 BP reaching maximum numbers of nearly 2000 structures. A long-term decline in arboreal pollen counteracted by the spread of pioneering species with notable indications of enhanced land use activities in the vicinity of Lake Belau started from 6000 BP onwards (Fig. 2.4 and 2.5). At the same time, successive landscape opening and the arrival of novel economic strategies is also well documented by macrobotanical analyses (Kirleis/Fischer 2014). They verify the first occurrence of tetraploid free threshing wheat around 6100 BP, which represents one of three important cereals in the Early Neolithic Funnel Beaker crop assemblage in addition to emmer and barley. Free threshing wheat is considered to be a demanding cereal preferentially thriving in warm and dry summers. A distinct shift in subsistence strategy is reported at 5750 BP.

This climate double event closely paralleled profound archaeological changes, namely the adoption and establishment of Neolithic subsistence strategies in Northern

Germany as generally accompanying profound societal transformations (Furholt/Müller 2011; Müller *et al.* 2013). Population reconstructions show that these developments also went along with large demographic changes. Sum calibrated ^{14}C ages used as a proxy for population density (Hinz *et al.* 2012; Fig. 2.7) show a first yet inert population increase from about 6000 BP until 5700 BP, thus closely paralleling the time of major climate deteriorations. This early FBC phase is intimately linked to cereal cultivation of emmer, barley, and free threshing wheat. A subsequent population boost, culminating around 5550 BP, was followed by a decline reaching minimum values at 5250 BP that lasted until 5100 BP. Interestingly, breaking down the record by sub-regions (Hinz *et al.* 2012) reveals a picture in which the increase occurs successively across various sub-regions with an initial boost that is reached between around 5750 and 5600 BP. Depending on the region, records display a strong population decline starting at 5400 BP with a long lasting minimum until about 5250-5150 BP that occurred simultaneously.

Thus, it appears plausible that these changes are interlinked. While the former perhaps forced the spread of Neolithic strategies, the latter may have been ridden out due to well established agricultural practices and a boosting population.

Monuments (Fig. 2.8) only moderately follow these trends and thus underline the complexity of potential underlying ideological constraints, which may act rather independently from environmental constraints. Interestingly, maximum numbers here are reached between 5500 and 5200 BP, when the population trend was regressive and climate was fairly stable.

While it is up to archaeologists to identify possible causes (*i.e.* decisions met by societies as potentially reflected in archives of material culture), the delayed spread of Neolithic practices into Northern Germany, established elsewhere centuries earlier, and detailed palaeoenvironmental scenarios sufficiently point to substantial climate disturbance centring around a time interval from 6300-5800 BP, which well may have had the potential to influence this process.

Yet, these demographic and cultural changes appear to slightly predate abrupt climate change and thus rule the latter out as a trigger for societal change.

Apparently contradictive evidence of abrupt climate deterioration and boosting societies can be interpreted in terms of successful coping strategies developed in the FBC.

Conclusions

Recent compilations of mid-Holocene climate change and regional chronologies have provided a robust target from which the role of the regional intensity of the mid-Holocene climate change in Northern Central Europe can be assessed on a regional scale. Converging evidence of climate variability in marine records from the Skagerrak and lacustrine records from Schleswig Holstein and Mecklenburg-Western Pomerania suggest a supra-regional climate disturbance related to BE4 at 5900 BP, as well as an earlier cold relapse matching the global relapses (Wanner *et al.* 2014) around 6300 BP.

They allow a more differentiated view on the role of regional climate changes in order to assess potential climate constraints as truly relevant restrictions for regional communities.

New approaches to test hypotheses on the role of climate change in inducing societal responses greatly benefit from the augmenting use of time series in archaeology, enabling comparisons of the transitional courses of socio-environmental variables as gained from environmental and archaeological archives, respectively. In particular, time series of sum calibrated ^{14}C reconstructions and of material culture, employed as proxies for population density and cultural changes, provide a measure against which environmental variables can be tested.

The case of new reconstructions of marine climate variables for the FBC suggests a strong impact of North Atlantic circulation on the winter climate in the Skagerrak region, an option previously widely neglected. The marine chronologies are well consistent with lake records from Schleswig Holstein and Mecklenburg-Western Pomerania, jointly reinforcing robust evidence of a two-phased cold relapse that occurred at 6300 BP and 5900 BP. An early period of a probably dominant negative NAO phase predates the North Atlantic Bond event 4.

Progress also comes from coinciding evidence independently supporting a series of harsh winters based on microfacies evidence from the lacustrine archives. The multi-proxy approach yields robust evidence and an improved delineation of the magnitude, rate and timing of abrupt climate change in Northern Germany related to BE4.

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From Hunting to Herding?

Aspects of the Social and Animal Landscape during the Southern Scandinavian Neolithic

Martin Hinz

Abstract

In accordance with current perceptions, the Neolithic landscape of Southern Scandinavia appears to be dominated by two innovations that are connected to the transition to the Neolithic in this region: agriculture and monuments such as megalithic tombs or Single Grave burial mounds. So it seems natural to assume that these aspects also dominated the contemporaneous perception and the organisation of space. Most prominently, the monuments have a very important role in the landscape archaeology of the Funnel Beaker period particularly because they form a landscape of monuments.

But from a pragmatic perspective, it is more likely for the perception of the landscape as a taskscape (*sensu* Ingold 1993) that the everyday practises and routines of the inhabitants as well as the movements that evoke such practises were much more salient than the monuments. Given the agricultural nature of the economy, it would be consequent to assume that the most important constraints on spatial planning and settlement locations would arise from this economy, resulting in an agrarian landscape.

On the basis of a case study from the region of Stormarn-Lauenburg and the evidence of the number of identified specimens (NISP) of animals from a range of Funnel Beaker sites, this paper intends to demonstrate that it might not have been the monuments nor the agrarian subsistence economy but rather practises founded in the Mesolithic tradition that dominated the settlement system of Funnel Beaker societies. As an alternative, a scenario should be presented in which the access to larger animals, hunted or domesticated, as a currency in a social exchange, had a more significant influence on the choice of the settlement site than the purely economic optimisation of agricultural production processes.

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Introduction

In terms of the Graduate School Human Development in Landscapes, landscape is the "dynamic space of social, cultural, and ecological significance, which develops interactively with the human societies occupying it" (http://www.gshdl.uni-kiel.de/the-graduate-school/). This can be divided into two aspects: the significance of specific spaces and interactions within these spaces. What in a dialectical way creates the significance of an individual place and that of a landscape are the relationships between different places. This includes, on the one hand, the semantic links between places, but also their spatial connections. This results from the fact that the term landscape entails both the web of meanings and the pure spatial layer. Moreover, with regard to this spatial layer a landscape unfolds through the spatial distances that exist between these places (Ingold 1993).

Due to its spatial character, a landscape becomes a reality and can only be conceived by moving in it. This may involve physical movements, or it just may be the eyes or the thoughts of the viewer that wander. Nevertheless, references within the landscape, the relations between its elements and with that the concept of a landscape as an interwoven unity of its parts can only be conceived when a bodily or mental movement takes place (*sensu* Ingold 2000, 54).

It is this movement that makes the spatial layer tangible, transcends it to a conceptual level and connects the different locations to a fabric of associations, which generates a landscape from geographical points. That is why the movement of people within a landscape is fundamental for their concept of this landscape.

Landscape as economic space

Why do people move? Probably to a large extent due to their daily, mundane activities that are connected to their subsistence and economy. Thereby, it certainly makes a difference how the temporal and cyclic pattern of this movement is composed. Early hunter/gatherer societies may have moved through space on the hunt for migrating large game, Mesolithic groups utilised different stations in their territory from a base camp in a seasonal rhythm, farming communities were bound to their fields, whereas movement in a pastoral setting was controlled by the needs of the animals and the seasonal cycle of transhumance (*cf.*, for example, Sjögren/Price 2013). All this undoubtedly must have resulted in a different attitude toward space and the landscape.

This directly leads to the second part of the statement above – interactions within spaces. This interaction is primarily based on the practises of these human societies when they utilize the ecological space, the way in which they shape this space with their actions and the way in which their actions are shaped by the 'already existing circumstances'. These actions and the character of the constraints imposed by the environment are a source of the perception of the environment. Thus, it is this perception that represents the reflexive nature of the dualistic term 'landscape'.

Considering this, the most important utilisation of the ecological environment in prehistory, including the Neolithic, was the exploitation of natural resources by humans, the possibilities that the products of this exploitation offered for practises and *vice versa* the constraints that the environment imposed on economic and subsistence possibilities. It is to a large extent the economy that defines the human attitude toward nature – being determines consciousness (*sensu* Marx).

From this, it follows that the nature of the places within a landscape defines the movements and it, in turn, is defined by this movement at the same time. Again, there is a dialectic relationship between the mobility of a life style and the permanence of the places (*i.e.* built or natural space charged with meaning) that are important for this life style. But this is not a simple relationship, since it cannot be claimed that, for example, highly mobile societies do not consider some specific permanent places to be significant. In contrast, some few permanent locations may have possibly gained even higher importance for such societies as a focal point of social, mental and ritual practices, as centres of their mental maps, when life in general was shaped by constant movement. However, a lifestyle based on an extensive rather than an intensive economy and land utilisation certainly distributes significance in space at other scales than that within an intensive lifestyle and economy.

Economy as a social playground

If we accept (subsistence) economy as one, if not the major factor in shaping a mental concept like landscape, it has to be kept in mind that this economy is not an activity that is conducted for its own sake, although "today's perceived reality" seems to suggest this. It is embedded in a social dimension; it is driven by social forces.

A subsistence economy seems to be a rather simple endeavour: it must produce enough food for survival. But beyond mere survival, there is always the possibility to choose – if there are alternatives – how this way of survival is to be archived. This choice is always socially determined. Especially, but not exclusively, in prehistoric or other pre-industrial societies, in which economic decisions are not directed by controlling departments, spreadsheets and cost-benefit analysis, profit maximization in an economic sense was presumably not the main driver for strategic choices (Polanyi 1944; Sahlins 1972). Especially when we consider that the social value of this economy was as important as the pure output.

"Food is an unusually powerful symbol of identity because foodways involve the performance of culturally expressive behaviours and the literal incorporation of a material symbol" (Twiss 2007, 2). Both the way in which food can be used to express and negotiate identity as well as how food can be used as a tool in a social network of actors should be regarded as not the least important aspect in the decision-making process that is involved with subsistence economy. Food sharing and feasting are fundamental mechanisms of the negotiation of status and power – probably extending from the Palaeolithic onward until today – and of "the creation or maintenance of important social relationships" (Hayden 2001) and are a potential risk reducing strategy. In this way, food and subsistence strategies directly connect the environmental and the social landscape, if they can be separated at all.

In what follows, I will argue that the choices for the locations of settlements and the economic network during the Funnel Beaker period in southern Schleswig-Holstein in the districts of Stormarn and Lauenburg were not least dominated by the decisions connected to the possibility of obtaining food that could have been used as a socio-political tool. This takes place within the setting of the Mesolithic settlement landscape. Therefore, a short characterisation of this will be included in order to demonstrate continuities. It appears that not the 'rational choice' of living near the fields was decisive, but the availability of game, and that later in the progress of the

Neolithic game was replaced by cattle, now fulfilling a role as a political animal. To demonstrate this, I will survey the record of animal remains from sites across the entire distribution area of Funnel Beaker ceramics.

The Mesolithic landscape

The elements of the Mesolithic landscape

The general picture of the Mesolithic landscape of the Ertebølle period may be described as follows (*cf.* Terberger 2006): The settlement sites near the rivers served as centres for the activities during most of the year, but were embedded in an overall settlement system with seasonal cycles. Sites with a certain distance to the rivers, for example, the site of Duvensee near the Stecknitz River, would have served as a location of temporary activities, especially for harvesting hazelnuts during the fall. The same can be assumed for the other core areas of settlement, since they provided similar ecological conditions: Due to their vicinity to open water and light floodplain forests, they offer favourable conditions for hunting and the utilisation of aquatic resources. This made it possible to fulfil the central necessities of everyday life within the range of the extended settlement area. There are indications that while aquatic resources together with gathering represented the 'staple food' sources of the Mesolithic, hunting large terrestrial game played a specific role within the prestige network and socio-political structure (Mithen 1990, 153-193).

The main elements within the Mesolithic landscape are therefore the base camp and the different non-permanent seasonal stations. Together they formed an extended territory with shifting borders, including the 'nature' that was enclosed within this territory, which may have provided specific 'natural' places (meaning those not altered extensively or durably, e.g., by building activities) that were additionally charged with (social and ritual) meaning, which hardly can be revealed and reconstructed by archaeological means. At least the evidence of permanent and shared burial sites is rare, so we can assume that such sites were not common as collective foci of significance within these societies, although burials might have represented important elements of the individual landscape of Mesolithic people. Regarding their fairly mobile life, and that the notion of the base camps as permanent places has been challenged (Johansen 2006), it is reasonable to assume that significance was distributed within a loosely defined territory with shifting borders, associated with the distribution of activities within this territory and the shifting of the centre of daily activities during the year.

The Mesolithic landscape of Stormarn-Lauenburg

During the Final Mesolithic within the study area, three distinct clusters of sites are visible (Fig. 1). They group along the course of the Bille, Stecknitz and Trave Rivers. It seems that all activities were concentrated in the vicinity of the flowing water. Certainly, the remains of Mesolithic activities may be easier to overlook than the remains of later periods, but there has been extensive activity of archaeologists and collectors within the whole working area. If we compare the total density of sites with those that are dated within the Neolithic, it is discernible that especially these areas show an over-representation of sites of Neolithic age (Hinz 2014a, 191-194, resp. map 12, 239). Moreover, the

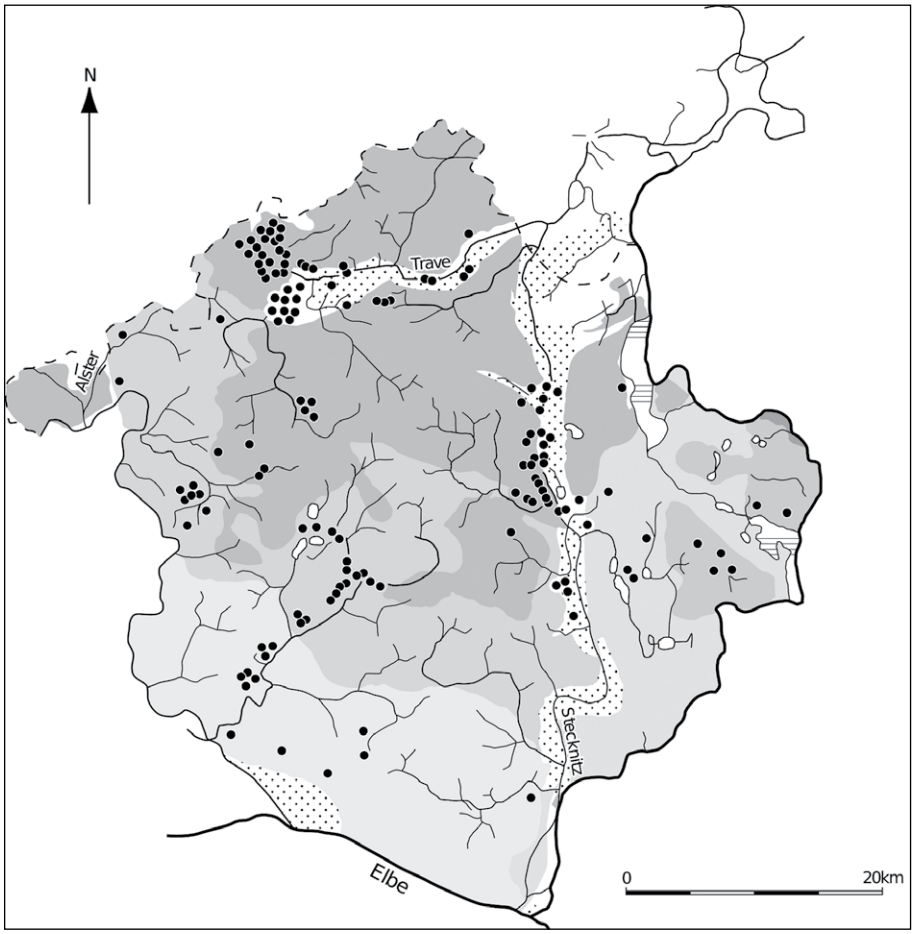


Figure 1: Mesolithic sites in the study area (after Schirren 1997, 247).

same is true for Mesolithic sites, so there is no reason to believe that the visible pattern is an artefact of a specific collector's activity or preference.

These rivers may have been utilised directly for subsistence by the exploitation of fluvial resources, but their substantial importance is additionally due to the floral and faunal composition of the surrounding floodplain forest. At the same time, they will also have served as a means of transport and as communication routes, most likely towards the marine environment. It is astonishing how void the hinterland of these riverside clusters appears, which do not provide any evidence of settlement or other activities during the Mesolithic. In the case of the Stecknitz Valley, a survey beyond the settlement cluster (Schirren 1997, 231) could confirm this negative evidence. It is the same pattern that we observe across the entire Baltic region (Zvelebil 2008, 32-35).

The Neolithic landscape

The general elements of the Neolithic landscape within Southern Scandinavia and the site types that dominate the archaeological record include permanent settlements with

their fields, monumental burial sites, such as earthen long barrows, megalithic graves, and causewayed enclosures, accompanied by sites of specific (economic) character, for example, flint acquisition/processing sites. What differentiates the Neolithic landscape of Southern Scandinavia from the Mesolithic? At first glance, it seems that the monumental sites, the megalithic burials and the causewayed enclosures represent the main contrast to the preceding period. But this is probably only half the story. Extraordinary ritual sites (if the common interpretation of the causewayed enclosures as such is correct), which were visited only occasionally, but were nevertheless important as places of identity focus for the society, could in principle have also been embedded in an extensive landscape concept. In the North European Mesolithic, a ritual landscape with places of significance and permanence certainly existed, although such sites are hard to trace archaeologically. But it is not coincidental that ritual sites, which were marked visibly above ground, e.g., by megalithic monuments, first occur in the archaeological record after the transition to the Neolithic. The difference is not the existence of such sites as durable ritual foci, but the practises that took place there, and first and foremost the fact that they were created by intense building activity, not inherited from nature or occasion. The fact that here an intentional materialisation of focal points of significance took place is absolutely essential for the understanding of change in the attitude towards the landscape from Mesolithic to Neolithic times in Southern Scandinavia. In this sense, even if we accept, for example, the derivation of monumental Neolithic burials in this region from the shell middens of Ertebølle (Müller 2013, 149), they still represent sites with a very different expression.

The reason for this new expression, the creation rather than the transformation of places, can be sought in the new economy. Firstly, the idea of investment in the land in the form of building activities for ritual sites significantly resembles the idea of clearing land for agricultural purposes. Secondly, within a Neolithic system of agricultural subsistence, increasingly more activities to secure the survival of a group could have been conducted within a smaller, more defined territory, likely resulting in decreased (daily) mobility. As a result, it is plausible to assume that significance was distributed to fewer sites within a closer distance to permanent, year-round settlements. Thirdly, an increased population may have simply enabled the mobilisation of a larger work force for such activities. These points probably also best describe the new landscape of the Neolithic, and the new attitude towards the environment, for which the monumental sites are only symptoms.

If these economic changes were so influential for the reorganisation of ritual expression, how strong was their impact on the settlement systems and the locations of the sites? It would be expected that such a tremendous change with completely new requirements regarding the basis for the economy would result in a total rearrangement of the settlement structures. While during the Mesolithic, the exploitation of aquatic resources and hunting strategies required a landscape with a high diversity of plant and animal species, such as the landscape of the freshwater systems (Johansen 2006, 205), a Neolithic economy relied on dry ground with fertile soil, probably within the forested areas of the river banks, which offer a supply of leaf fodder and slash-and-burn agricultural space. It would have been a rational choice to settle in such surroundings, presuming that agriculture was the main driver for settlement location. We will investigate this on the basis of the Stormarn-Lauenburg region.

The first phase

Within the working area, the earliest Neolithic is not visible archaeologically. The reason might be that the artefacts for this phase are not diagnostic enough (lacking good ceramic evidence for this period), or this phase is not present in the working area, and the sequence develops directly from the Mesolithic to the Early Neolithic (EN). Nonetheless, the evidence points towards continuity from the Mesolithic to the situation visible for the first phase of the Neolithic.

The EN Ia might be seen as a transition horizon, since the pollen evidence for this phase indicates no major forest opening, and accordingly no significant rise in human impact. It might also be denoted as Epimesolithic, since there is possible evidence for cereals, at least in the Danish area, in the form of cereal impressions on ceramics (Store Valby: Helbæk 1955; Stengarde: Hjelmquist 1975). But this form of agriculture neither left significant traces in the pollen profiles, nor are cereal depots known for this phase (Hinz 2014a, 202). It seems that the Neolithic element played a subordinate role within the economy of the Earliest Neolithic (Andersen 2008, 72).

A different land management regime becomes visible from the EN Ib onwards by a significant increase of *Plantago* values, accompanied by a rise in general open land indicators and a decrease of oak wood forest taxa. This might coincide with the introduction of the ard (Sørensen/Karg 2012, 7). The settlement clusters of this phase (in the valleys of the Trave, Stecknitz and Bille, Fig. 2) correspond to those of the Mesolithic period, making continuity very likely.

Sites that do not show the character of permanent settlements are located in confined areas in the vicinity of the settlement clusters. There is no indication of an extensive use of the whole area.

The pollen data for this period indicate an extensification of areas used for agrarian production and hint towards an increased importance of agriculture as a main source for the subsistence economy. Contemporaneous with this development is the beginning of monument and burial constructions that are visible above ground. These include earthen long barrows, megaliths and enclosures. At the same time, we see an intensification of copper imports (Müller 2011, 18). All this might hint towards the necessity to organise the social landscape, induced by an increased population (*e.g.* Hinz *et al.* 2012) and the intensification of labour investment into the area by clearing activities, resulting in a more 'crowded' landscape that has to be regulated. The monuments themselves suggest the development of larger social organisational units which extend beyond the boundaries of individual settlements. The concentration of burial sites in the Sachsenwald area is one example of such regional ritual spaces in the working area.

The model for this phase can be summarised as follows: The settlement areas remain the same as during the preceding periods due to the favourable conditions resulting from similar social and economic necessities, although we have to acknowledge the changed basis of the subsistence economy. The settlement size as well as the number of sites may have increased. The river banks were now used more intensively for (permanent) fields as well as for burial sites. Nevertheless, the settlements were still located where they were established during the Mesolithic: on the floodplains that offer a high diversity of plant and animal species, and on the grounds favourable for hunting, fishing and gathering.

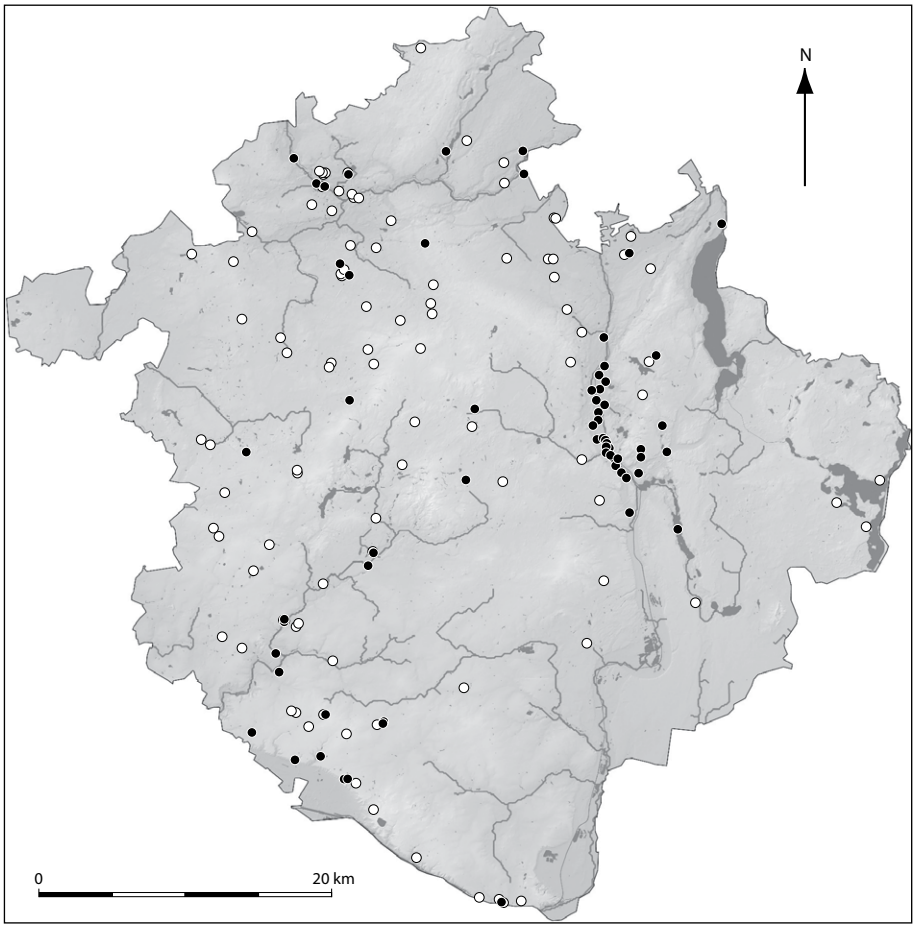


Figure 2: Early Neolithic sites in the study area; black: settlements; white: other sites (Hinz 2014b, 213 fig. 3).

The crisis

There are several indications that between 3400 and 3200 cal BC Neolithic societies all over Europe, including those that inhabited the distribution area of Funnel Beaker ceramics, underwent a restructuring process that could probably be called a "crisis". In the overarching picture, there is a reduction in site abundance and the general amount of (radiocarbon) dated archaeological material (Shennan *et al.* 2013), whereby this phase has also been verified more regionally for the Funnel Beaker area (Hinz *et al.* 2012). Additionally, on the regional scale other indicators may be correlated (Hinz 2015) so that the following trend could be described and interpreted: Just as the number of ^{14}C dated sites decrease, human impact on the landscape, deduced from the pollen spectra, also declines. This takes place at a time when a sedimentological analysis of Lake Belau shows a constant series of cooler summer temperatures (Dreibrodt *et al.* 2012). At the same time, decoration diversity on burial ceramics increases, it becomes more regionally distributed, and copper imports to the north cease. Whatever the reason for these changes might be – demographic developments, environmental change or reorganisation of the settlement landscape – it is clear that

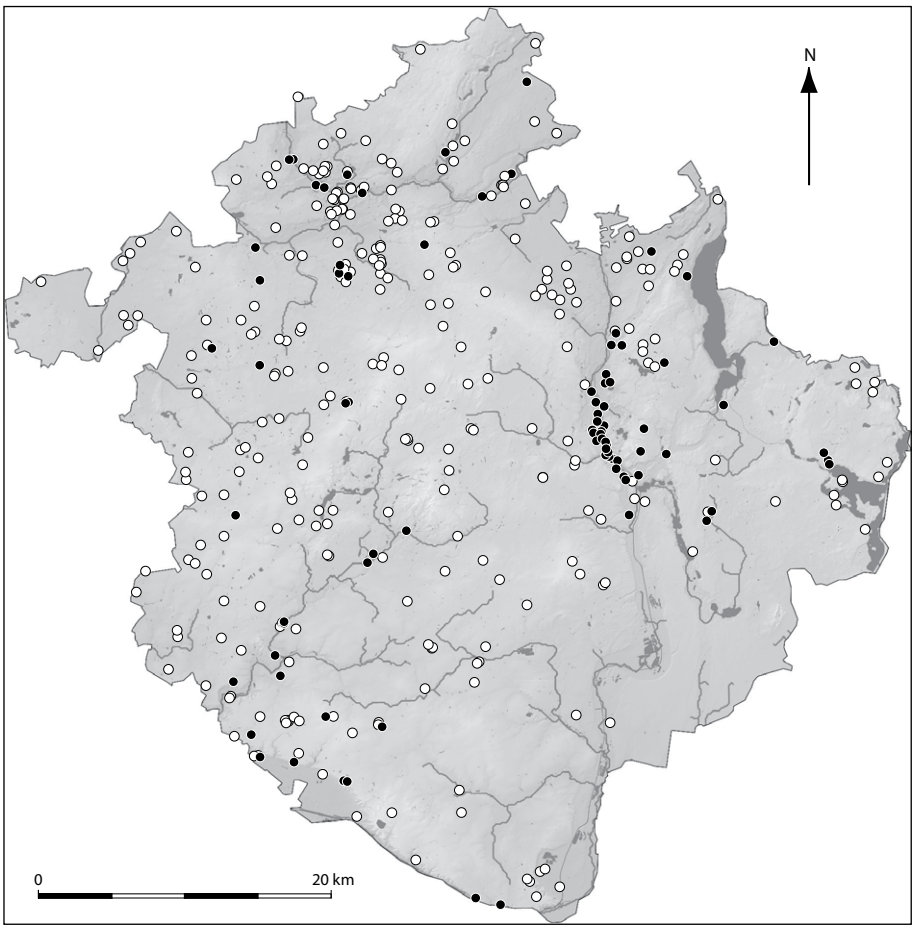


Figure 3: Middle Neolithic sites in the study area; black: settlements; white: other sites (Hinz 2014b, 215 fig. 4).

this transition indicates a significant shift in the practises of these societies in multiple spheres.

Within the working area of Stormarn and Lauenburg, few sites could be dated to this horizon. On the one hand, this substantiates that these developments could also be observed on a sub-regional level, but complicates, on the other hand, the detailed analysis of this process. Nonetheless, after this period the Neolithic landscape as a place for economic and social practises had changed, as will be shown below.

The second phase

The Middle Neolithic (MN) shows a different signature in the pollen data: *Plantago* values have declined significantly to recover on a lower level, taxa of mixed oak forest do show renewed clearing activities after a strong regeneration signal, while general openness indicators reach a higher level than ever after a strong decrease. The reasons for this picture might be found in changing environmental factors or shifts of human behaviour; most plausibly they are the result of changed human practises under changed conditions.

Considering the distribution of archaeological sites, a different land use regime, even a different landscape, becomes apparent (Fig. 3). The settlement clusters are stable, human occupation of the area in the form of permanent settlements do cover the same ground as before. But those sites that do not exhibit a permanent character are now spread evenly over the entire area and indicate land use at localities far away from the permanent settlements. The cause for such a pattern is most likely the onset of an activity that does not require or permit a daily return to an actual settlement site. Moreover, it must have been labour that was so location-independent and mobile that it would not have been reasonable to establish a new permanent settlement on the spot of this activity. Nonetheless, it must have been an activity for which these areas, formerly not under use, provided specific possibilities – the drier, less fertile morainic ridges. Animal husbandry, especially with cattle and transhumance, appears to be the most obvious explanation. This interpretation is backed by studies and syntheses from other regions of the Funnel Beaker area (Kristiansen 1988; Welinder *et al.* 1998; Andersson 2014).

Interim conclusion: Continuities and changes

If the preferences for settlement location were so similar from the Mesolithic to the Neolithic, it may be assumed that at least a part of the economic reasons for these preferences were similar, or that the new components of agriculture and husbandry could successfully be integrated into the existing system. From the pollen data, it is obvious that it took quite a while before the new way of life was predominant, and before human impact substantially changed larger parts of the landscape. It appears that the choice of settlement locations was not so much dominated by the conditions of the new agricultural way of life: Although the Neolithic inhabitants of Stormarn-Lauenburg settled on the floodplains of the rivers, these locations did not offer good conditions for cereal cultivation. The space that could have been utilised for fields was located on the drier river banks often some kilometres away, where the megalithic burials were also constructed.

If the new economic system was not the reason for the location of the settlements, it must either have been due to the old system or conditions that were favourable in both regimes – conditions suited to both hunting and gathering and farming. One advantage of these locations that is difficult to assess archaeologically – due to the perishable nature of its remains – is fishing. In general and from the ethnological record, the percentage of terrestrial animals, terrestrial plants and aquatic resources contributing to the diet of hunter/gatherer societies is equal, while in more northern latitudes fishing might contribute with ~50 % (Binford 2001). It is evident that the use of marine, but especially also of freshwater resources, postdate the Mesolithic – Neolithic transition, based on animal remains (*e.g.* Becker/Benecke 2002; Ewersen 2007), lipid analysis (Heron/Craig 2008; Craig *et al.* 2011) or on isotope data (*e.g.* Fischer *et al.* 2007). It seems plausible that the Neolithic inhabitants also valued the food source readily available at their doorsteps. The second benefit of the settlement locations near the rivers is the fact that they do represent by far the easiest and most comfortable transportation and communication routes. But the highest impact on settlement choice must have been the economic favour of the riverine sites that is clearly linked to the Mesolithic tradition – their richness in wild resources. Leaving aside the evidence of

fish, which clearly is underrepresented in the archaeological record, we will turn to the investigation of the animal spectra that were found at Funnel Beaker settlements. For this endeavour, we will use sites from all over the distribution area of Funnel Beaker ceramics to gain a broad and robust data basis for interpretations.

The animal remains of Funnel Beaker sites

How can the hypothesized importance of hunting within the agrarian Funnel Beaker society be analysed, interpreted and explained? Moreover, is it possible to observe changes from the Early to the Middle Neolithic situation? A survey of the isotope data of Southern Scandinavian individuals regarding the ratio of their consumption of animal and plant product is not yet available, so it is not possible at the moment to judge to what degree animal products were actually the basis of subsistence. But we have, of course, the animal remains from different settlements within the distribution area of Funnel Beaker ceramics. These can be used to estimate the ratio and relationship between wild and domestic animals and the individual share of the different domesticates for subsistence. The basic source in this study for this issue is the collection of NISP from Jan Steffens (2005), supplemented by the data from Ola Magnell, accessed via Peter Imperiale (2011). In total, the data of 61 sites could be analysed (Fig. 4, Tab. 1). From these sites, the site of Brachnowko was excluded because it has a very specific animal spectrum that skewed the results (~20 % foxes in the assemblage).

The spheres of domestic and wild animals

To investigate how practises that are related to different animal species are connected, a network analysis was undertaken. The basis for this is the correlation of the frequency of different species at the individual sites, according to the following procedure:

1. Testing the correlation of the values for each pair of species. This means that, e.g., the values of cattle and red deer were tested for correlation.
2. If the correlation was positive and significant, it is marked as an edge for the network in a matrix.
3. Displaying the resulting network.

The logic behind the procedure is explained as follows: If the presence of one species is positively (and significantly) correlated with that of another species, practises related to each species were conducted at the same site and therefore do represent a common realm of action.

The overall result is not very surprising: Within the network, two subnets are formed, one representing all wild species, the other consisting of domestic species. Both nets are connected by dog that may have served a role in the world of hunting as well as in the world of animal husbandry (Fig. 5).

What might be interesting is that fox also represents a connection and is therefore present in both worlds. Fox was either already a hemerophile species in the Neolithic and was hunted because of its presence at or near human settlements (either to secure stored food or due to occasion), or fox played another, special role, as is indicated, e.g., by the evidence of fox mandible in the burials of several Neolithic cultures. Not

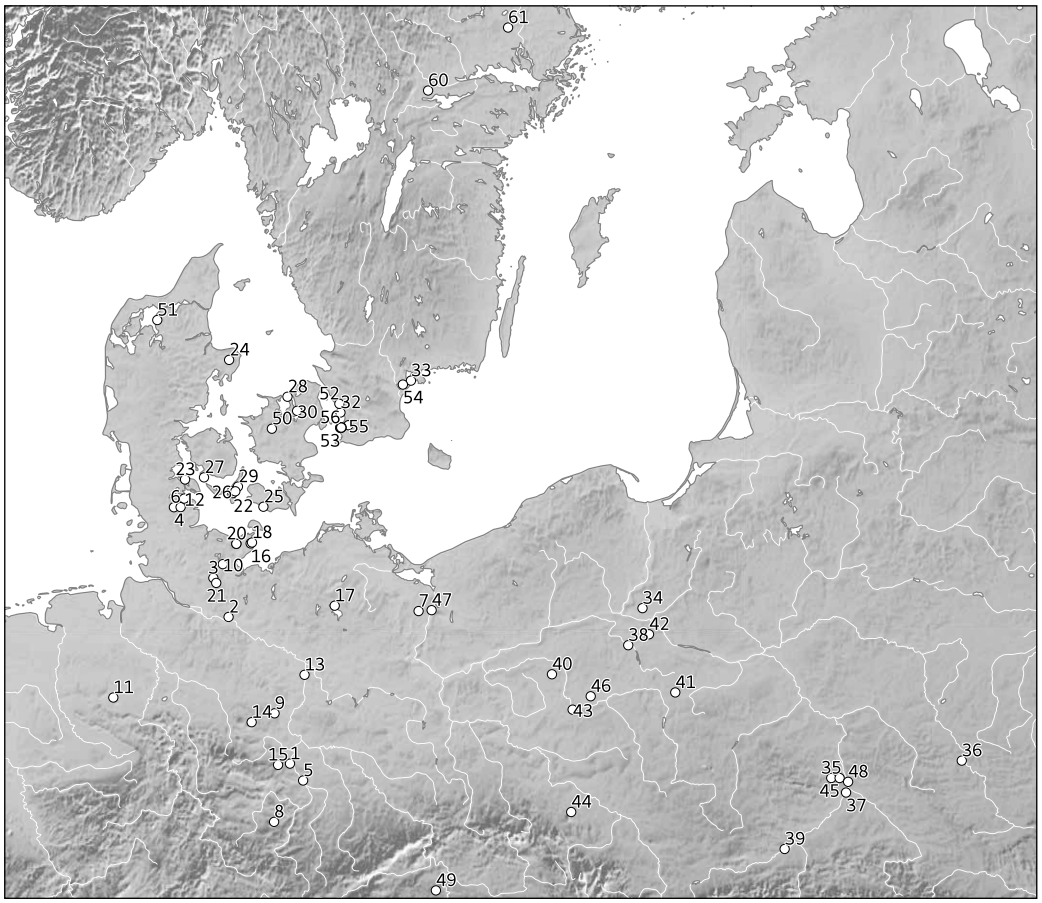


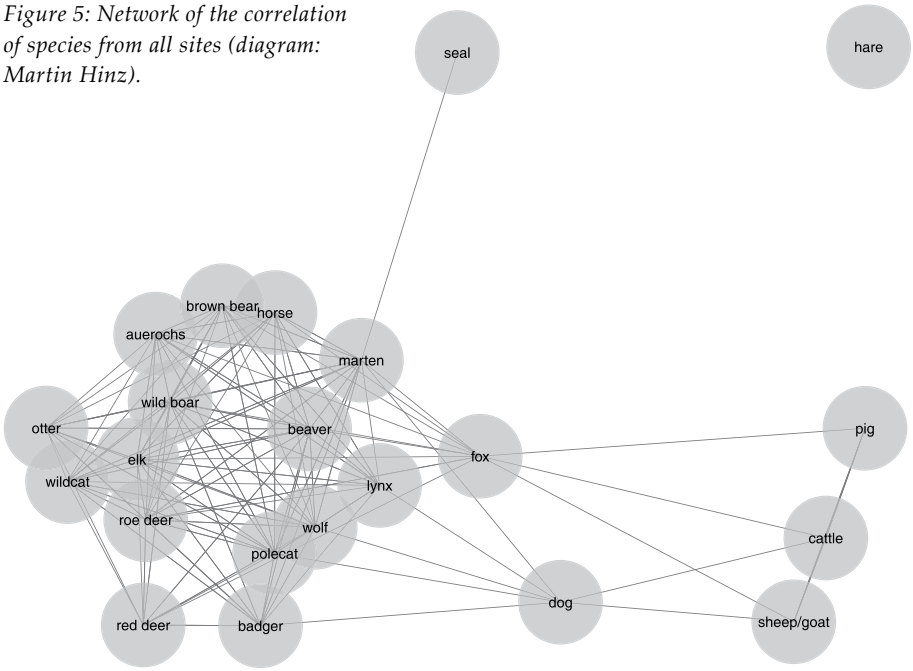
Figure 4: Location of the analysed sites: 1 Alsleben; 2 Basedow; 3 Bebensee; 4 Bistoft; 5 Dölauer Heide; 6 Fuchsberg-Südensee; 7 Glasow; 8 Großobringen; 9 Haldensleben; 10 Heidmoor; 11 Hüde I; 12 Neukirchen-Bostholm; 13 Niedergörne; 14 Runstedt; 15 Schalkenburg; 16 Siggeneben-Süd; 17 Stinthorst; 18 Süssau; 19 Wangels FN; 20 Wangels MN; 21 Wolkenwehe; 22 Blandebjerg; 23 Bundsø; 24 Fannerup; 25 Lidsø; 26 Lindø; 27 Lyø; 28 Sølanger; 29 Spodsbjerg; 30 Svaleklint; 31 Troldebjerg; 32 Löddesborg; 33 Nymölla III; 34 Brachnowko; 35 Cmielow; 36 Gródek Nadbużny; 37 Kamień Łukawski; 38 Kruska Podlotowa; 39 Książnice Wielkie; 40 Mrowino; 41 Pikutkowo; 42 Podgaj; 43 Śrem; 44 Strachów; 45 Stryczowice; 46 Szlachcin; 47 Ustowo; 48 Zawichost-Podgorze; 49 Makotřasy; 50 Muldbjerg I; 51 Bjørnsholm; 52 Saxtorp; 53 Almhov – CT1; 54 Hunneberget; 55 S. Sallerup 15H; 56 Elinelund 2B; 57 Hyllie station; 58 Hyllie vattentorn; 59 Hyllie Hotelltomten; 60 Skumparberget; 61 Anneberg (map: Martin Hinz).

id	site	cattle	pig	sheep/goat	dog	horse	red deer	roe deer	elk	aur-ochs	wild boar	brown bear	bad-ger	mar-ten	pole-cat	otter	wolf	fox	lynx	wild-cat	bea-ver	hare	seal	others	sum
1	Alsleben	46	1	8	0	0	2	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	60
2	Basedow	87	26	15	9	29	265	71	10	25	81	2	4	0	0	0	0	0	0	0	10	0	0	0	634
3	Bebensee	43	17	2	11	6	99	20	1	47	27	0	0	0	0	3	0	0	0	2	8	0	0	0	286
4	Bistoft	213	112	209	24	0	363	17	5	22	72	0	0	2	0	43	1	0	0	0	53	1	0	0	1137
5	Dölauer Heide	105	35	44	2	22	2	1	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0	1	216
6	Fuchsberg-Südensee	624	94	44	18	5	45	15	0	20	46	0	0	0	0	0	0	0	0	1	3	0	0	7	922
7	Glasow	37	11	68	0	0	5	10	0	21	3	2	2	0	0	0	1	0	0	1	0	0	0	0	161
8	Großobringen	3064	0	570	161	129	248	28	1	0	0	14	1	0	0	0	0	2	1	0	5	0	0	0	4224
9	Haldensleben	45	5	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	57
10	Heidmoor	891	440	139	145	35	1707	336	162	93	515	6	35	17	6	46	35	1	1	46	579	1	29	17	5282

id	site	cattle	pig	sheep/ goat	dog	horse	red deer	roe deer	elk	aur-ochs	wild boar	brown bear	bad-ger	mar-ten	pole-cat	otter	wolf	fox	lynx	wild-cat	bea-ver	hare	seal	others	sum
11	Hüde I	75	46	17	35	393	301	237	307	989	793	110	6	29	6	64	12	6	2	23	781	0	0	0	4232
12	Neukirchen-Bostholm	190	148	36	4	0	12	2	0	2	4	1	2	0	0	0	0	0	0	0	1	0	0	0	402
13	Niedergörne	60	29	39	0	0	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	135
14	Runstedt	67	7	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	83
15	Schalkenburg	1508	404	792	104	24	37	67	0	12	28	3	3	6	0	0	3	9	0	3	1	1	0	49	3054
16	Siggeneben-Süd	38	41	9	3	0	16	1	0	3	6	1	0	0	0	1	2	0	0	4	0	0	8	2	135
17	Stinthorst	15	18	6	2	8	151	31	13	5	30	5	1	1	0	0	0	1	0	0	3	0	0	0	290
18	Süssau	568	113	97	12	0	18	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	2	0	813
19	Wangels FN	164	8	57	11	1	65	23	0	13	11	1	0	1	0	1	0	0	0	0	0	0	5	9	370
20	Wangels MN	151	128	32	15	0	113	48	0	9	34	0	0	0	0	0	0	0	0	0	0	0	24	72	626
21	Wolkenwehe	2586	448	168	16	32	2875	416	16	104	288	0	8	1	0	8	2	8	0	8	456	0	8	0	7448
22	Blandebjerg	423	124	37	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	586
23	Bundsø	1405	1222	359	196	0	142	3	7	7	7	3	0	14	1	3	1	0	0	0	0	0	10	0	3380
24	Fannerup	183	106	149	10	7	46	10	0	13	16	0	1	0	0	3	0	1	0	0	0	0	17	0	562
25	Lidsø	672	66	137	49	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	1	938
26	Lindø	1293	659	421	30	1	90	0	0	0	5	3	0	0	0	3	1	0	0	0	0	1	0	1	2508
27	Lyø	297	85	59	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	0	474
28	Sølanger	15	1	29	34	0	60	128	0	0	96	0	0	0	0	8	0	9	0	3	0	1	16	1	401
29	Spodsbjerg	1978	891	588	101	4	179	8	0	0	8	1	0	0	0	4	1	4	0	0	1	0	23	101	3892
30	Svaleklint	35	0	0	0	0	126	65	0	0	0	0	0	0	0	0	0	0	0	1	5	0	10	0	242
31	Troldebjerg	10459	11632	2721	25	75	25	25	0	1	5	0	0	0	0	5	0	5	0	1	1	0	5	0	24985
32	Löddesborg	7	0	0	3	0	65	30	0	0	0	0	0	0	0	1	1	0	0	0	2	0	33	22	164
33	Nymölla III	7	0	0	0	0	74	23	0	0	0	1	0	0	0	8	0	3	0	2	0	0	21	6	145
34	Brachnowko	24	76	107	0	0	0	0	0	0	0	0	8	0	1	0	0	80	0	0	0	0	0	0	296
35	Cmielow	1579	566	276	112	57	36	44	3	0	44	3	5	0	0	0	3	3	0	0	5	0	0	0	2736
36	Gródek Nadbużny	1265	453	252	41	15	19	11	6	0	60	2	1	0	0	1	0	2	0	0	0	6	0	0	2134
37	Kamień Łukawski	1675	581	402	66	9	26	28	3	11	11	3	3	0	0	0	0	0	1	0	23	3	0	0	2845
38	Kruska Podlotowa	237	0	1	7	25	8	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	279
39	Książnice Wielkie	150	137	25	31	0	9	26	0	0	5	0	0	0	0	0	1	0	0	50	0	2	0	0	436
40	Mrowino	359	78	93	8	3	29	3	0	0	12	7	0	0	0	0	0	0	2	0	1	0	0	0	595
41	Pikutkowo	103	26	14	69	3	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	217
42	Podgaj	197	19	94	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	312
43	Śrem	1040	216	50	17	11	1	1	0	0	4	0	0	0	0	0	0	0	0	0	0	3	0	0	1343
44	Strachów	215	76	119	4	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	22	0	0	451
45	Stryczowice	327	36	48	71	0	0	0	0	8	4	0	0	0	0	0	0	0	0	0	0	3	0	5	502
46	Szlachcin	56	14	11	4	43	30	45	0	0	0	1	0	0	0	0	0	1	0	0	7	0	0	0	212
47	Ustowo	483	267	76	37	46	191	59	0	60	16	4	0	0	0	0	1	1	0	1	114	0	1	0	1357
48	Zawichost-Podgorze	1017	323	214	93	40	10	10	0	0	9	2	3	0	0	0	0	0	2	0	3	2	0	0	1728
49	Makotřasy	1636	373	173	50	14	31	1	0	5	10	2	0	0	0	0	2	0	0	0	2	7	0	2	2308
50	Muldbjerg I	33	0	3	0	0	665	116	0	0	5	0	0	2	0	115	0	0	0	0	179	0	0	4	1122
51	Bjørnsholm	1	0	2	0	0	6	9	0	0	3	0	0	1	0	0	0	2	0	0	0	0	0	0	24
52	Saxtorp	246	78	90	1	3	4	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	429
53	Almhov – CT1	157	170	51	0	0	71	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	452
54	Hunneberget	85	50	36	16	0	19	27	0	0	0	0	0	1	0	0	0	1	0	1	3	0	7	2	248
55	S.Sallerup 15H	371	52	43	2	4	22	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	495
56	Elinelund 2B	314	59	14	2	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	393
57	Hyllie station	39	41	7	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	89
58	Hyllie vattentorn	40	27	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68
59	Hotelltomten	79	68	7	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	156
60	Skumparberget	397	68	20	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	4	492
61	Anneberg	54	46	4	11	0	0	0	2	0	0	0	1	17	0	17	0	3	0	2	6	0	674	24	861

Table 1: NISP of animals at the analysed sites.

Figure 5: Network of the correlation of species from all sites (diagram: Martin Hinz).



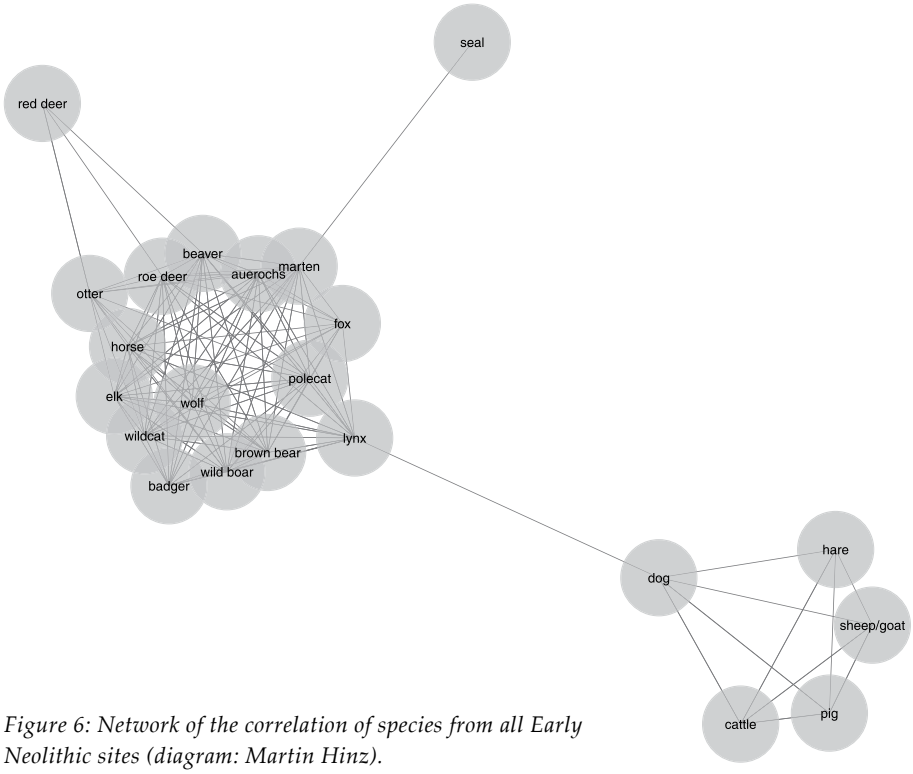


Figure 6: Network of the correlation of species from all Early Neolithic sites (diagram: Martin Hinz).

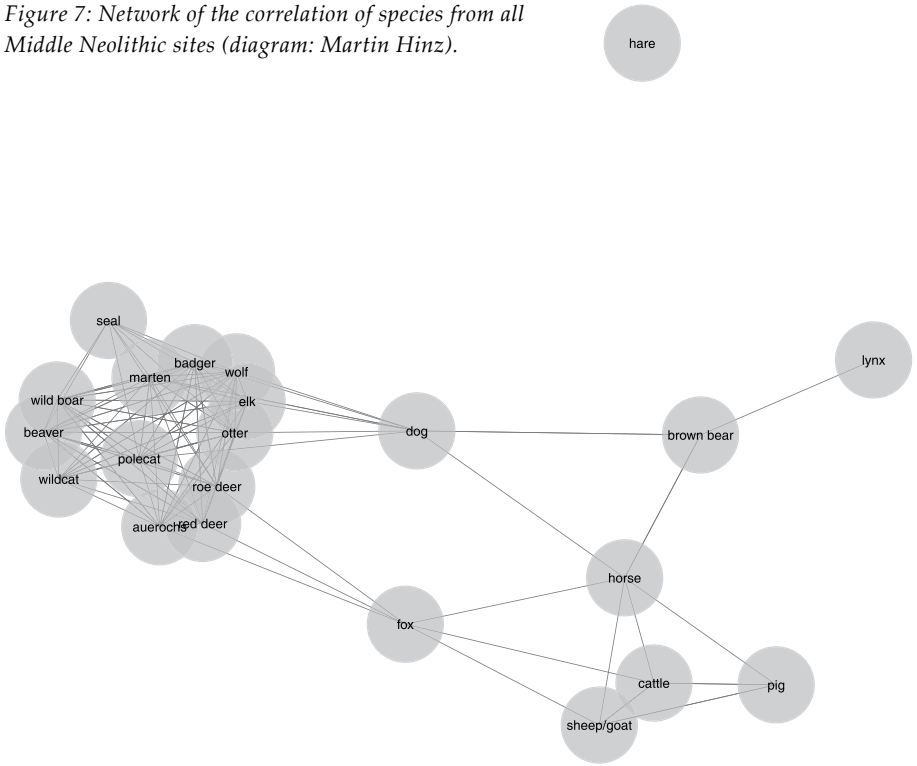


Figure 7: Network of the correlation of species from all Middle Neolithic sites (diagram: Martin Hinz).

connected to the network is the hare, so the appearance of this animal is not correlated to any other species. The seal is separate from the network, but still connected via the marten. The reason for this separation might be that it was mainly hunted at specific, specialised sites. In the bone assemblage of the sample, seal played either a negligible role, or its ratio is significant.

If we analyse the EN and MN sites separately, a somewhat different picture is gained. In the network of the species from the EN sites (Fig. 6), domesticates still are clustered together and form a separate subnet, but now only dog connects the two networks.

Hare is included in the network of domestic species. The reason might be that hare was not hunted primarily as prey, but probably to protect the fields in some form of 'garden hunting'. Except for a dense network of wild animals, other species are also separate, for example seal and red deer. Seal might be separate for the same reason as in the overall analysis. In the case of red deer, it is common that no specific correlation to other species occurs, beside roe deer, beaver and otter. The latter correlations might be an indication that red deer was particularly hunted in wet areas, such as the floodplains that evidently represent the preferred settlement locations at least in the working area of Stormarn-Lauenburg.

In the network of the MN sites (Fig. 7), horse is now connected to the domestic species. If this indicates a changed role of horse or not must be the subject of a more in depth analysis with other methods. The identification of domestic horses within the Bernburg complex (3200-2700 cal BC, Benecke 2006) would fit culturally and temporally to such an interpretation. Fox and dog connect the network of domestic and wild species, whereas seal is now part of the subnet of wild animals. Interestingly,

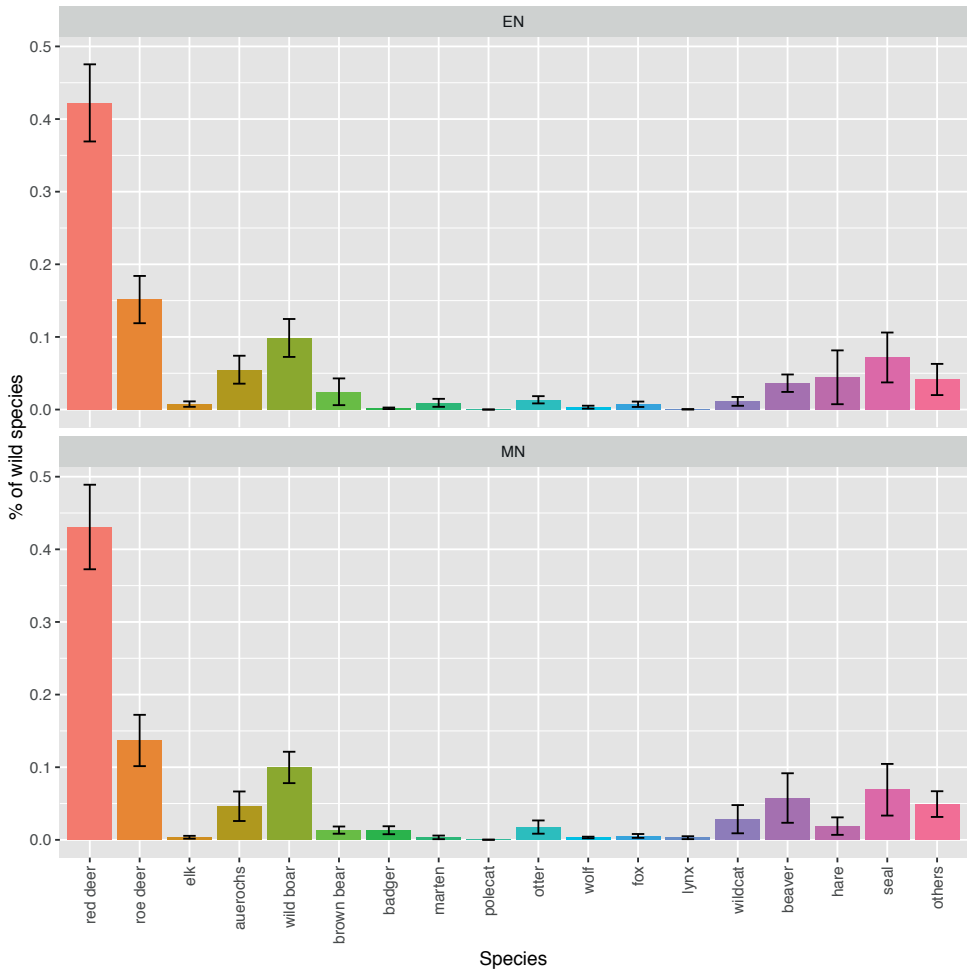


Figure 8: Ratio of wild species, divided between the Early and the Middle Neolithic (diagram: Martin Hinz).

brown bear and lynx occur in close connection to horse and dog. But both species are so rare in the sample that this correlation should not be overemphasised.

As a result of these analyses, the following seems to be a plausible synopsis: In general, we see two distinct areas of practise, one connected to domestic, the other to wild animals. Fox and dog seem to connect these spheres, or better remains of these species accumulate in both contexts. In the case of dog, the interpretation is straight forward. Dogs were present in the domestic sphere, but might also have been used for hunting. In case of fox, its special role seems to begin in the Middle Neolithic, and there are good reasons to believe that this is due to their ritual meaning. Seal hunting played a special role, but more in the Early than in the Middle Neolithic. It might be that the maritime connection is more pronounced in earlier Neolithic times due to Mesolithic traditions. While the hare is not connected in the MN, during the EN it is part of the 'domestic' sphere. If the interpretation of

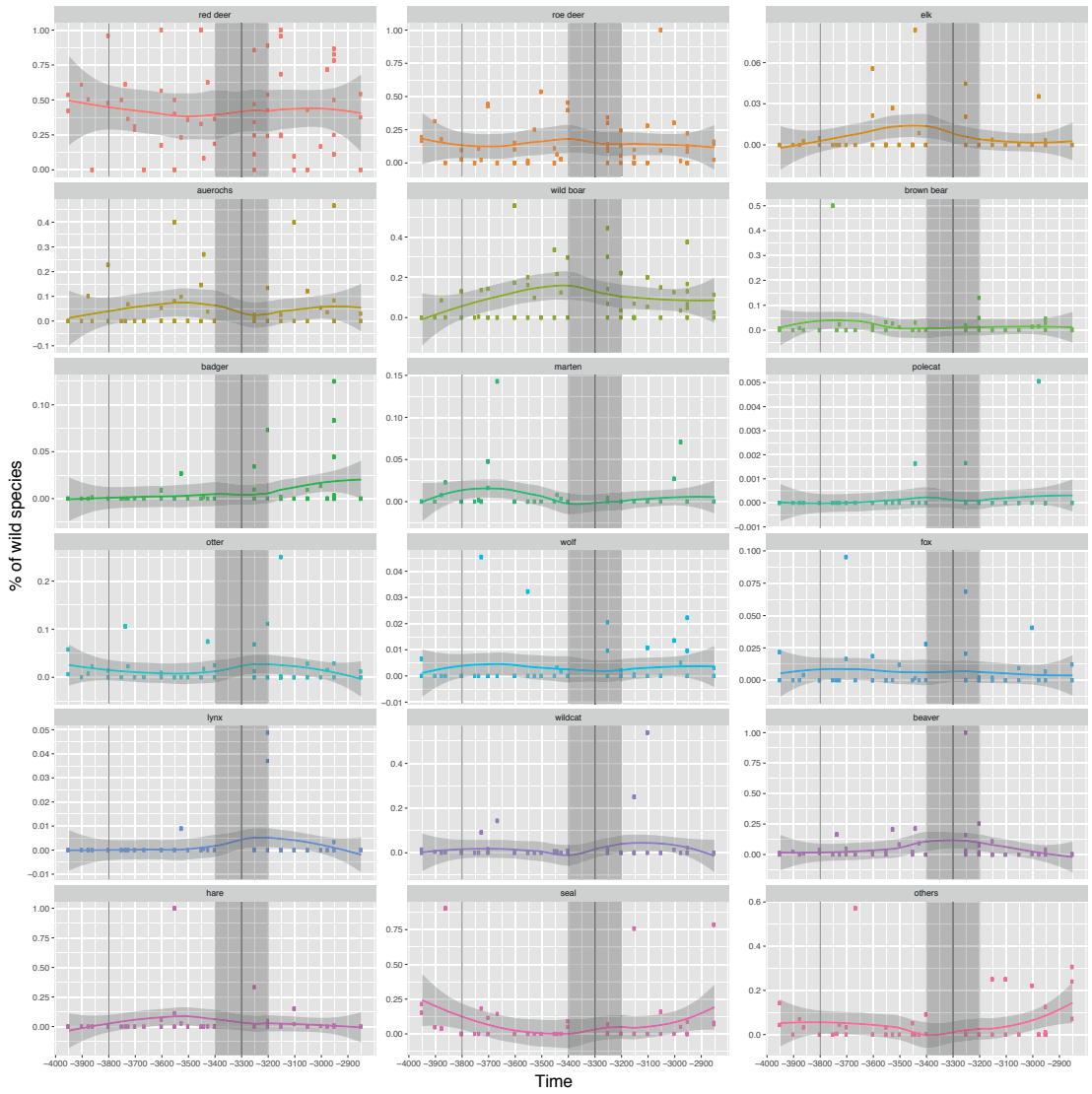


Figure 9: Visualisation of the change of the ratio of wild species within the bone assemblages of all sites. Dots represent individual sites, whereas the solid line represents a running mean as a trend showing the development. Lines represent the temporal phases: before 3800 cal BC EN Ia, 3800-3300 cal BC EN Ib – EN II, after 3300 cal BC MN. The shaded area marks the time of the potential crisis from 3400-3200 cal BC (diagram: Martin Hinz).

the hare hunt for protective reasons is true, then the fact that this species is not connected in the later period indicates a change in the agricultural practises from the EN to the MN. During the Early Neolithic, red deer also played a special role in the spectrum of wild animals, while during the Middle Neolithic this species seems to be integrated into the general realm of hunting. Can we infer from this that the role of the hunt for large game changed from Early to Middle Neolithic? We will come back to this later.

Wild animals

Another perspective on the development of the relationship of humans toward animals during the Funnel Beaker period can be gained by analysing the dynamics of the animal spectra. To this end, each site was connected to a specific date. The temporal dimension was introduced by ^{14}C dates, if available, or by taking the mean of the duration of each site extracted from the archaeological material present at the sites. When this is done, each site can be placed on a temporal axis, and the development of the species spectra can be observed.

To start with wild animals, there is no significant change visible within the spectrum of hunted animals during time on a coarse scale. Regardless if we look at the mean values of the sites differentiated between the Early and the Middle Neolithic (Fig. 8), or if we investigate the dynamic of the ratio of individual species among the hunted animals over time (Fig. 9), no substantial difference can be determined.

In the mean of all sites, red deer represents 43.6 % of the bones of hunted animals, roe deer 14.6 %, wild boar 10.2 %, seal 7.5 %, aurochs 5.9 %, and all other species were below 5 % (18.2 % together).

Acknowledging the fact that this survey covers a large area with different ecological conditions and sites of different character, it can still be maintained that hunting was a rather traditional affair in the Funnel Beaker societies. Over the course of the duration, no fundamental changes in the hunting strategy seem to take place.

Domestic animals

If we turn to the domestic species (including horse among domesticates), the situation between the EN and the MN also seems to be static (Fig. 10).

In general, cattle comprises 59.4 % of the bone assemblages, pig amounts to 19.1 %, sheep/goat is recorded with 13.8 %, whereas dog and horse represent only 4.4 %, resp. 3.2 %, and are therefore rather insignificant.

An inspection of the dynamics over time (Fig. 11) offers a more interesting picture: While cattle has an overall high ratio within the domestic species, we observe a decrease over time until the advent of the possible crisis at 3400 cal BC. Within and after that time, the cattle ratio rises significantly and the ratio of pig also increases, both at the expense of other domestic species. In this display, this development is only visible within the range of domesticates. It becomes more pronounced and meaningful if we look at the total composition of animal species, comparing the development of hunting and husbandry.

The wild/domestic ratio

The total share of domestic animals within the bone assemblages of the sites, in a diachronic view, shows an interesting pattern regarding the development of animal husbandry over time (Fig. 12). For the first phase, EN Ia (until 3800 cal BC), the animal spectrum of nearly all sites is dominated by wild animals. Only the Early Neolithic sites of Wangels and Almhov show a dominance of domestic animals. In Wangels, cattle is primarily observed, but this site has to be critically (re-)interpreted (Sørensen/Karg 2012, 101) on the level of zooarchaeology, which cannot be done here. The pattern of the ^{14}C dates for Almhov seems to indicate that the site belongs

to a late phase or probably even to a later period than 3800 cal BC, whereby 33 % of the pig bones from this site may actually represent wild boar (Magnell 2015, 86).

Within the second phase (EN Ib – EN II), the ratio of domesticates rises to a level of ~70 %, but this mean number might be misleading: Actually, we observe two

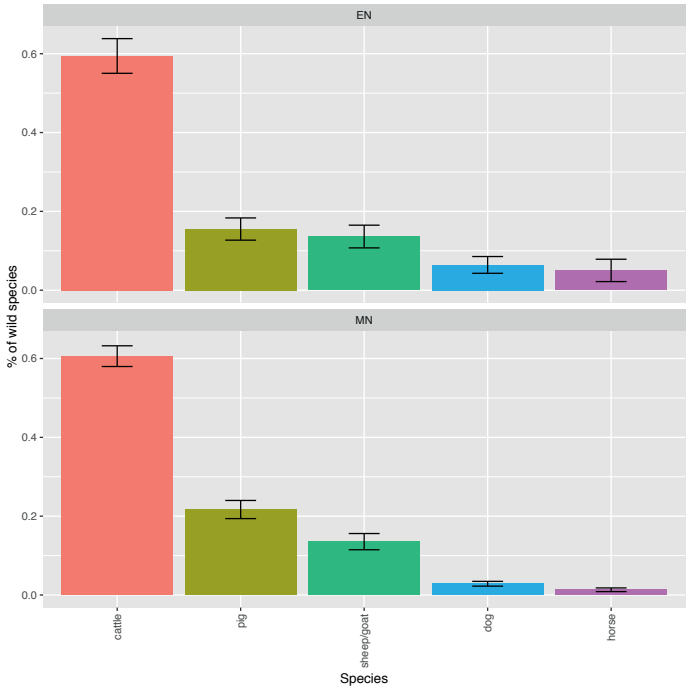


Figure 10: Ratio of domestic species, divided between the Early and the Middle Neolithic (diagram: Martin Hinz).

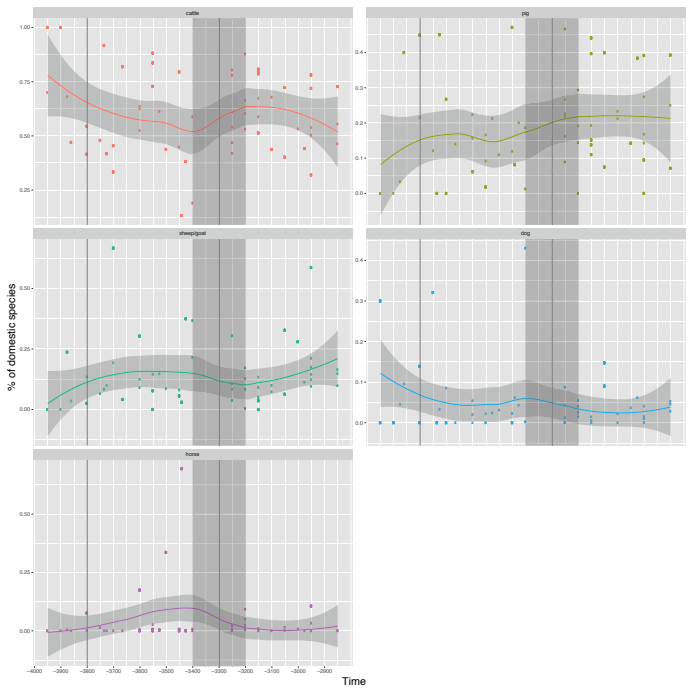


Figure 11: Visualisation of the change of the ratio of domestic species within the bone assemblages of all sites. Dots represent individual sites, whereas the solid line represents a running mean as a trend showing the development. Lines represent the temporal phases: before 3800 cal BC EN Ia, 3800-3300 cal BC EN Ib – EN II, after 3300 cal BC MN. The shaded area marks the time of the potential crisis from 3400-200 cal BC (diagram: Martin Hinz).

groups of sites, one with a domesticate ratio of more than 80 % and a second group with less than 40 % of domesticates. Moreover, there are some sites with ratios in between these levels.

For the time of the possible crisis (3400-3200 cal BC), little evidence is available, but after that the general ratio of domesticates rises up to 90 %. The cause of this is

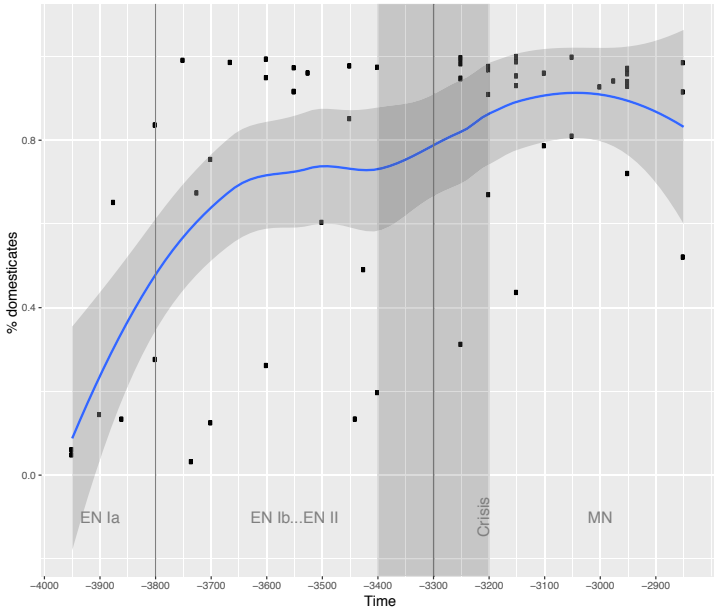


Figure 12: Visualisation of the change of the ratio of domestic animals in total within the bone assemblages of all sites. Dots represent individual sites, whereas the solid line represents a running mean as a trend showing the development (diagram: Martin Hinz).

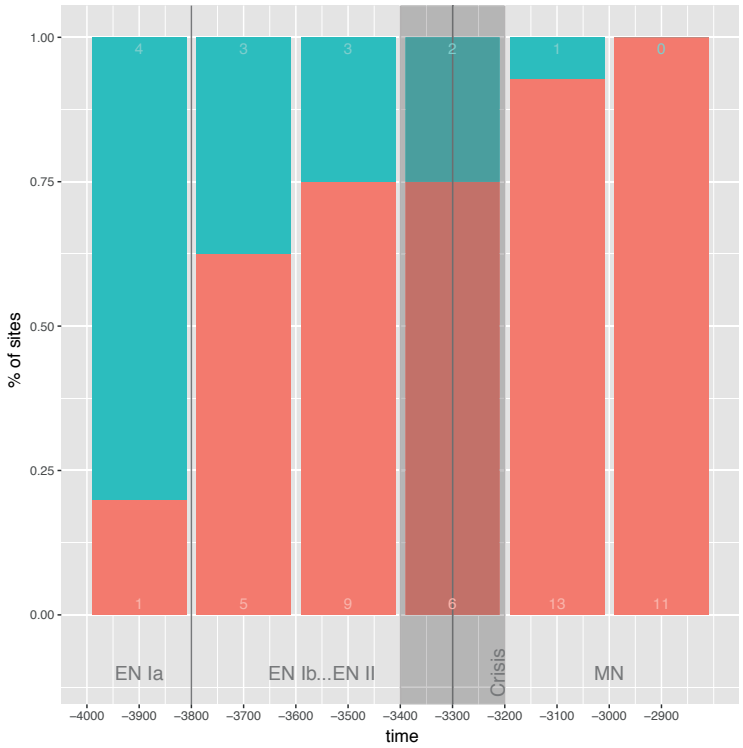


Figure 13: Percentage of sites with a dominance of wild or domestic animals (>50 %). The numbers on the top and the bottom of each bar represent the absolute number of sites (diagram: Martin Hinz).

not a general increase in domesticates, but that the sites with a mean ratio of domestic animal bones of less than 50 % are nearly missing. This becomes even more obvious, if we compare the development of the number of sites with more and less than 50 % of bones from domestic species (Fig. 13).

While before 3800 cal BC, most of the sites were dominated by wild species, from 3800-3400 cal BC ca. 70 % of the sites show a spectrum with a majority of domesticates. During 3400-3200, there seems to be a shift in the subsistence strategy toward an exclusive reliance on domesticates, with only a negligible ratio of hunting.

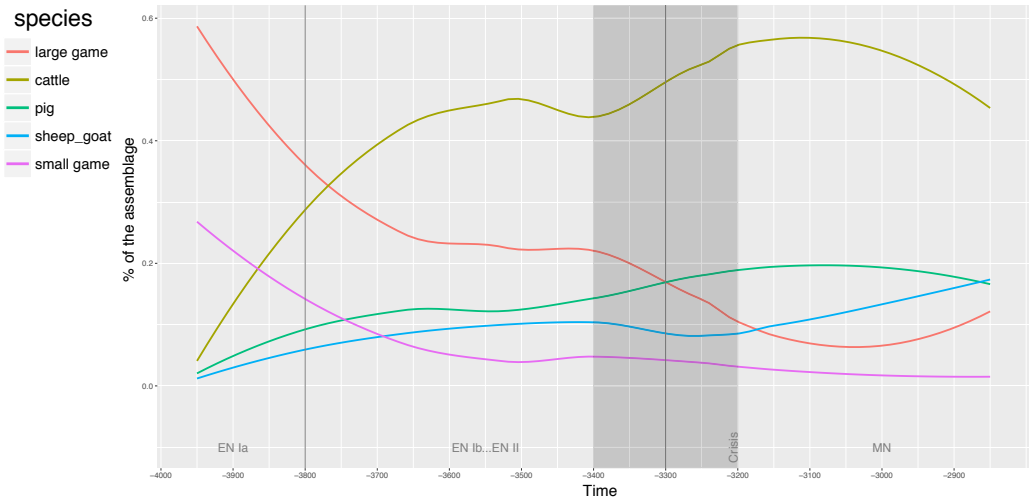


Figure 14: Visualisation of the trend of cattle, pig and sheep/goat as well as large (red and roe deer, elk, aurochs and wild boar) and small game or such that is not primarily used for subsistence (all other species) (diagram: Martin Hinz).

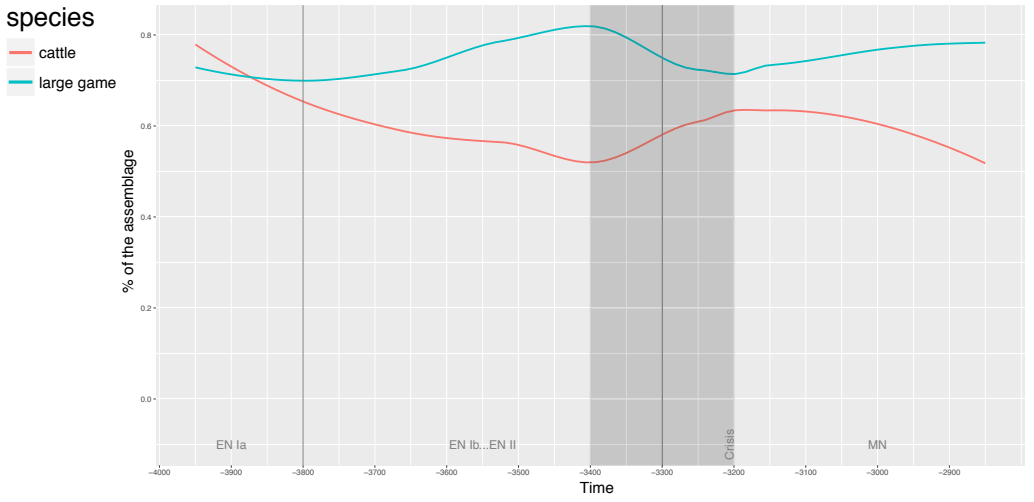


Figure 15: Visualisation of the trend of the ratio of cattle within domestic species and large game within wild species (diagram: Martin Hinz).

Cattle and wild species

We have seen that the ratio of wild animals within the assemblages declines over time. But which animal species take their place? Figure 14 shows the ratios of the domestic species that are primarily used for meat (cattle, pig and sheep/goat) in comparison to the ratios of large game (red and roe deer, elk, aurochs and wild boar) and small game or such species that are not primarily hunted for their meat (remaining).

From this chart, it becomes clear that the curve for cattle mirrors the curve of large game. Such a mirroring can also be observed if we compare the ratio of large game among the wild animals with that of cattle among the domestic species (Fig. 15). It is evident that cattle primarily assumes the role that large hunted animals formerly occupied.

Interim conclusion: Stages of human/animal relations

The analysis showed that the development of animal use, hunting and husbandry during the Funnel Beaker period is not simply a decline of hunting with the substitution of hunted meat by domestic animals. Rather, it appears that we are confronted with different stages of a complex transition.

From the beginning of the Funnel Beaker complex until 3800 cal BC, the spectrum of the sites is dominated by wild animals, with an addition of some domestic species, mainly cattle. Sites of this character are also visible in the next phase (3800-3400 cal BC). But at the same time, we can observe the establishment of another type of sites that is dominated by domestic species with only a small proportion of hunted animals. While we have little evidence for the time span from 3400-3200 cal BC, it is clear that this type of site does survive, while the sites with primarily wild animal remains vanish.

It is clear that the sites with a dominance of wild animals fulfilled a distinct function in the economic and social network of the Neolithic people, considering the distinctly different animal spectrum. It also does not seem plausible that these sites only represent situations in which hunting was of higher importance due to crisis, crop failures or other kinds of hazards. In such cases, we should observe a more continuous range. The explanation can also not be put forth that hunting was practised at these sites only during times when the inhabitants were free of agricultural duties: This might be a valuable explanation for animals hunted at sites with a dominance of domestic species, but it does not explain sites where wild animals represent the majority of bones.

Hunting may have possibly played a role in the ideology and/or in the social and political economy. This role must still have been important even where domestic species were available, but the relevance of hunted animals was replaced by cattle in later times. Both hunting as a 'traditional' subsistence strategy and hunted meat might have had a specific value. In many past and contemporary societies, hunting had a high social status. Moreover, there is a second aspect: The butchering of large game as well as cattle provides or even presupposes the opportunity to share the acquired provisions. These shared resources are likely to be a currency in the social bargain.

We have evidence that cattle gained a specific role in the ideology during the Middle Neolithic, be it the cattle burials of Northern Jutland (Johannsen/Laursen 2010) or the cattle depositions/burials of Central Europe (Pollex 1999; Szmyt 2006). Was this revaluation necessary so that cattle could become a social tool replacing hunted meat? Cattle-raising has another advantage over hunted meat: it is possible to share the stocks while it is still 'on the hoof'. If it is true that a social reorganisation has to be assumed

after 3400 cal BC, in connection not least with the establishment of larger settlements and resulting increases in social tensions leading to the establishment of a new social structure in the Single Grave period, the time had probably come to abandon the traditional economy that incorporated a substantial hunting aspect. Conceivably, it was this slight shift in the value of cattle that resulted in a changed configuration of the socio-political arena, replacing large communal building projects, such as megaliths, by feasting activities that gave individuals the possibility to set the agenda on the basis of an unequal access to the resources for such feasting – *i.e.* the number of cattle. These individuals appear to dominate the following Single Grave period at least from a ritual perspective, documented by the burial mounds of that time.

Conclusions

From what has been put forth, it is evident that although people in the study area of Stormarn-Lauenburg occupied the same places within the landscape from the Mesolithic onward and during the Neolithic period, this landscape and its perception must have changed very much in character. During the final Mesolithic, the riverine settlement clusters represented only one spot within the economic network, and the Mesolithic inhabitants of this region are likely to have been highly mobile during the seasons. Hunting was certainly an important part of the subsistence, yet the hunt for large mammals may have served more than just subsistence purposes.

In the Early Neolithic, we observe an even stronger concentration of these settlement clusters, and due to the nature of the economic system everyday mobility must have decreased. At this time, the centre of the landscape was surely the permanent settlement, representing one anchor point, while other foci and places of significance were marked by an intentional construction of places such as long barrows and megaliths. This mobility pattern, and the fact that landscape was also actively shaped by the clearing of fields and the building of places, would certainly have influenced conceptions of the environment. Hunting still continued to be an important activity, probably so important that it, together with access to aquatic resources, influenced the location of the settlement, respectively led to the stability of the settlement locations from the tradition of the Mesolithic. At the same time, it is not likely that the importance of hunting, especially for large game, resulted from the number of calories or protein that it contributed to the diet. In the first phase, it seems, that 'husbandry and agriculture substituted fishing' (Johansen 2006, 218), not hunting. The reason for this must have been that its value must have been seen in its social significance as a tool for risk minimisation, and its function in the social arena.

During a time of change, approx. 3400-3200 cal BC, coinciding with the transition from the Early to the Middle Neolithic, it seems that this function switched to cattle, as can be observed in the changes in the ratio of different animal species at Funnel Beaker sites. The situation described here might be very similar to those described by David Orton (2008, 307, see also 121-123) for the Vinča communities: "Regional scale social trends, with domestic animals [meaning primarily cattle, M.H.] [became] increasingly important in the political economy as tensions between household and community increased". Archaeologically, the disperse distribution of non-permanent sites with a simultaneous stability of permanent settlement locations also underlines a changed

economic practise most likely reflecting mobile or transhumant cattle herding, while ritual practises connected to cattle show its growing significance in society. Again, a changed mobility pattern must have resulted in a changed perception of the landscape that now also became increasingly open, as pollen data indicate (Feeser *et al.* 2012).

Perceptions of landscape cannot be investigated without considering changes in the economic basis of a society that governs, to a large extent, the daily practises, which in turn determine world views. But this economy cannot be interpreted meaningfully, if its social embeddedness is disregarded. In this sense, this article represents an attempt to link the different layers of the complex term 'landscape'.

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Borders: Developments of Society and Landscape during the Bronze Age and the Iron Age – Face Urns as a Case Study

Jutta Kneisel

Abstract

Face urns or anthropomorphic vessels are a phenomenon that we find at different times and at different places spread all over the world. They are used as grave goods or in settlements, as transport jars or – exclusively during the Bronze Age and the Iron Age – as urns. The following article will mainly discuss the dispersion of face urns across the Bronze Age and the Iron Age landscape, which differs from other distribution patterns of material culture. Even if the face urns at that time can be seen as a common phenomenon that reaches from Norway, Sweden and Denmark to Northern and Central Germany as well as to Northern Poland, a consistent distribution as well as uniformity in the burial custom are lacking. A combination of distribution patterns, research on the find contexts as well as on grave goods enables a differentiated insight on the cultural boundaries and on common patterns across borders of Bronze Age and Iron Age societies in North and Central Europe. This article tries to explain this common face urn phenomenon despite all cultural differences and to describe the transfer of this facial idea as a result of trade and exchange similar to phenomena during the Viking Age or the Hanseatic period.

Introduction

Borders in the landscape

Borders and boundaries in the landscape and the distinction of cultures are issues that have political topicality – even today. The dismantling of the border fence in Hungary in 1989 was hailed and considered to be an act of freedom, whereas border fences

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are currently (autumn 2015) erected in the same country to exclude cultural groups. Boundaries, borderlines and distinction are a current topic in Europe today. However, what do we know about borders and boundaries in the past – before the first literal European cultures occur?

We know borderlines from archaeological investigations as palisades, fences and pit alignments that extend for kilometres in the landscape and mostly originate from the Bronze Age and the Iron Age (Stäuble 2002; Schwarz 2005; Agthe *et al.* 2002). How different are these structures in form, size and design, and how different are interpretations on the constructions? Louis Nebelsick interprets the Central German structures as economic borders. They divide the landscape in terms of resource use and regulate access to resources (Nebelsick 2007, 277). Fire pit alignments or groups of fire pits (*Feuergrubenreihen*) are rather assigned to a ritual context. In some examples, like Hüsby, fire pit alignments mark the landscape and divide them in two parts (Meier 2013). They were used for the preparation of meals within the frame of festive activities (Schmidt 2012; Schenk/Goldmann 2004; Prangsgaard 2014; Lenssen 2009; Mattes 2010). In comparison, the palisade rows of Brandenburg (May 2009) and Denmark (*hulbælter*) are interpreted as fortifying structures (*e.g.* Steen 2005; Steen 2009). In recent years, all these structures were detected more frequently thanks to large-scale excavations and surveys – but they do not represent the norm.

In contrast, we observe a local form of the delimitation of settlements, which are surrounded by protective ramparts, ditches and palisades. In the Bronze Age and the Iron Age in Europe, we find the whole spectrum of such constructions from simple palisade rows to ramparts measuring several meters high (Nakoinz *et al.* 2017). They delineate the human occupation of the surrounding landscape and serve as protection and limitation for the animals inside the fortifications and against "wild animals" from without. Simultaneously, they define the populated areas as political and social units and make the settlements defendable against invaders.

As archaeologists, however, we also consider other borders – borders that we define using material culture. The spread of certain types, shapes, ornaments, customs and structures are specified as a cultural unit or group that can be distinguished due to space and time from other cultural units. Thus, a cultural unit is formed according to an assemblage of artefacts, structures and customs which are temporally and spatially coincident (see also Burmeister/Müller-Scheeßel 2006). Nevertheless, these cultural units generally have no sharp boundaries, but irregular to diffuse boundaries that may overlap in certain areas of the material culture. Internal distinctions can also occur (Müller 2006, 105).

However, how can we interpret components of the material culture that are distributed beyond such cultural boundaries and cannot be interpreted as imported or simple trade goods? This situation is the case in the Late Bronze Age and the Early Iron Age (1100-500 BC) with the representations of faces on ceramic urns in North and Central Europe. The faces appear in cultural units such as the Nordic Circle, the Pomeranian Culture and the group of Central German house urns. These anthropomorphic vessels are geographically separated from each other and differ in their characteristics. Nevertheless, the face urns are a common phenomenon of the Late Bronze Age and the Early Iron Age. What is behind this phenomenon and how we can explain it within the cultural borders of this period?

Thus, the following sections will discuss the borders and areas of contact of Bronze Age and Iron Age facial depictions. On the one hand, the common phenomenon of face urns will be described and, on the other hand, the differences and boundaries between these material culture expressions are researched in detail. We will first start with an overview of the faces on pottery in Northern Europe.

First vessels with faces in Europe

Facial depictions in North and Central Europe from the Neolithic to modern times

In Europe, faces on ceramics appear since the Neolithic. The earliest vessels are known from the Linear Pottery Culture (Schwarzberg 2014a, 16 fig. 10-12). In Northern Europe, earliest forms with "owl-like" facial images are found on Funnel Beaker pottery (Fig. 1), mainly on the Danish Isles (Ebbesen 1978) and a few in Mecklenburg-Western Pomerania and Schleswig-Holstein (Brozio 2016).

All of these ceramics are found within megalithic graves and were used as grave goods not as containers for bones. Faces are also known from the pre-Roman Iron Age, e.g., a group with small medallion-like faces from Northern Jutland (Lund 1990) and singular finds in Norway, England and Northern Germany (Bugaj 1999). All of these described appearances of faces on vessels are connected to graves, but they are not used as urns and are, for the most part, regionally distributed. From the Middle Ages onwards, the context of facial depiction changed. Pots with faces are now mostly known from settlements. In medieval Bergen, Norway, for example, a piece of English Grimston-pottery from the 13th – 14th century was found depicting a man with a beard[1]. This imported piece leads to the younger phenomenon of facial depiction in early modern times from the 16th to the 18th century – the so-called bearded-man jugs or Bartmann jugs from the Rhineland. The pottery of the ceramic manufacture of Frechen near Köln became quite popular and those jars were exported worldwide. They are used as drinking jars or transportation jugs for liquids, for example, for mercury. But they have also been found in Native American graves as grave goods. Among their worldwide distribution, they also occur in Denmark, Sweden and Norway (Gaimster 1997; Schwarzberg 2014b).

But by far the largest group of anthropomorphic vessels in the north appeared between 1100 and 500 BC. From this time span, ca. 270 vessels with facial depictions have been found in Scandinavia, 280 in Northern Germany and over 3000 in Poland (Kneisel 2012; Kneisel 2010). In contrast to ceramics with faces of the Neolithic, the pre-Roman Iron Age and Medieval times, ceramics with faces were used as urns (containers for human bones) in the Bronze Age and Early Iron Age Europe. With the exception of a single settlement sherd from Denmark (Bertelsen *et al.* 1996, 261; Kneisel 2012, 579 DK 149a), facial depictions on ceramics belong to the burial ritual and are therefore closely connected with the dead individuals. This means that these face-urns were solely produced for the grave context. The depiction of faces on urns

1 Exhibition in Bergen 21th Sept.–6th Nov. 2014. http://www.bymuseet.no/index.php?vis=1156&spr=en [18.12.2014].

Figure 1: Anthropomorphic vessels from Northern Europe from the Neolithic to modern times: 1: Wangels, Schleswig-Holstein, megalithic tomb (Neolithic S-H: Wangels LA 69, photo: S. Jagiolla); 2: Bindeballe, Denmark, urn grave (Late Bronze Age Denmark: Bindeballe, photo: J. Kneisel); 3: Gościcino, Poland, urn grave (Early Iron Age Poland: Binino, photo: A. Heitmann); 4: Hæsumsminde, Denmark, grave good (Roman Iron Age: Hæsumsminde, Lund 1990, 57-76); 5: Bergen, Norway, settlement (Medieval Norway: Bergen, http://www.bymuseet.no/index.php?vis=1156&spr=en [18.12.2014]); 6: Frechen, Germany (Frechen: Schwarzberg 2014, 129-142 fig. 7.4).

commenced parallel to the final implementation of the cremation ritual in Denmark around 1200/1100 BC, as if the cremated bones regained their original shape inside a ceramic body. The author Helga van den Boom describes this as if the cremated remains form a semantic unit with the grave vessel and the urn could thus be understood as a restoration of the dead (van den Boom 1980/81, 25). With the face, they even acquire a more individual touch (Fig. 2). Hence, it can be assumed that the Bronze Age and the Early Iron Age facial depictions are a clearly different phenomenon than faces of the other periods mentioned earlier.

Face urns in the Bronze Age and the Early Iron Age

Research history and its limits

Even the research history of face urns is not without boundaries, in this case the political boundaries of modern times. According to respective political preferences, face urns were characterized as a common or an independent phenomenon. This is partly

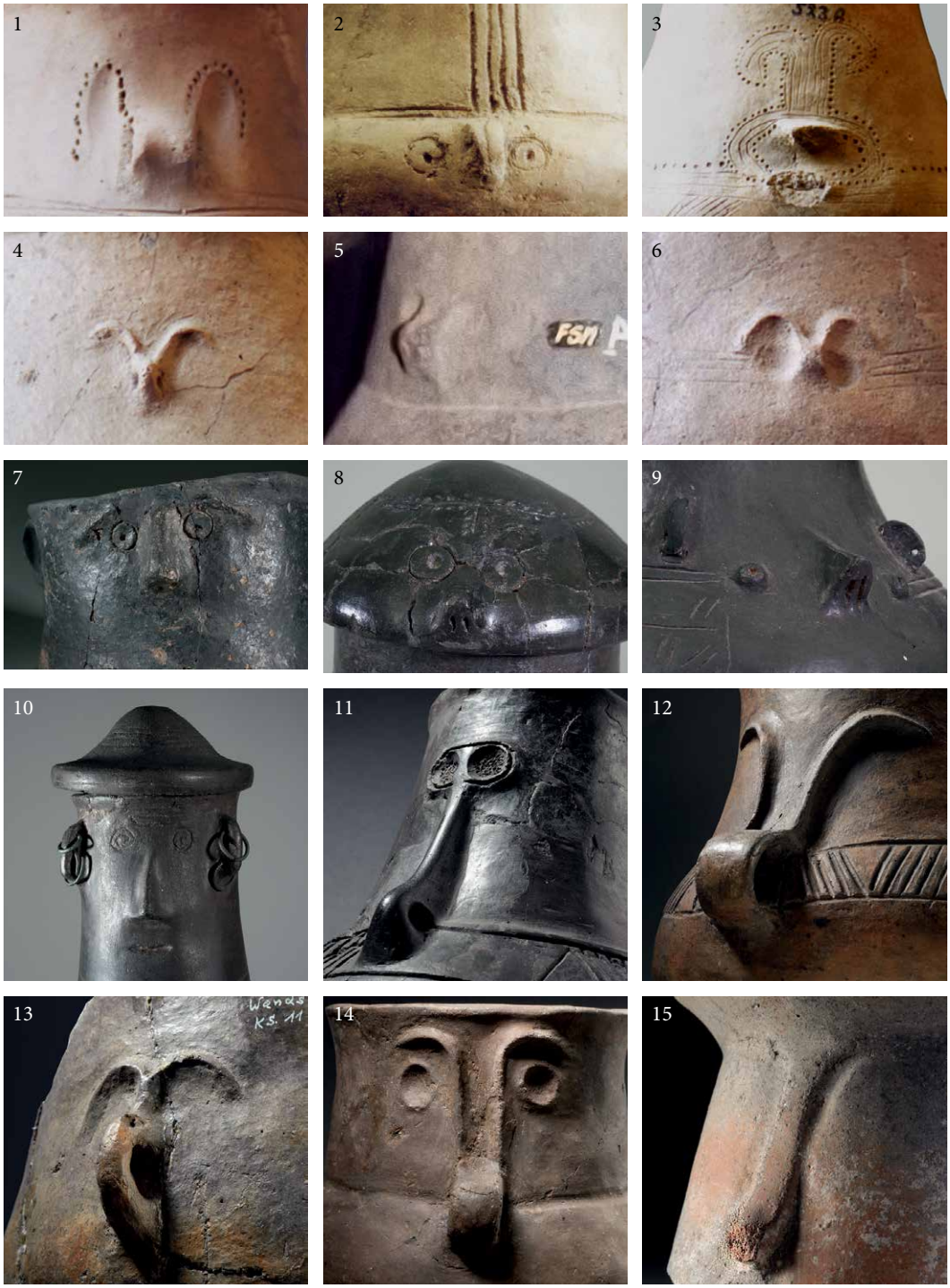

Figure 2: Variation of faces from Scandinavia, Poland and Germany: 1: Redsø; 2: Øster Løgum; 3: Alstrup Sogn; 4: Store Rørbæk; 5: Mosbæk; 6: Skovsgård, Denmark; 7: Duszno; 8: Bukowiec; 9: Wymysłowo; 10: Rzadkowo, Poland; 11: Beldorf; 12: Bilsen; 13: Marienthal; 14: Boostedt; 15: Meldorf, Northern Germany (photos: 1-6 J. Kneisel/C. Kiefer; 7-10 A. Heitmann; 11-15 S. Jagiolla).

grounded in the varied research interests of Poland, Germany and Denmark. In Poland, interest in face urns started already in the 17th century AD with the first publication of scientific papers on the topic (N.N. 1656). First dissertations on this subject were written already in the 19th century AD (Berendt 1872), while the Danish finds were published after World War II (Broholm 1949). Authors, such as Wolfgang La Baume and Hans C. Broholm, compare finds between Scandinavia and Poland (Broholm 1949; La Baume 1956), but without elaborating on these commonalities in more detail. Nonetheless, the differentiation of Pomeranian and Northern European face urns and the accentuation of their similarities is a research controversy, which was mainly led by representatives of Polish and German archaeology in the 1930s (Kostrzewski 1937-39; Petersen 1929; Hoffmann 1938; see also van den Boom 1980/81, 227-231). From today's perspective, the issue of cultural demarcation, respectively their genesis was a highly politically influenced question, which was connected with territorial claims of that time ("Germanic" or "Slavic" origin).

Current research construes the development of face urns as a common phenomenon that – despite all differences – exhibits many similarities (Kneisel 2012; Sabatini 2007; Kneisel 2016a). Chronological studies also verify that face urns occurred in all regions in a certain time horizon from the Ha C period until the beginning of the La Tène A period (mid 8th to early 5th century BC; Kneisel 2012, see fig. 8).

Thus, the research history concerning face urns should be critically assessed during and after World War II, whereby we must bear in mind that the current trend of research, namely the Europe-wide analysis of this phenomenon, is also not free from the influence of today's political developments.

To understand the face urn phenomenon, its borders and cross-border similarities, it is important to consider the development of the burial landscape and the material culture in the different regions. In the subsequent sections, the differences and similarities between the face urns in the various regions will shortly be discussed before turning to the question: How can we interpret the distribution patterns that apparently constitute a common phenomenon across cultural boundaries?

Face urns in the burial landscape

In the following section, the differences and similarities between burial rituals with face urns will be discussed. The funeral landscape in Southern Scandinavia and Northern Germany is characterized by monumental mounds of the Neolithic and the Early Bronze Age. These impressive grave mounds are located on the moraines and along river valleys – at highly visible places in the landscape. Scientific research has estimated that with the extensive construction of grave mounds and settlement activities (Holst *et al.* 2013), the landscape changed during the Bronze Age at the latest to a heath covered landscape with some trees (Fig. 3).

With the start of the Late Bronze Age, the burial ritual changed. Whereas inhumation burials dominated during the Early Bronze Age until around 1200/1100 BC, after that cremation was dominant. Nevertheless, the same burial areas remain in use. Urn or grave pits are dug into the southeastern edges of the older mounds. Of the few excavations in Scandinavia, which also include the surroundings of the grave mounds, we know that small urn fields existed with maximally 20 burials around the mounds (Hornstrup 1999; Runge 2013). Larger cemeteries with over 100 burials are currently

Figure 3: Ydby Hede at Skibsted Fjord. Grave mounds in a Bronze Age heather landscape, Northwest Jutland (photo: J. Kneisel).

only known from Simris in Southern Sweden (Stjernquist 1961) and in Northern Germany (Schmidt 1993; Kneisel 2018, fig. 15).

The occurrence of face urns is generally limited to the Jutland Peninsula and additional single occurrences on the Danish Islands, and in Southern Sweden and Norway. In Northern Germany, the distribution of face urns reaches from the Jutland peninsula to the Elbe-Weser-Triangle and Hamburg.

The urns themselves are dug into the ground, and are sometimes placed in small stone cists or surrounded by stone packing. There is rarely more than one urn in a grave and the addition of vessels as grave goods is very rare. Within burials, the anthropomorphic urns do not differ from other urns. Even the grave goods are similar to graves with other urns. Razors, pins, tweezers and jewellery, such as rings and double buttons, are the standard repertoire of the urn burials of the Nordic Circle and the face urns there; only weapons are a little bit less frequent (Kneisel 2018, fig. 10).

The funeral landscape in Northern Poland is very different from the Scandinavian landscape. Geographically, the northern Polish lowlands are the eastern part of the North European lowlands with lakes plates, whose highest point measures up to 329 m. Grave mounds from the Neolithic period connected with the Corded Ware Culture are known, but towards the end of the Neolithic flat grave burials increased. Single major grave mounds are still built during the Early Bronze Age, but the flat cemeteries constitute the vast majority. During the Middle Bronze Age in the Tumulus Culture, smaller grave mounds are erected, some in cemeteries located in the south in the hilly landscape and mountainous area of Greater Poland and Silesia (Jaeger/Pospieszny 2011; Kneisel *et al.* 2010). In this region, the Late Bronze Age large urn fields, arising from the 15th century BC onwards, continue over a long stretch of time until the Late Iron Age (*e.g.* Liebersee, Niederkaina, Kietrz; *e.g.* Ender 2002; Coblenz/Nebelsick

1997; Gedl 2000). In the northern Polish lowlands, however, the Pomeranian Culture developed from the 7th century BC onwards with a different grave custom. Unlike the large cemeteries in the south, the urns are buried in massive stone cists, forming up to 3 m^2 large grave chambers. The number of buried urns varies from single vessels to 20 urns pro cist (Fig. 4). On average, the stone cists contain between four and six urns.

The cemeteries usually consist of 10-25 such stone cists of different sizes. The distance between the cemeteries suggests small funeral communities, which approximately correspond to small hamlets. In addition to the graves, the cemeteries also have fire pits, which served as ustrina or were used to prepare food during funeral ceremonies (Fudziński/Gładykowska-Rzeczycka 2000, 12 fig. 5). With their stone covers and strong charcoal layers, they look very much like the Northern European fire pits (Schmidt 2012; Runge 2013, 18 fig. 12). Fire pits occur regularly on cemeteries of the Pomeranian Culture. They occur in groups (Fudziński/Rożnowski 1997, 10 fig. 5) or, as in the case of Rębie, gm. Przodkowo, in a half-circle on the top of a moraine (Fudziński/Rożnowski 2002, 8 fig. 3). The Polish face urns are rather poor in grave goods with the exception of some fibulae, pins and ring fragments and thus do not differ from other urn graves of the Pomeranian Culture. Unlike Scandinavian and Central German urns, jewellery and weapons are carved as icons (pictograms) on the Polish urns, which can then be used for dating purposes and enable statements regarding the social structure of the community that buried its dead there (Kneisel 2003; Kneisel 2001; Kneisel 2002).

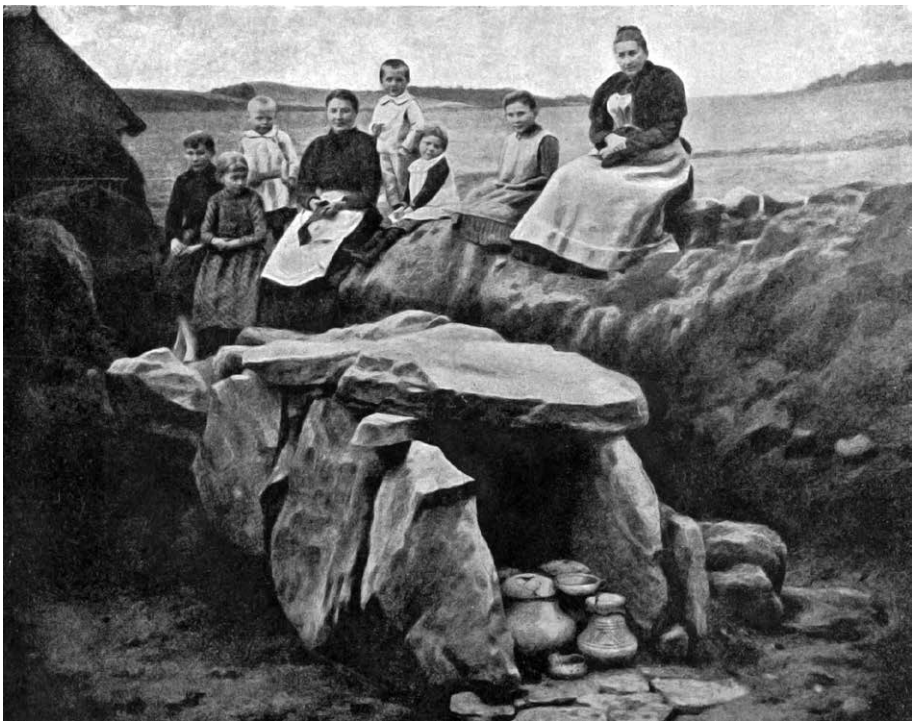

Figure 4: Zielenica, Poland. Excavation situation at the beginning of the 20th century AD with the family of the landowner (photo: Heydeck 1895/96, 67 – 74, plate VI).

The funeral landscape in Central Germany is located at the southern rim of the Nordic Circle and is culturally not substantially different from this. The northern Harz foreland is composed of regular ridges with heights of up to 300 m (Heske 2010, 87). Large grave mounds are not nearly as common as in the north. Flat cemeteries are the usual burial form. Cemeteries with cremation burials (Saale-Unstrut group) exist since the Late Bronze Age. In addition, inhumations in caves are present in this region, too (Schaefer in press). In the northern Harz foreland, the House Urn Culture is located (Heske 2010). Within this smaller cultural unit, face urns are buried in small stone cists and multiple burials with up to three urns per cist are possible. Occasionally, other vessels are also included (Wendorff 1981; Koberstein 1964). They are closely related to the house urns and their distribution. Mixed forms also exist, e.g., as a house urn with a face, or as a face urn with a door (Sabatini 2007; Behn 1924; Kneisel 2010). Face

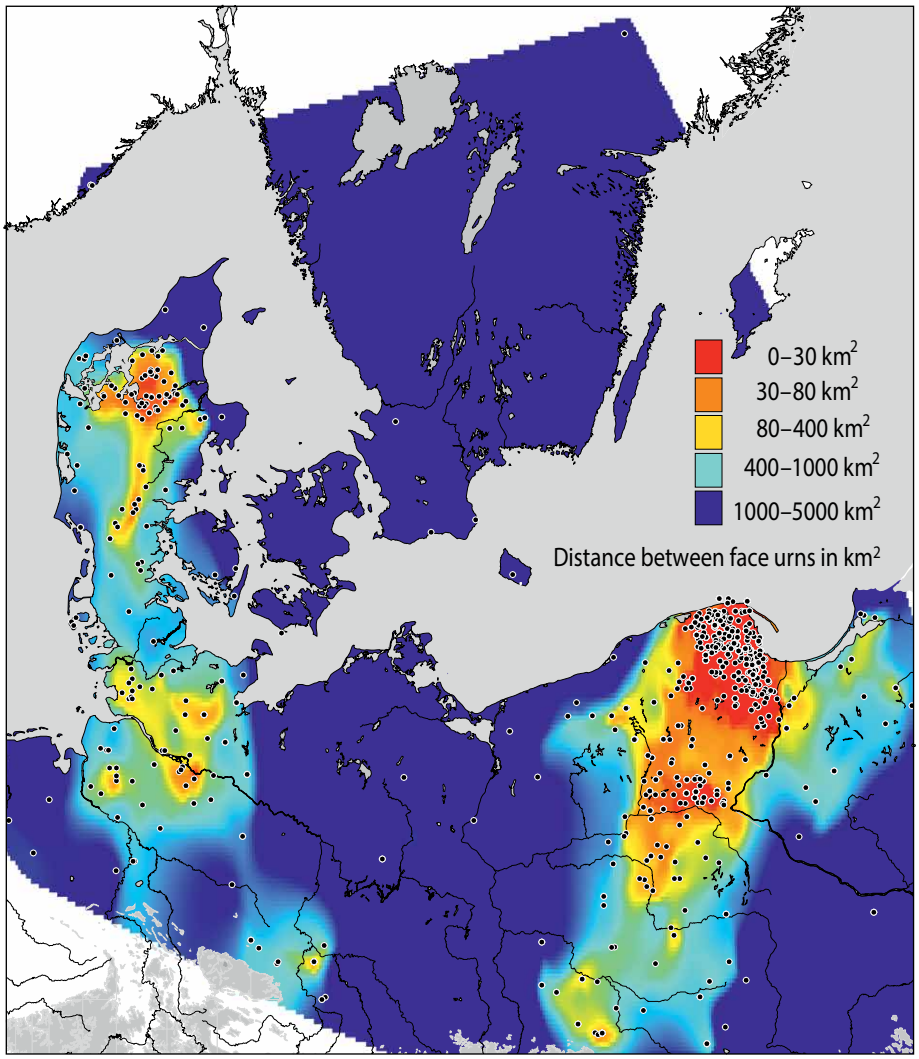

Figure 5: Distribution and density map of face urns in Northern and Central Europe during the Late Bronze Age and the Early Iron Age. Points: sites with face urns (density map: J. Kneisel).

urns occur in this region much less frequently than in Northern Germany, only around 20 pieces are known so far. As in Poland, the Central German face urns have only few grave goods, whereby most of the pieces cannot be dated closer.

The described regions with face urns differ in the prevalent grave structures, in the surrounding burial landscapes, and in the accompanying grave goods. In the north, weapons in the grave context of face urns are lacking, whereas they are represented as weapon-pictograms in Poland. In the north, pins and razors dominate. In Poland, we observe mostly pins, tweezers and ring fragments as grave goods. The respective grave goods mirror the local material culture. In addition, the types and forms of the grave goods in these mentioned three regions point to significant differences in the material culture.

Borders between the face urns (distribution patterns)

Looking at the total distribution of face urns in Northern and Central Europe, there are clear boundaries between these regions. With the help of a density map, the distance of the urns to each other can be visualized (for the method, see Kneisel 2015, 257). The density map (Fig. 5) shows the distance between the face urns in square kilometres.

Rather than mapping according to the individual sites, the analysis includes the number of face urns *per se*. The similarity in terms of the frequency of the distances was divided into four regions (Germany, Denmark, the rest of Scandinavia and Poland). The next graph (Fig. 6) shows that the distribution of face urns in Germany and Denmark is about the same and the distances of urns to each other are between 100-10,000 km^2.

However, a group of Danish urns has a much smaller distance from 30-70 km^2. The Polish urns show a wide range of distances, but the majority (over 50 %) has distances from 1-30 km^2. A secondary frequency in Poland is the distance between 30-80 km^2 and is consistent with the densest Danish concentration. The urns in the rest of Scandinavia, however, are so isolated that they have much greater distances between each other. The diagram (Fig. 6) was used to form intervals of density for the face urns in the map (see

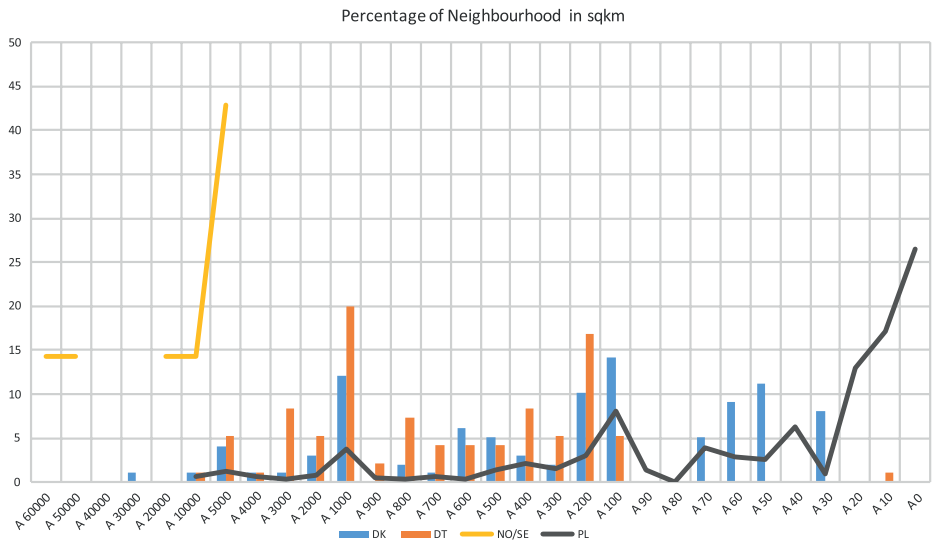

Fig. 6. Frequency of distances between face urns, separated after regions. Blue Denmark, orange Germany, yellow rest of Scandinavia and grey Poland.

legend Fig. 5). Accordingly, two density concentrations emerge – one in Northern Poland along the coast of Gdańsk and a second in North Jutland.

As a result of the diagram and the density map, two centres with face urns are recorded – one in Northern Poland and a second one in North Jutland, south of the Limfjord.

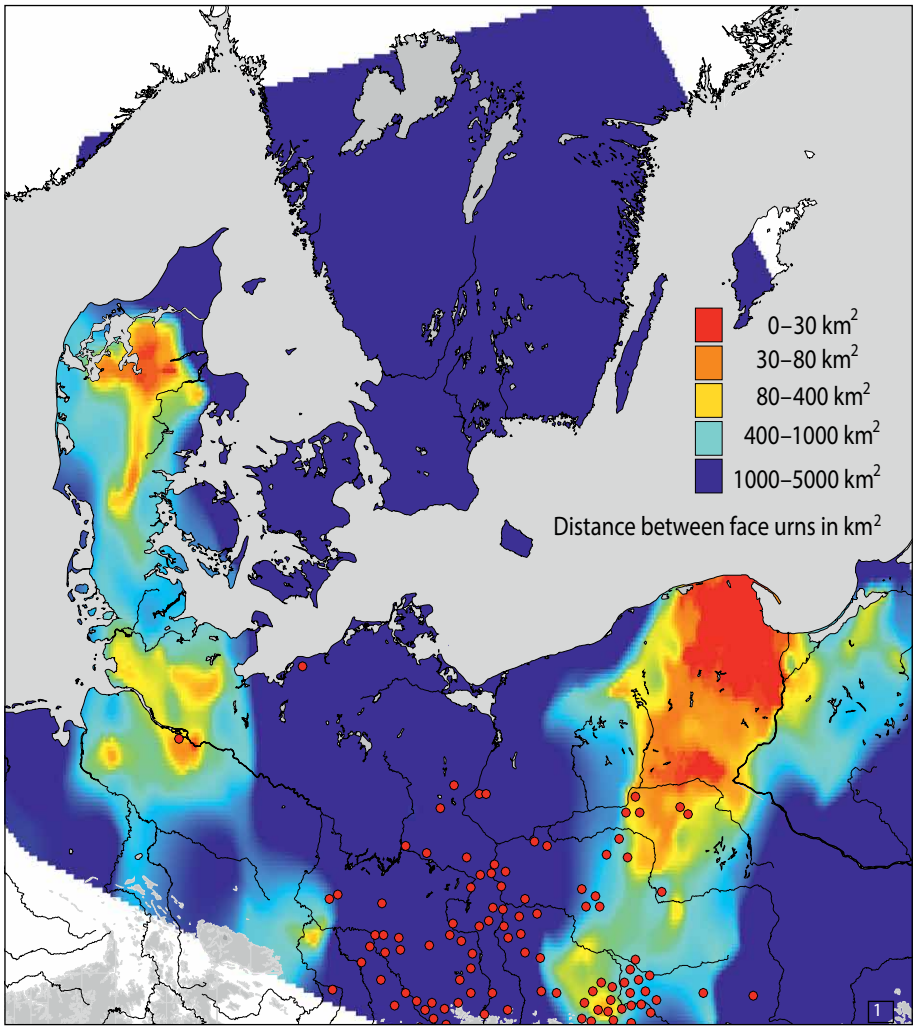

Figure 7: 1: Density map of face urns in Northern and Central Europe and bird figurines (red points) and rattles during the Late Bronze Age and Early Iron Age; 2: Bird rattle from Miejscowość, Poland (rattle after: Skorupka 2008, 15 fig. 10; distribution after: Gediga 1970; Buck 1979, 104 fig. 83).

Two additional but minor concentrations are visible in Silesia and another one ranging from Dithmarschen to Hamburg. Between the Elbe and the Oder, we find only few face urns. The face urns of the northern Harz foreland are another very small and thus local centre. Between these regions, we only find face urns sporadically. Using the density maps enables us to comprehend the limits of distribution (see also Müller 2006) and thus to visualize the extent of the phenomenon of face urns. With help of the density map, we can visualize the borders in the landscape. This leads to the question, what material culture exists in the geographical area of the face urn distribution and what do we know about burial rites in the region between the Elbe and Oder Rivers?

The burial custom in this region is characterised by small and larger cemeteries with cremation burials of the so-called Lusatian groups. Similar to those of Northern Europe, some of the burial sites are oriented to older grave mounds (Bönisch 2011). Even small stone cists, wooden chambers and multiple burials are known from this region (Bönisch 1995), but not to the extent as observed in Northern Poland. In addition, pits with animal bones and paving from sherds are observed, which are interpreted as remnants of festive activities associated with the burials (Tiedtke 2015). The graves of the Lusatian groups include, in contrast to the face urns, several vessels as grave goods, sometimes even whole sets of pottery (Buck 2007; Nebelsick 1995). Seeking for figurative expressions of the ritual world in that region, we come across clay figurines shaped as birds or water birds (Fig. 7), partly designed as rattles and originating mainly from grave contexts (Schmeiduch 2016). Just as the faces, the birds are also a rare expression of figurative intention of the Late Bronze and the Early Iron Age. Both the face depictions and the bird figurines play a ritual function in the grave context. A comparison of both find categories is adequate to obtain a boundary between them. In their distribution, these two spheres of figurative expression are clearly separated (Fig. 7).

The distribution of bird figurines lies precisely in the area between the Elbe and Oder Rivers, from where we know no face urns. A slight overlap of these two spheres is only found in Silesia. Right here we can draw a cultural boundary between the facial depiction on the urns and clay bird figurines as grave goods. Parts of the burial ritual seem to be quite different.

Chronological boundaries of the facial depictions

The various manifestations of the faces are not only separated geographically but also in time. Against earlier assumptions that Polish face urns are much younger than the earliest Scandinavian forms, new investigations provided a chronological order of their appearance. The earliest face urns occur in period IV of the Nordic Bronze Age from about 1100 BC onwards (Fig. 8).

The facial depictions at this time show a high variety and are rather small and concealed on the urns (Kneisel 2012, 139-140). The earliest forms are from Northern Jutland. During period V from about the 9th century BC, face images spread throughout the Baltic region. In Central Germany, they are observed from the Ha C period onwards (Wendorff 1981). In Poland, we know a few urns from this period, but the majority of urns with faces dated to the Ha D period, which extends further until La Tène A (end 7th – 5th century BC). Despite these chronological differences, a common period exists in which urns with anthropomorphic ornamentation occur in all regions. This ranges from the mid-8th century BC until the end of the 6th century BC (Kneisel 2012, 487).

	Denmark	other Scandinavia	North Germany	Central Germany	Poland	Trachsel 2004	Jensen 1999 Trachsel 2004 Hennig 2001
Per. IV early	?					Ha B1	1100 - 1000
Per. IV young						Ha B2	1010 - 890 / 820
Per. IV-V						Ha B3	900 - ~850 / 800
Per. V						Ha C	~850 / 800 - ~730 / 20
Per. VI early							~730 / 20 - 620
Per. VI late						Ha D	650 - 530 / 20
Ib						LT A	530/20 - 425
Ic						LT B1	
Id						LT B2	425 -
II						LT C	

Figure 8: Chronological order of face urns in different regions. Light blue: early forms; blue: faces; dark blue: rudimental forms (graph: J. Kneisel).

Figure 9: Similarities between different Regions. Upper pictures from west to east along the Baltic Coast: 1: Bilsen, Germany (Elbe-Weser Triangle) (photo: S. Jagiolla); 2: Askeløkken, Bornholm (photo: J. Kneisel); 3: Chłapowo, Poland (Peninsula Hel in the Gulf of Gdańsk) (Kneisel 2012). Lower pictures from north to south: 4: Bringsvar, Norway (near the coast) (photo: J. Kneisel); 5: Szprotawa, Poland (Silesia) (photo: Kneisel 2012).

Similarities across the borders of facial occurrence

Despite the iconographic differences in the representation of faces, in the partly different burial customs and the clear boundaries between the different appearances, a number of parallels point towards a joint development of the face urns or to a common phenomenon of the face image. The burial custom related to face urns in larger stone cists with multiple burials is rather unusual for Northern Europe, but it is found both in Bringsvær, Aust-Agder and Njølstad, Rogaland (both Norway) and in Boostedt, Schleswig-Holstein (Kneisel 2016a; Kneisel 2016b). In Central German burials, stone cists consisting of multiple burials are more frequent than in other areas. Similar forms and depictions of faces can be found between distant regions such as Norway and Silesia or Northern Germany, e.g., in Bornholm and the Gulf of Gdańsk (Fig. 9).

The Central German face urns have their closest parallels in Poland, but iconographic parallels also exist between Italy (the Italian canopic urns from Chiusi and the surrounding area) and the Gulf of Gdańsk (Kneisel 2013; Kneisel 2010). These geographically separated regions have further characteristics that speak for a close linkage of these regions in terms of burial rites. In all regions – albeit with varying frequency – house urns and mixed forms of face and house urns occur (Kneisel 2012, 480). In addition, urns with lids were only found in all these areas with facial depictions (Kneisel 2012, 452-453). Although we also know of urn covers from other regions in this period, such covers are normally upturned bowls or vessel bottoms and not specially made lids with notches or plugs, whose sole function is to close an urn and which were manufactured specifically for the urns. These quite striking similarities between long distance areas could be only explained by knowledge about the vessels from the respective other regions.

Transfer of ideas

Symbolic interactionism as an explanation model

Accordingly, we can speak of a common phenomenon associated with the ritual context of burials (despite all the differences of material culture and spatial distances): the representation of faces on human bone containers. How can we imagine this transfer of ideas? Despite all of the displayed parallels, the fundamentally different design of the faces argues against a common design principle. The three regions of Northern Poland, Central Germany and the Nordic Circle belong to different cultural units, whereby their material culture sets them apart from each other. Despite the similarities mentioned above, the majority of urns were manufactured locally and facial representations were adapted to local convention and taste. This is where Herbert Blumer's symbolic interactionism helps (Blumer 1973; Blumer 2007). The mechanisms of the exchange of ideas and imaginary worlds or spiritual concepts are essentially based on communication. The acquisition of images and ideas can reveal something about the degree of communication and the quality of the contact between two groups or individuals. Based on Blumer's symbolic interactionism, a model for exchange was developed (for more see Kneisel 2016a). According to Blumer, the meaning of an object or an idea is imparted by communicating with other individuals or groups which presupposes social interaction. This can lead to a shift in meaning of the object or the idea – a transformation that Blumer describes as

an interpretive process. The key to his model is that the meaning of things or ideas is derived from social interaction between counterparts.

The high variance in face depiction makes a common design principle for all face urns unlikely. Rather, the urns were manufactured locally for use in grave contexts. The face images were respectively adjusted to local tradition and taste in the regions of North Jutland, Northern Germany, Central Germany, Poland and Italy. Only individual – above-mentioned urns – indicate links between these regions. The question is what connects these regions in order to enable such a transfer of ideas?

Areas with resources as centers for the transfer of ideas

The face urns are found in areas that have rich resources and coveted goods. North Jutland and the Gdańsk Bay are rich in amber, which was exchanged in large quantities to Southern Europe (Kneisel 2012, 470-477; Kneisel 2013, 166 fig. 12.10). The Harz region is rich in saline springs and as early as the 7th century BC salt extraction from Bad Nauheim is verified and develops into a very intensive production process from the 4th century BC onwards (Kull/Becker 2003; Saile 2000). Italian face urns occur in the area of Bucchero ceramic production (since the 7th century BC; Regter 2003), also a sought-after commodity. At the same time in Poland and Central Germany, import goods can be found, which validate contacts with the Eastern Alpine area and Italy. The small region of Dithmarschen, as one of the smaller regional concentrations of face urns (see Fig. 5), is characterized during that time span by exceptionally long distance contacts and rich grave goods, among others gold (Kneisel 2012/13; Kneisel 2018).

Summing up these observations (in more detail in: Kneisel 2018, the density centres, which have been visualized in Fig. 5, are also areas with a high frequency of long distance relationships. They connect the Baltic Sea with the Gulf of Gdańsk and the Limfjord with river systems, such as the Elbe, Vistula, Noteć and Warta. The Elbe-Weser-Triangle connects Hamburg with Dithmarschen and lies on the western route from England to the Netherlands and North Jutland.

Transformed burial rituals

Burial rituals within a society or a group are normally standardized. It is unlikely that an individual alone can influence the burial ritual of a society or subgroup in the sense of symbolic interactionism. For something as fundamental as the burial ritual to be adopted means that a foreign person or a group of foreign persons must have lingered in one place for a sufficient length of time so that he or they could die and be buried within a foreign site. However, this presupposes that the burial community knew how the deceased person(s) should be buried according to customs of their place of origin. It is therefore likely that we are dealing with foreign groups that were responsible for the "proper" burial of their dead. Consequently, it is also likely that the transfer of ideas was carried out by groups that moved from one region to another and adhered to their own local burial customs in case of death onsite. Burials in face urns are equally distributed between men and women and include both children and adults (Kneisel 2012, 194). The grave goods are adapted according to local contexts. It can therefore be assumed that local individuals also observed such burial rituals; some may have participated or had to take over these rites due to marriage and children.

Thus, the transfer of ideas between the regions can be explained, on the one hand, by means of transformation and different interpretations of the burial rites. On the other hand, the regions were involved in intense exchange relationships, which were probably carried out by entire groups or families who stayed for longer time spans at places outside of their areas of origin. From younger periods, such as the Viking period, such examples are known. The Scandinavian burials in ship graves and/or in ship settings are known from maritime trading sites along the southern Baltic (*e.g.* Groß Strömkendorf, Menzlin) and are evidence of such trading voyages and display adopted or imported burial customs (Jöns *et al.* 1997; Schoknecht 1977; Müller-Wille 1968/69). Obviously, traders from the north died at the south Baltic coast and were buried according to the customs of their home regions. In this case, seasonal travelling to trade centres and longer stays in these areas are proved by several sources. From Hanseatic times, we know that the merchants of Lübeck were integrated within more than one social environment, both in their home ports and at their Swedish trading posts, where they stayed biannually (Naum 2016). In these two examples, travelling and longer stops at central places for trading show partial social integration, while maintaining the burial rites of home regions. In the areas of exchange, it was possible during the Bronze and the Early Iron Age to see or apply a different kind of burial ritual, a ritual that then spread in the 8th century BC in different regions with resources of interest.

Concluding remarks

In conclusion, from the 8th – 5th century BC we can assume larger social groups in Europe, which were connected due to trading and who traversed through Europe and temporarily settled outside of their places of origin. I assume that we need to talk much less about individuals or small trading groups than about family groups or larger social units, who were able to settle or stay for a while in a foreign region. This thesis could explain why the age and gender distribution is quite even in the anthropological material of the face urns in Northern Europe. The destinations of such trips were places with rich resources such as salt or amber. The Lusatian region or the Danish islands, where face urns are rare or absent, however, were just areas to be passed through and where merely temporary visits occurred[2].

Summary

The question posed at the beginning of this study about the presence of cultural units and boundaries could be clarified. We can show clear boundaries not only between occurrences of the face urns but also cultural boundaries within material culture and the grave rituals in the Late Bronze Age and the Early Iron Age. Face urns come from different regions, separated by other cultural units such as the Lusatian Culture or the Mecklenburg/Southern Swedish/Danish Island Bronze Age. Nevertheless, face urns are to be regarded as a common phenomenon that extends from North Jutland, spreading over the Baltic Sea to Poland and Central Germany. With help of Blumer's symbolic

2 At least not from people connected with face urns.

interactionism, the process of transformation and the different appearances of the faces could be explained. The transformation of the burial ritual could only have occurred with the participation of larger groups that lived onsite (outside of their original places of origin) for a longer period of time and buried their dead according to their own and not local customs. The distribution of face urns is linked to the occurrence of natural resources (amber, salt) and places with a high frequency of long distance contacts. Parallels from the Viking Age and the Hanseatic period, such as the finds of Scandinavian ship graves on Slavonian maritime trading sites or the biannual change of residence between two trading posts of Hanseatic traders, provide us with similar phenomena, which are closely linked to trade and shipping routes. Obviously, it was possible to overcome these clear cultural boundaries during the Late Bronze Age and the Early Iron Age in order to establish roots in other places, to become socialized there and to build up family contacts. Cultural borders are not insurmountable.

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The Iron Age in Southwestern Germany

Oliver Nakoinz

Abstract

Intensive work over decades and outstanding finds lead to a rather canonical image of the Early Iron Age in Southwestern Germany. This image includes social hierarchies and territoriality and is mostly based on the research about princely seats and ostentatious graves. A question driven approach, cross-examining certain assumptions, leads to a consistent alternative image. The concept of image archiving and the results are discussed in this paper. Modelling cultural areas, border transportation systems, interaction patterns and settlement dynamics are applied and form an analytical system comprised of complementary approaches. The result shows a society, in which territoriality and hierarchy play rather moderate roles, while social ranking and remote connections are vital phenomena. The interpretation of princely seats changes considerably.

Introduction

The traditional image of the Early Iron Age in Southwestern Germany was developed during many decades and is based on an impressive quantity and quality of finds and building structures (Archäologisches Landesmuseum 2012; Biel 2007; Kimmig 1969; Kimmig 1983). This work was carried out by using a hermeneutic approach rooted in humanities. The research process is comprised of abductive reasoning and empathic interpretations. The plausibility of rather guessed explanations has been shown not by deduction or verification but by showing consistency with other ideas and assumptions. In this process, a semantic net of possible meanings emerges and enables an understanding of the archaeological evidence and the development of narratives on history based on the archaeological evidence. An outline of some ideas of traditional research will illustrate these observations. A first observation, which leads to interpretations with far-reaching implications, is that some graves are provided with prestigious goods such as gold, bronze vessels and chariots. This observation leads to the conclusion that some individuals are not only wealthier than others but also occupy a superor-

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dinate position in a social hierarchy. In particular, certain individuals are assumed to be political, religious and economic rulers. The appearance of rich graves during different phases and generations is sometimes used as an indicator of dynasties.

During Ha C and Ha D1, the indicators of wealth in graves do not only increase but are also more concentrated. Prestigious goods are no longer widely spread, but concentrated in certain areas in which we often find a fortified settlement with certain properties. These so-called princely seats are interpreted as centres of political and economical power and hence the process is interpreted as a concentration of power (Biel 1987; Biel 2007; Krausse 2004). In particular, two concepts are used to interpret this outstanding type of settlement, the princely seats: centralisation and urbanisation (Krausse 2004; Krausse 2008). The sites are considered to represent a certain step in the process of urbanisation, a process in which settlements are transformed from a rural way of life to urbanised life. This process is associated with a growing population and changes in both communication and consumption. The princely seats – interpreted as central places – assume central functions such as administration, security and trade for associated areas. An associated area is a kind of territory. The general idea revolves around the notion that the importance of a princely seat can only be derived from controlling big territories. Such importance is exhibited by goods with origins in the Mediterranean region, whereby only important territorial rulers can be considered to be decent trading partners for the Mediterranean civilisations. Goods from the north are rarely observed at the princely seats, which hence appear as the northern terminal of trading links between Central and Southern Europe. Although some modifications are discussed – for example an application of social structures that are observed in ethnological studies was proposed (Eggert 2007) – this image of the Early Iron Age seems to be accepted as common sense (Archäologisches Landesmuseum 2012; Brun 2002; Chaume 2001; Biel 2007). Only one class of problems of this concept shall be mentioned here: The assumed assignment or subordination of elements to superior elements. This problem appears at different places in the concept and on different levels of argumentation. In general terms, hierarchies are equalled with rankings. From a systemic as well as an organisational point of view, a hierarchy comprises a ranking and an assignment of elements to superior ones. While the ranking can be derived from observations, the assignment is difficult to prove. This means that social hierarchies and settlement hierarchies are rather assumed than based on empirical observations. The hypotheses whether the members of assumed dynasties are related and whether certain areas belong to central place territories also belong to this class of problems. The traditional image of the Early Iron Age seems to be consistent and different parts of this image appear to support each other, even though this image is based on some similar but far-reaching assumptions which are not supported by observations. We can neither accept nor refute these assumptions without an empirical validation. The traditional approach results in a plausible model, although it is not the only plausible model. The modern approach discussed in this paper is a strict formalized approach, which increases the balance between the roles of deduction, induction and abduction. In contrast to the hypothesis-driven hermeneutic approach, which aims to support certain interpretations, this is a question-driven approach aiming at answering questions by testing the evidence. This approach employs a modelling based framework, strategy and terminology and applies, in particular, quantitative methods (Nakoinz/Hinz 2015). This approach reduces the assumptions on the

meaning of archaeological objects and focuses instead on the reconstruction and recognition of patterns and structures. While traditional approaches promote certain theories and other quantitative approaches focus on certain methods, this approach combines complementary methods and concepts and balances method and theory. All methods possess a strong theoretical background, which is the basis of the interpretations. The driving question of this paper is: How can we explain the genesis, location, development and collapse of agglomerations such as the Heuneburg?

This question is addressed with an approach, which considers human behaviour in landscapes and hence is focussed on spatial aspects. Topics touched in this paper include areas of interaction, territories and borders, pathways and connections, centrality and networks and finally population dynamics. A new image of the Early Iron Age is drawn by complementary analysis located in the field of the mentioned topics. Although nested concepts and analysis are used, the reasoning is due to the formalized modelling approach not as complicated as in the traditional approach. This paper does not focus on methodological details, but on the interweaving of concepts and results which is important for an understanding of the chain of arguments.

Material and methods

The research presented in this contribution is the outcome of and based on the data acquired during different projects. First, the project "Siedlungshierarchien und kulturelle Räume", proposed by Dirk L. Krausse, Johannes Müller and Ulrich Müller, has to be mentioned. This project resulted in an extensive database, containing more than 100.000 records on sites, finds and structures (the SHKR-database is available at: http://www.johanna-mestorf-academy.uni-kiel.de/wordpress/data-exchange-platform/shkr/). The database comprises all available information on sites, artefacts, building structures and burial rites. Settlements are considered as well as graves and single finds. Furthermore, a dissertation (Steffen 2012) and a habilitation thesis (Nakoinz 2013a) were prepared as a result of this project. The project "Modellierung und Rekonstruktion ältereisenzeitlicher Interaktions- und Distributionssysteme in Südwest- und Westdeutschland sowie im Elsass" proposed by the author is currently an ongoing project, extending and refining the SHKR-database and applying different approaches (Faupel in print; Fig. 1). Finally, the author's Heisenberg fellowship has to be mentioned, which was used to conduct some additional analyses (*e.g.* Nakoinz 2013b).

The methods employed in this study, are embedded in two types of models. Theoretical models establish conceptual or quantitative connections between different entities. The connections in theoretical models can involve definitions and assumed or optimized systems of relationships. In contrast, empirical models map observations. For each of several topics, models of both basic categories are discussed.

Cultural distances

The first topic is cultural distance. Based on a conceptual model, mapping the relationship between people and cultural traits, the idea of cultural distances allows a quantification of culture implementing certain methods on empirical data. Cultural distances and assumptions on the emergence of cultural traits are used to determine

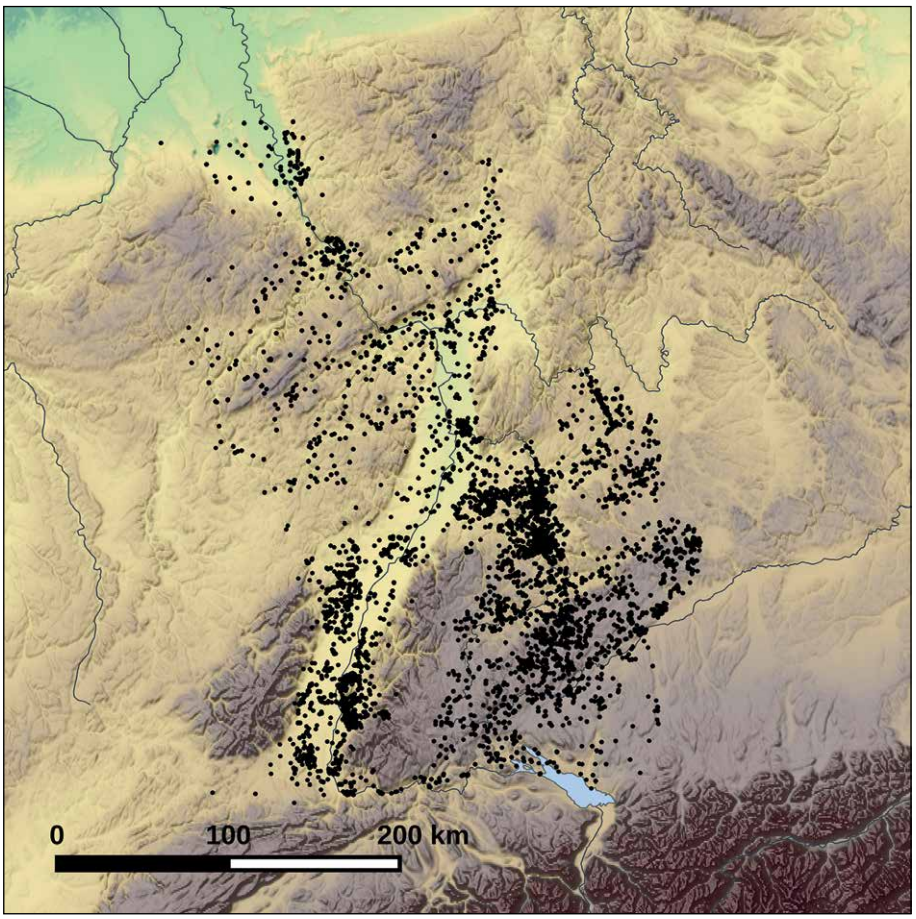

Figure 1: Map of sites in the area of interest (created with SRTM data: http://srtm.csi.cgiar.org).

cultural territories. These cultural areas, being empirical models, are compared with some theoretical Voronoi-models of borders. While the border-oriented approaches are focused on the delimitation of cultures, pathway-analysis and simple interaction models enlighten cross-connections. Based on the information contributed by these five approaches, the problem of locating extraordinary settlements is addressed. The theoretical centrality models are involved in this step. Finally, theoretical and empirical models of population dynamics, including agent-based-models, help to explain the emergence and disappearance of agglomerations.

This contribution employs a balanced combination of theoretical and empirical approaches – of naturally and of culturally determined behaviour and of different modelling techniques. Hence, it produces a multi-faceted image of the Early Iron Age. This topic focuses on definitions, concepts and the interrelationship of different concepts and approaches, while methods are described in detail in other publications (Nakoinz 2009a; Nakoinz 2013a; Nakoinz 2014).

According to Klaus P. Hansen (2003), cultures are the standardisations that are valid in collectives. Standardisations are similarities and collective groups of people. According to David Bidney (1967) and Julian S. Huxley (1955), culture is comprised

of artifacts, socifacts and mentifacts. Socifacts and mentifacts are not directly accessible from archaeological sources and have to be reconstructed from material culture/artefacts. The artefacts, interpreted as proxies of standardisations, form a kind of cultural fingerprint (Nakoinz 2014) which allows the identification and distinction of cultures. For this purpose, knowledge of the meaning of the standardisations is not required. The theoretical considerations induce certain methods for dealing with cultures in archaeology. If the relative quantities of artefact types (*Typenspektren*) are available, it is possible to calculate cultural distances, which indicate the differences of cultural entities. In order to compile the "*Typenspektren*", all available types of artefacts (finds and structures), which are connected to the whole society or certain parts of the society, are used and since social and mental structures are reconstructed using artefacts, all information about ancient cultures are involved.

On the basis of cultural distances, cultural groups can be reconstructed. First, we have to consider the implications of our theoretical considerations. Since individuals participate in different sets of standardisations, they may belong to different cultures at the same time. According to the standardisations and members, different cultures can be organized in a poly-hierarchical structure. The different cultures are usually not spatially bound. Spatial cultures are therefore are a special case of cultures. Although this contribution deals with spatial cultures, non-spatial cultures, which encompass the majority of cultures, are not out-ruled by principle, but by research focus. Connecting to traditional research, we can define archaeological cultures as spatial cultures with crisp borders. Archaeological cultures are a special case of spatial cultures. It is obvious that we cannot presume the existence of archaeological cultures, although cultures exist by definition in a world with similarities. The existence and extent of certain archaeological cultures has to be tested on the basis of empirical data.

When focusing on spatial cultures, the cultural distances have to be calculated for spatial entities, for example, regular sample points (Nakoinz 2013). The cultural distance between spatial entities with a similar culture is rather small. A cluster analysis reveals groups of spatial entities with similar sets of standardisations. These groups comprise the most frequent sets of standardisations and hence are dominant in the poly-hierarchy of cultures. If the members of a group are spatially clustered, it can be deduced that the similarity is not random and that the culture is spatially bound. For archaeological cultures, we also need to show that the extent of spatial cultures of different parts of the society is similar. For this purpose, the results of cluster analyses of types connected to different parts of the society are overlaid and compared. Secondary cluster analyses, which group the groups/cultures of the first cluster analyses, can help to distinguish different components.

Archaeological cultures might tell us something about collective identities – at least under certain circumstances. Archaeological cultures can in no case be interpreted as historic actors, races and similar entities (Nakoinz 2013). For a general interpretation, we need to know about the emergence of similarities/standardisations. The applied definition of culture focuses on a relationship between similarities and groups of people. Psychological research on alignment in dialogues (Garrod/Pickering 2009; Pickering/Garrod 2006), for example, shows that interaction in general leads to increasing similarities. Archaeological cultures can therefore be interpreted as interaction areas. More specific interpretations require more specific information.

Cultural areas

The analysis of cultural areas produces an empirical model of cultural borders. Subsequently, we proceed with theoretical border models. A very common class of border models are Voronoi models (Härke 1983; Okabe *et al.* 2000). A border is drawn at the same distance to two centres and hence, centres are required. Since the princely seats are assumed to be centres, the approach is applicable. Usually the calculation and the plotting are done in accordance with geographical space. It is also possible to use economical (=least-cost) and cultural distances. Further additions to the set of theoretical border models can be weighted Voronoi-models, where the centres are assumed to be of different importance. The number of rich graves or prestigious artefacts can be used for weighting the centres.

In contrast to the border models, pathway models show the connection of different places and areas. Empirical pathway models are based on pathway indicators. Since observed pathway remains dated to the Early Iron Age are not very frequent, other indicators have to serve the purpose. We assume that necropoles are located at pathways. The distribution of graveyards corresponds rather with pathway locations than with the border locations, although a location at both lines cannot be out-ruled in general. A recently developed approach constructing density ridges (Nakoinz/Knitter 2016) is used for the reconstruction of the empirical pathway system. While pathway analyses are rather concerned with local and regional scales, we can use the cultural area approach to explore connections on regional and supra-regional levels. Certain longitudinal cultural areas can be interpreted as communication axes. In this case, intensified interaction along the main roads produces a higher level of similarities of material culture. Empirical communication axes are not only indicators for a pathway or a set of pathways, but of the actual usage of such connections.

Least-cost path models

Least-cost path models serve as theoretical models (Herzog 2014; Nakoinz 2010; Nakoinz/Knitter 2016, 169-192) and yield the route between two places, which, in turn, denotes the least effort when travelling from one point to the other. Different parameters can be used for measuring the effort. The slope of the elevation model is the most frequently used parameter, which is converted to a measurement of effort by cost functions. Other parameters might be elevation, sight and soil-type. Random walk models allow the production of maps with the probability of pathways instead of one optimal route. While the actual pathway is established by the empirical model, the theoretical models are essential for an understanding of the routes. They allow an investigation of the preferred parameters of pathways and help to deduce social and economic conditions.

Traditional interaction models complete this knowledge with some details (Nakoinz 2013b; Nakoinz 2013c). They map the intensity of interaction over a distance. The distance can be the geographical distance, an economic distance, for example, a least-cost distance, the distance in the road system or cultural distances. The interaction intensity can be calculated for certain point pairs, for all point pairs or for certain groups of point pairs, for example, along a transect. Here, we learn about the factors influencing interaction. What causes interaction friction? Where are interaction

thresholds? What topographic elements work as interaction obstacles? How do people cope with interaction obstacles? Distance decay functions serve as theoretical models (Renfrew 1977; Harris 1964). Although it is difficult to compare sophisticated distance decay functions to empirical interaction models because of interfering factors, such as topography, a simple distance decay model can be assumed. This simple distance decay model is a continuous and monotonic decreasing function according to Waldo R. Tobler's (1970) first law of geography. Empirical interaction models are based on the distribution of artefacts. Fall-off curves map the number of finds of a certain type over the distance to the production site. Inverse cultural distances can also be used and have some advantages. Here, it is not required to know the place of origin and the result is more robust since many more observations are involved. Furthermore, inverse cultural distances can be defined for different parts of the society and hence, the study can reveal knowledge of the interaction behaviour of different social groups.

Centrality

A theoretical concept, which helps to understand the patterns of spatial organization, is centrality (Nakoinz 2009b; Nakoinz 2012). A place provides, according to Walter Christaller's (1933) central place theory, a higher quantity of central functions to a surrounding area than would be predictable from the population of the site. This relative surplus of importance connects a central place to some subordinate settlements in the central place's territory. Christaller's theory focuses on a centrality strategy that optimizes a settlement system by gaining synergies through the concentration of central functions and saving transport costs by deciding for the nearest supplier. This is a special optimization strategy and cannot be presumed in general. Ancient people might have applied other or no optimization strategies. Another strategy also falls back on synergies by concentrating connections, but lacks the minimization of transport costs by limiting the connections to the nearest centre. According to the network centrality concept (Freeman 1977), not the village supplying a certain area but rather the village connected to most other settlements or controlling the connections between most other settlements is the central place. Network centres lack territoriality but not importance. Although one centrality concept might be dominant, each settlement possesses certain degrees of Christaller's and network centrality. Knowledge about which concept was dominant is essential for an understanding of the function and social organisation of a settlement. While the theoretical models were described above, the empirical model has to establish the effective connections of the centre to other places. The cultural area models serve this purpose. Centrality is in the end a certain structure of interaction. Christaller's centrality increases the interaction in a certain territory and decreases the interaction to others. According to the above-mentioned research, increased interaction leads to cultural alignment and hence to recognizable cultural areas. If we assume centrality to be the main source of power and wealth, this effect should be considerable and will dominate the observable spatial patterns.

The above-mentioned approaches provide detailed knowledge about spatial structures but not on dynamics. In order to explore the processes that shape and change the population at the central sites, additional approaches are useful. Once again, we start with some conceptual models, which are concerned with population size. Without

limitations, populations would grow according to an exponential function. What limits the population growth in reality? One of the limitations is the need for food. A certain area cannot supply more than a certain number of people, which is denoted as the carrying capacity (Zubrow 1975). When a population exceeds the carrying capacity and the need cannot be covered otherwise, parts of a society begin to starve and the society becomes unstable. Similar effects occur if the population exceeds another threshold (MacSweeney 2004). Populations become complex systems with unpredictable behaviour when exceeding this threshold.

As an addition to these conceptual models, which are actually theoretical models, simulation can be useful. Simulations are processes, which produce artificial data according to certain rules.

Agent-based models

This data can be used to replace empirical data in further analyses which are compared to analyses with real empirical data. Agent-based models (Wurzer *et al.* 2015) are simulations, which use digital representatives of entities that can act individually – individuals for example. We desire a model, which explains the emergence and disappearance of agglomerations, and introduce two types of agents in our model, indigenous people and merchants. The merchants are forced to move and are attracted by the north. Indigenous people have a limited range of movement and can decide to stay. Both are attracted by roads and wealth and indigenous people by high population values. This simple model explains the emergence of agglomerations at certain locations but not the disappearance of these. But to be frank, we do not need an agent-based model to predict these locations, which can be predicted directly by the rules involved in the modelling. The strength of agent-based models is to predict complex systems, which are otherwise unpredictable. Two additional factors in our agent-based model produce a complex system and facilitate the collapse of the agglomerations. Population-thresholds allow triggers, such as climate, which can change the carrying capacity to be modelled. Triggers are small changes in influencing factors, which cause considerable changes or even a collapse of a system. The gradient of population allows actors to be attracted by growing populations and to avoid places with decreasing populations. Although agent-based modelling is expandable for the Early Iron Age in Southwestern Germany, even this simple approach teaches us about the influence of different parameters and probable conditions of decline and collapse.

Results

After this brief discussion of methods and, in particular, of the interrelationship of the approaches in the research process, an outline of some results will demonstrate[1] the potential of this model- and question-based approach for an alternative image of the Early Iron Age in Southwestern Germany. The cultural distance approach results in the

1 Even the presentation of the results of the cultural area approach requires more than 500 pages without discussion: https://www.jma.uni-kiel.de/en/research-projects/data-exchange-platform/data/shkr-analyseband.

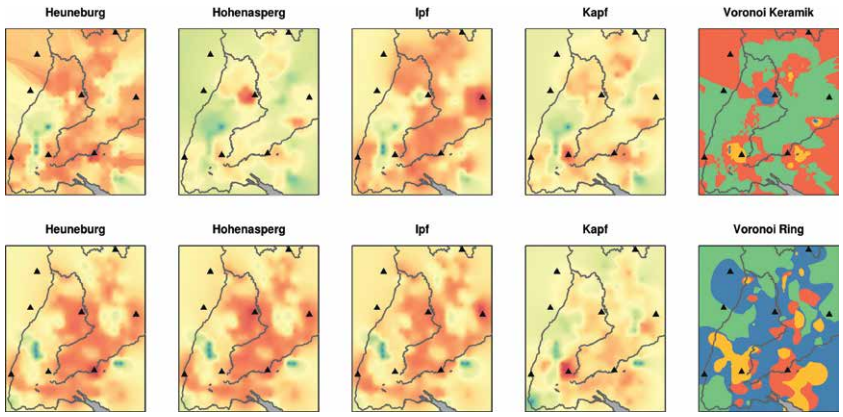

Figure 2: Cultural distances to three princely seats and Voronoi diagrams in a cultural space (Nakoinz 2013b, fig. 10).

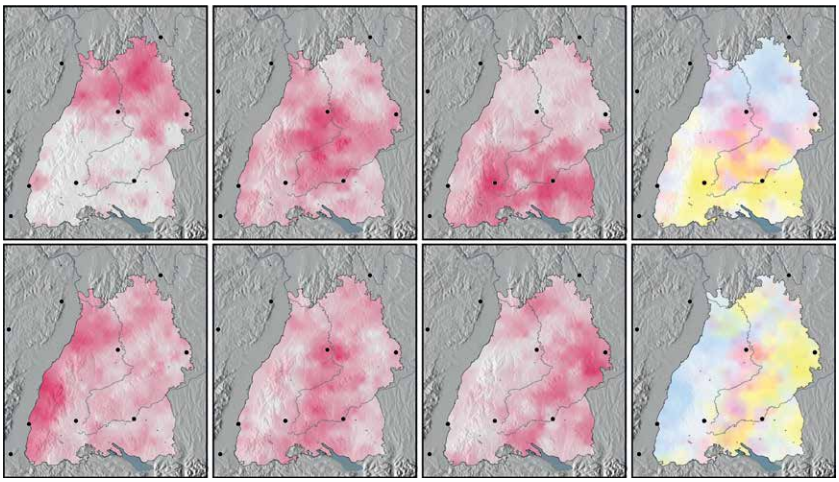

Figure 3: Latent cultural areas (Nakoinz 2013, fig. 6.7).

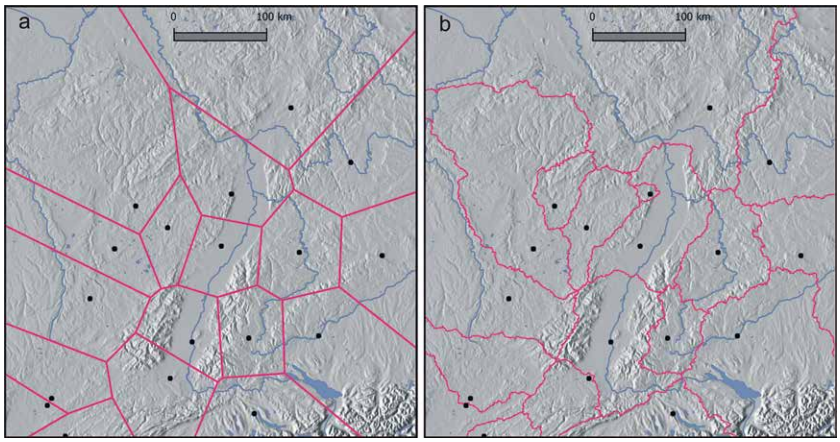

Figure 4: Voronoi models in geographical and economical space (Nakoinz 2013b, fig. 9).

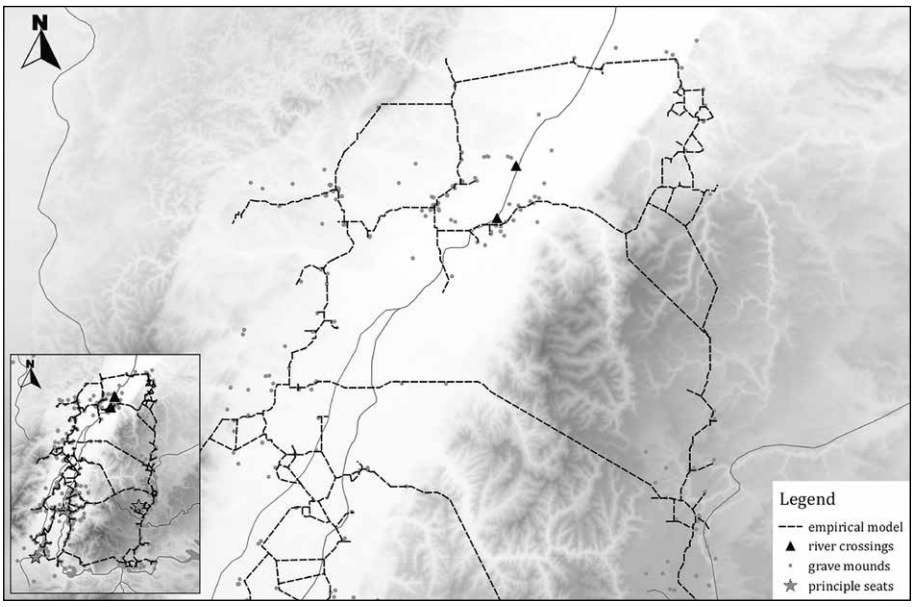

Figure 5: Map of an empirical pathway model (after Faupel in press, fig. 2).

calculation of different categories of cultural distances, which are used in the further approaches. In addition to these approaches, cultural distances can be used to plot the cultural similarity of all points in an area with a certain reference point (Fig. 2).

The cultural area analysis, conducted in 225 cluster analyses on different compilations of types representing different research objectives, parts of the society, time slices and classification depth, produced many groups of locations with similar material culture (Nakoinz 2013a). The positive validated ones represent interaction areas. In contrast to a previous analysis of an adjacent area (Nakoinz 2005), the different interaction areas do not share a common border. Each part of the society developed, in fact, its own interaction space, independent from others and do not share a common area of a culture. A hypothesis of borders of archaeological cultures in the area of interest has to be rejected. However, a secondary analysis revealed latent spatial structures (Fig. 3).

These latent structures are present in all time slices and groups of material culture, but are overlapped by many other rather dynamic and non-persistent interaction areas. It is rather doubtful, whether the ancient people were aware of these spatial structures. Nonetheless, the latent cultural areas map actual interaction behaviour and borders represent the most likely borders of effective interaction.

The border models, which we compare with the cultural-area-border model, are produced by Voronoi-approaches using the princely seats as centres (Fig. 4).

We need not to discuss all different models, since it is clear that none fit to the empirical model. The centres are located at the cultural borders (Fig. 3) and not in the spatial centre as produced by all Voronoi-approaches. The only model, which would be acceptable, is small areas around the princely seats, which are smaller than the spatial resolution of the cultural area analysis, which is about 20 km.

But what can be noted about the connections? At the time of the completion of this paper, the pathway analysis is still ongoing. The least-cost path analyses, which will

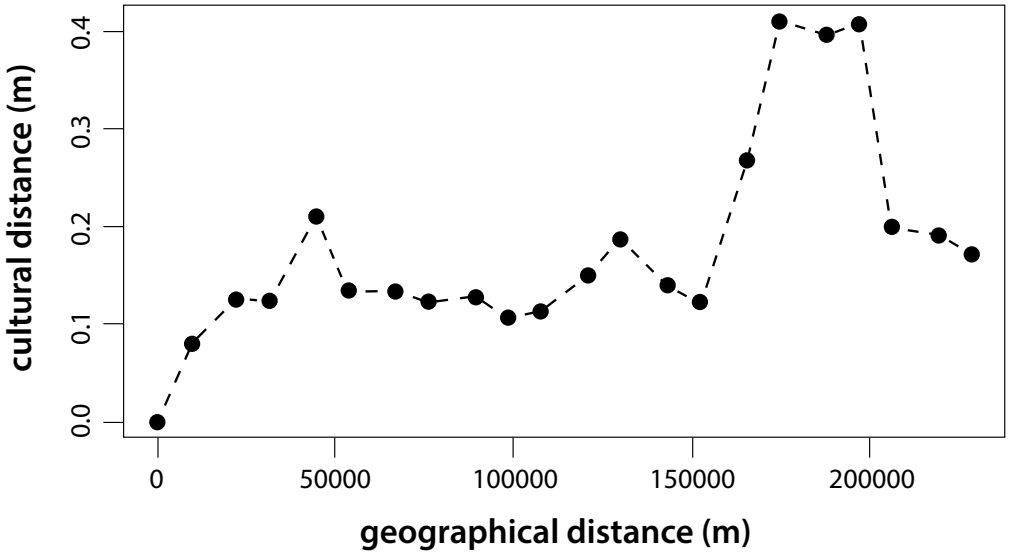

Figure 6: Distance diagram with fixed viewpoint and direction from Heuneburg westwards (created with SRTM data: http://srtm.csi.cgiar.org).

reveal the preferred parameters of the routes, are not finished. Two other models are available. An empirical density-ridge-based model of the Rhine Valley indicates some pathways (Fig. 5).

In addition to some north-south connection, there are a couple of east-west connections crossing the Black Forest and the Rhine. This supra-regional communication network is complemented by some local connections.

The communication axes model is rather conclusive. Here, north-south connections are visible in longitudinal cultural areas along the river systems. This result stresses the importance of the north-south connections and shows that transport on or along rivers was very important.

The interaction models reveal many details of interaction behaviour and transportation. A static interaction model, looking from the Heuneburg westwards, for example, shows the effect of the Black Forest, which has much lower interaction intensity with the Heuneburg area than the surrounding areas (Fig. 6).

Obviously, people avoided the Black Forest. But does it serve as an interaction friction or as an interaction obstacle? If it would be interpreted as friction, then most people would have stopped in front of the mountains and few would have crossed through the forest. Interaction intensity would have decreased rapidly at the mountains and would have remained at nearly the same level behind the mountains. However, those crossing the mountains had certainly no problem in reaching the Rhine. The empirical interaction models do not fit to this theoretical model, since interaction intensity increases behind the mountains, which indicates that the Black Forrest is an interaction obstacle and people circumvent the mountains. The next interaction model is a statistical one and uses all possible connections of points (Fig. 7).

This model indicates an interaction threshold at which most interactions stop. This threshold is indicated by a steep part of the curve in section four. Before the threshold,

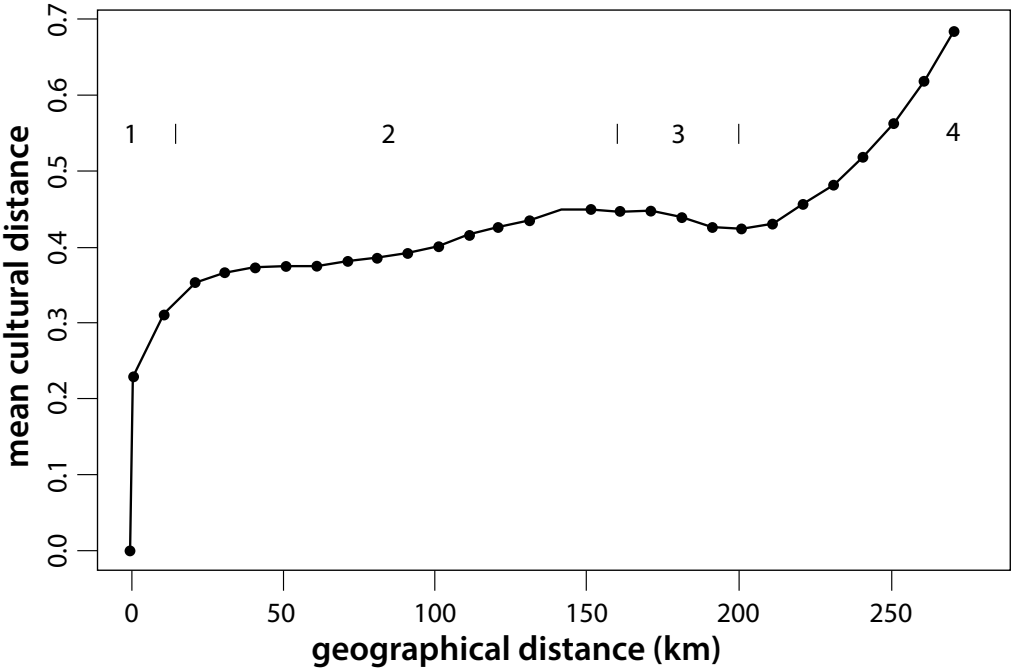

Figure 7: Statistical distance diagram (Nakoinz 2013c, fig. 1).

a section with rather high interaction, indicated by lower cultural distance values, is visible and indicates that the ancient people were aware of the threshold and tried to get near this threshold with their connections. This model reveals a spatial activity range in daily life and certain strategies for optimizing interaction behaviour.

Coming to the problem of centrality, we observe that the princely seats are located at the border of latent cultural areas and along the main communication axis. This observation forces us to reject the Christaller centrality model and to decide for network centrality. The princely seats, hence, can be interpreted as gateways connecting different areas, in particular to the north and south of the location. The surrounding settlements are of lower rank but need not to be subordinate to the princely seats. The elites rather control trade than rule big territories.

The agent-based models do not prove a certain process but teach us which processes are possible and might provide explanations for the observations. In particular, the rapid decline of population from Ha D1 to Ha D2 (Kurz 2010) can be caused by small triggers such as minor changes in climate. No invading warriors, social revolutions, epidemics or natural catastrophes are required to explain the population collapse.

Discussion

The results suggest that an updated image of the Early Iron Age might be appropriate. Although persistent latent spatial structures (Fig. 3) existed and map the interaction behaviour for several centuries, as shown by the secondary clusters, individual interaction areas, represented by the primary clusters, are one of the main outcomes of the analysis. People were free to develop individual interaction spaces, which could

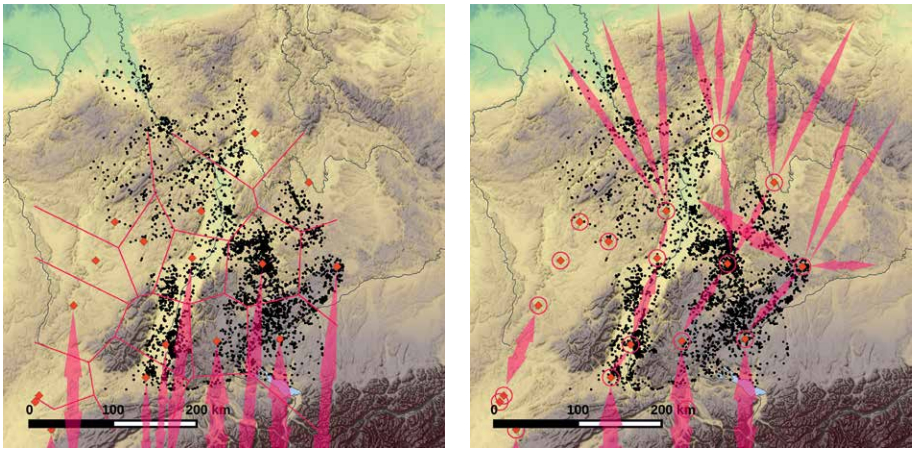

Figure 8: Map of sites, princely seats, assumed territories and connections. Left: traditional interpretation; right: new interpretation. The different princely seats along a route act as gateways in different phases (created with SRTM data: http://srtm.csi.cgiar.org).

change fast. The people appear not to have been entirely controlled by elites that ruled big territories. The elites do not conquer land to integrate them into their big territories. Some members of the elites take advantage of strategic positions at borders and along roads and make a fortune by controlling trade. This attracts people. The emerging community agglomerations do not function as Christaller-central places but as network centres. They are very vulnerable and prone to react on different triggers. The interaction behaviour is adapted to the landscape, to topographic features and probably to social and economic needs. Apart from possible long distance trade, daily interaction is restricted to a certain range.

It seems that the communities of the Early Iron Age had no strong hierarchies, although a pronounced ranking is visible. Power and wealth seem not to be based on territoriality and the centres depend rather on exchange with other regions than on a dedicated hinterland. The "princes" appear rather as supra-regional acting entrepreneurs than as rulers of small empires (Fig. 8).

Conclusion

Although there are open questions, the new image of Early Iron Age society is different from the traditional one. Due to some effective basic principles, a more consistent result emerges.

The principles include questioning the assumptions as well as rejecting questionable assumptions such as the hierarchy assumption. Moreover, the question-based approach, which aims to test hypotheses by comparing theoretical models and empirical models and not to prove theories, appears to be useful. While the hermeneutic approach is self-reinforcing, the question-based approach is sensitive for new evidence. The model-based terminology and concept makes complicated reasoning comprehensive and enables us to criticize it. Finally, the rejection of the traditional processual and postprocessual paradigms and an application of an integrative paradigm results

in an open and adaptive concept, which combines complementary approaches. The analysis based on these principles contributes to an explanation of the genesis, location, development and collapse of agglomerations. This explanation involves the establishment of the function of agglomerations, the estimation of conditions of collapse and indicators of social subordination and independence. Southwestern Germany appears not to be just the endpoint of connections to the Mediterranean. This region, serving as a contact zone, is the centre of communication with and between different regions in all directions with a certain emphasis on south-north connections.

Questions, which have not yet been sufficiently answered, are concerned with how local and regional exchange is organized, how the actual interaction of individuals and social groups was shaped and how Southwestern Germany was integrated into a European system. Hence, following steps have to involve supra-regional studies and have to particularly look northwards. The previously rather neglected relationship of Central and Northern Europe in the Early Iron Age might be important for the understanding of regional developments.

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The 'Iranian' Period in the Near East: A Landscape Studies Approach

Josef Wiesehöfer

Abstract

The Ancient Near East under the rule of the Achaemenids, Parthians and Sasanians, whose centres of power were in Iran, offers numerous possibilities to conduct landscape studies, i.e., the study of complex human-environment relationships. For an ancient historian, studies on the impact of landscape on the human mind and/or society, on the cultural mechanisms and transformations of mental and social reflection on landscape, and on human development in it have proven to be particularly rewarding. In this article, after methodological and theoretical preliminary considerations and remarks on contributions by young female historians in this field within the framework of the Kiel Graduate School, the chances of further transdisciplinary research in the field of landscape studies are pointed out in three case studies: 1) World Empires, World Domination and World History: Antique Views of the Near East (the idea of world domination; the idea of a series of empires; views of world history and the Near Eastern countries' role in it); 2) Achaemenid Water Provision and Water Use; 3) Rum and Iran: East and West in Iranian Tradition. The projects and case studies clearly show that transdisciplinary approaches have been able to help the historian to detect *topoi* in texts, to identify hitherto unclear terms of plants or animals and to date sites or finds with the help of methods of ceramic chronology. Conversely, a critical appreciation of the written source material by ancient historians has been able to help the scientist to get a better understanding of the historical background of changing environments or alleged environmental crises, of processes of increasing urbanisation or of the dangers of an uncritical trust in literary texts on the Iran-dominated Ancient Near East between 550 BCE and 650 CE.

Introduction: sources and methodological problems

The history of the Ancient Near East from 550 BCE to 650 CE was largely determined by the three great Iran-centred empires of the Achaemenids, Parthians and Sasanians

in: Haug, A., Käppel, L. and Müller, J. (eds) 2019: *Past Landscapes. The Dynamics of Interaction between Society, Landscape and Culture*, Sidestone Press (Leiden), pp. 277-290.

(general works on the history of pre-Islamic Iran: Wiesehöfer 2015; 2004a; Brosius 2007; Huyse 2005). The history of these empires is difficult to understand without knowledge of the political and cultural traditions of the Near Eastern predecessor empires (of the Neo-Elamites, Neo-Assyrians, and Neo-Babylonians) and tribal confederations (mountain and steppe peoples; Potts 2014). The time of Iranian domination over the Near and Middle East was, for a short time, interrupted by the empires of Alexander III and his Seleucid successors. Even these could not elude Near Eastern influences and had, in turn, impact on the kingdoms of the Parthians and Sasanians.

Apart from royal pronouncements in the form of inscriptions, coin legends and images as well as from administrative records, literary testimonies of the inhabitants of the Iranian highlands have only survived from Late Sasanian times and/or in an early Islamic version. This is mostly due to the oral character of Iranian tradition (Huyse 2008), the Zoroastrian sacred texts (Avesta) having preserved parts of the original ideas and even the exact wording and sound system. Iranian oral tradition was otherwise subjected to serious processes of change and adjustment. There is, e.g., hardly another way to explain the disappearance of the Achaemenid kings from the so-called Iranian National History, probably in the Parthian period. Even the Arsacids were denied their share in this tradition – by the (last) Sasanian rulers. One can only talk about Iranian *literature* from Late Sasanian times onward. Then, a wealth of historical, religious, geographical, educational and entertaining literature emerged – presumably triggered by the secular and religious book cultures of the West. Source material of different literary genres was more abundant in Persian-dominated Babylonia and Egypt, due to those countries' old and various literary traditions. Impressive chance finds (ostraca from Idumea of the 4th century; administrative texts from Early Achaemenid Persis, Late Persian and Early Hellenistic Bactria and Parthian Nisa (Turkmenistan); seal legends from Sasanian Iran, etc.) are not really able to revise this impression.

For the ancient historian, this means that the history of the pre-Islamic empires with an Iranian centre have to be reconstructed to a significant extent from foreign and late, sometimes even 'hostile' sources and from the non-written local tradition. As for historical events and structures, this reconstruction requires a high degree of source-critical attentiveness and a dedicated effort not to succumb to the *horror vacui* and to build up untestable hypotheses. At the same time, however, dealing with non-Iranian tradition opens up paths for a better understanding of foreign perceptions of Iran, and to uncover the reasons for the emergence of stereotyped ideas and topical distortions within this tradition. In addition to an abundance of individual studies, we now have excellent editions of sources: of the Achaemenid (Schmitt 2009; 2000) and Sasanian royal inscriptions (Huyse 1999; Back 1978), but also of other material (Hackl *et al.* 2010; Kuhrt 2007; Dignas/Winter 2007; Greatrex/Lieu 2002; Dodgeon/Lieu 1991). As for the material legacy of the empires' residents, whose disclosure, evaluation and interpretation require a special – archaeological or art-historical expertise, Ancient Near Eastern and Classical archaeologists as well as art historians have contributed in no small measure to a better understanding of the cultural developments within the great empires, but also of the living conditions of their inhabitants and the forms of cultural transfer and globalisation within Eurasia.

Research on the history of the pre-Islamic empires, like its academic teaching, still suffers from several problems: 1) the still not overcome handing-down of stereo-

typed views of the (Ancient Near Eastern) Orient, which are often confronted with equally stereotypical, but clearly more positive views of Greece / Rome, Europe, the Occident, etc. (Wiesehöfer 2008; 2005a); 2) the political instrumentalisation of Mesopotamian and Ancient Iranian history and traditions in the form of historical myths, both in Iran and in the West; 3) the academic-disciplinary separation of ancient history, which, for Iran, is almost only concerned with times of Iran's military confrontation with Hellas or Rome or the political rule of Greeks / Macedonians or Romans over the Near East, and the philologically oriented disciplines of Assyriology and Old Iranian (or Indo-European) Studies. The same boundaries can be observed between the disciplines that are devoted to the study of the pre-Islamic Near East and those that study the Islamic Middle East. Only in recent decades, transcultural approaches and forms of interdisciplinary cooperation (such as the *Achaemenid History Workshops*) have succeeded in bridging those gaps (Achaemenids: Curtis/Simpson 2010; Curtis/Stewart 2005; Sancisi-Weerdenburg *et al.* 1987-2008; Parthians: Curtis/Stewart 2007; Wiesehöfer 1998; Sasanians: Gyselen 2010; 2009; Curtis/Stewart 2008; Wiesehöfer/Huyse 2006).

A great number of European popular narratives of the relations between the Iran-centred empires and Greece and Rome (later Byzantium) has, until recently, been written exclusively from a western point of view, i.e., as part of the history of Greece or the Roman Empire. They have further been presented as tales of continuous clashes between the states of the West and those of the East, and as encounters between an allegedly familiar 'western' world and an alien eastern 'counter-world'.

The Greek idea of a succession of world empires (see below), created by Herodotus and Ctesias, later lived on in Europe in the idea of a *translatio imperii*. In its salvific version, which goes back to the book of Daniel and Jerome's commentary on it, it structured historical epochs and is still virulent in Western religious fundamentalist circles. Together with the Hegelian teleological idea of history as an intelligible process moving towards the realisation of human freedom, it accorded to the Near Eastern empires and cultures only the role of a childhood stage of world history and, beyond that, cut the links between these cultures and the more eastern as well as the later Islamic worlds. However, the role of the ancient Iranian empires does not end with that of the big opponent or partner of the Greeks and Romans; rather, the political unification of the Near East under Iranian auspices allowed cultural, religious and ideological developments and transfers that radiated into the East and the West and into the empires themselves and became historically significant (Wiesehöfer 2013; 2005b).

A just appreciation of the historical role of the Iranian empires is not only still lacking in Europe; it is also not dealt with impartially in today's Iran: politicians and intellectuals ascribe a role to the Achaemenids that is as historically incorrect as is Cyrus as the alleged founder of the idea of human rights (Wiesehöfer 1999). The Sasanians, strongly anchored in the Iranian tradition, are less considered by the same circles – on the basis of the Iranian mythical tradition – as cultural mediators but rather as the great opponents of the Turanians in the east (often equated with the Turks), the Greeks and Romans / Europeans (Rum) in the West (see below) or sometimes even of the Arabs in the south (Wiesehöfer 2005a). For many Iranians, Alexander's and the Arabs' conquest of Iran appear as world-historical turning points that utterly endangered the survival of the people's 'Iranianness' but, thanks to the extraordinary traditions and talents of

those Iranians, were not able to affect the immutable core of that quality. The Parthians are equally unknown in the East and in the West.

The three Iranian 'world-empires' stand out for their extraordinary military capacities. For a long time, no rivalling power was able to overcome them. That all three of them finally collapsed was not due to a gradual decline of military, political or economic power, but to the specific strategic planning and accomplishments of Alexander, Ardashir and the Muslim generals. The Iranian empires' armies were the basis of their hegemony. But for most of the time, military pressure and strict control went hand in hand with clever and deft political handling of subject communities. Since the empires of the Achaemenids, Parthians and Sasanians always comprised areas in which non-Iranian ethnic, cultural and linguistic groups were predominant, the problem of how to deal with foreign languages, traditions and religious ideas, but also with political hopes and aspirations of formerly independent people was a given from the outset for all Iranian dynasties. Cultural and ethnic diversity in combination with decentralised governmental structures were significant constraints on the state. The answer was a policy of 'tolerance'. The long duration of their rule over 'Iran (and Non-Iran)' or the Near East respectively, on the whole speaks for a rather wise and farsighted as well as successful policy of the kings towards cultural, religious or political minorities. Their religious policy offers strong support for this thesis: Demands of religious or cultic uniformity, which at least might have been a current issue in late antiquity, were never pressed on the subjects as a means of securing domination; at all times, the basic idea of rule was the support of loyal and the punishment of disloyal people and communities.

The rule of pre-Islamic Iranian dynasties is also characterized by the fact that within their realm not only Iranian traditions and ideas were cultivated (*e.g.* the Zoroastrian view of cosmic and worldly events, the ideals of Old Iranian kingship or the interest in entertaining and at the same time instructive interpretations of Iranian history). Instead, Iranian kings, artists and intellectuals also quite eagerly recorded, mixed, reshaped or transmitted those of other cultures. The same tendency to build on older models and to learn from examples but also mistakes of their predecessors decisively shaped the dynasts' ways of administering foreign and newly conquered territories and governing their subject peoples.

Imperial and governmental crises were only partly a result of external pressure, by Greeks, Macedonians and Romans in the west, steppe people in the north and the east (*cf.* Iranian world-views of a decisive struggle between Iran, Rum and Turan; see below) and last but not least by the Arabs in the south. Problems and conflicts inside the empire were at least as important: the tensions within the royal family (particularly fights for the throne), conflicts between kings and highly ambitious nobles or grand landowners, as well as rebellions of unreliable or disloyal parts of the population, now and again also epidemics, hunger crises and social conflicts. Moreover, external and internal factors of this kind could go together at certain times as, for example, during the big crisis of the Sasanian Empire in the fifth century CE. Achaemenid rule came to a rather unexpected end with the victories of Alexander, not as a result of insoluble problems inside the empire, and the downfall of the Arsacid Empire was due to the political and military talent of the first Sasanian ruler Ardashir who, however, benefitted from the Parthian kings' engagement in a conflict with Severan Rome and in a struggle for the Arsacid throne. In the seventh century

CE, also both external and internal factors were responsible for the end of Sasanian rule over Mesopotamia and Iran: the collaboration of Turks and East Romans, the driving faith of the Islamic *umma* but also regional particularism, tensions between kings and nobles and rivalries within the royal family.

Ancient Iranian empires and landscape studies

Historical studies on the complex human-environment relationships in the three featured empires are multiform: First of all, they comprise the study of theoretical concepts of spatial structures, of the development of natural and cultural landscapes and of settlement patterns as well as methodological questions (principles of history: source study and source criticism, hermeneutics, heuristics). Furthermore, they include not least issues that – in accordance with the objectives of Cluster 1 of the Kiel Graduate School – are concerned with "the impact of landscape on the human mind and/or society", "the shaping of landscape by the human mind and/or society" and "the cultural mechanisms and transformations of mental and social reflection on landscape and on human development in it". The Ancient Near East is an ideal object of historical study: 1) it is a historically still neglected area which has even disappeared from school textbooks, although it ranks among the best-attested and historically-culturally most influential regions of the Ancient World; 2) it illustrates in a very special way the close relations between environments, social groups, material culture, population dynamics, and human perceptions of socio-environmental change (keywords: Neolithic Revolution; first urbanisation processes; the beginning of statehood and literacy; the origin of great empires; disruptive and/or beneficial migration processes, etc.); 3) its afterlife in the philosophy of history, in historiography, but also in popular culture (keywords: Oriental Despotism; the alleged economically stagnant Orient; Harem society; the battle of Salamis as "the birth-cry of Europe", etc.) is particularly suited to show – in an exemplary way – orientalist, colonialist and other questionable uses of historical arguments.

Already completed Graduate School dissertations were not least concerned with political relations between, but also the mutual perception of Near Eastern political authorities and social minorities (such as the mountain 'tribes' of the Zagros, deportees, etc.) and their ways of life. They therefore also touched questions of the perception of sedentariness and mobility and thus bridged the usual disciplinary boundaries between Ancient History, Cultural Anthropology, Ancient Near Eastern Archaeology and Philologies and between the Humanities and the Natural Sciences (projects of Silvia Balatti, Chiara Matarese). Another almost completed project, which is located in the Hellenistic Near East (Milinda Hoo), approaches cultural encounters as volatile processes through which new spaces of connectivity and entanglement in and between cultures and societies are formed and explored. Central to the project is the question if and how Central Asia's and Mesopotamia's populations reacted to tendencies of Eurasian globalisation by reorganising cultural norms and forms.

In the ensuing part of this contribution, other research fields of pre-Islamic Near Eastern history will be presented in the form of three case studies that are compatible with the objectives and thematic priorities of the Graduate School and on which the author of this article himself and one of his collaborators (Marie Oellig) have spent their time.

Case studies

World empires, world domination and world history: Antique views of the Near East

Antiquity was the time of Ancient Near Eastern world empires. The designation 'world empires' owes its existence not only to a modern perspective, but also to contemporary antique (self-) reflection. In the context of the presented case study, three aspects of such an early view are most important: 1) the idea of *world domination*, for the first time detectable in 3rd millennium Mesopotamia; 2) the idea of a *series of* (three, later four, and five) *succeeding empires*, originating in Classical Greek literature, an idea that remained virulent up to the Early Modern period – especially in the Christian guise of a history of salvation; 3) the notion of a *world history*, to be encountered in Near Eastern traditions in different ways, which accords the respective area of origin of these traditions a special role.

1. The idea of world domination is reflected in Mesopotamia in various royal epithets – such as "Ruler of the Four Quarters (of the World)" (*šar kibrāt arbaim/erbettim*), "Ruler over the Totality" (*šar kiššatim*), "Ruler of Rulers" (*šar šarrāni*), etc. (for the origin and history of those designations and ideas, *cf.* Galter 2014; Seux 1967). In addition to simple titles for the ruler, such as Old Persian *xšāyaθiya* ("Who Is Distinguished by a Rule"), the Achaemenid Persian kings also used (sometimes multiple) extensions of this title, such as OP *x. dahyūnām* ("King of the Countries"), *x. dahyūnām paruzanānām / vispazanānām* ("King of the Countries Containing Many / All Races"), or phrases such as *x. ahyāyā būmiyā (vazṛkāyā) (dūraiy apiy)*, "King on This (Great) Earth (Even Far Off)". The Iranian royal epithets *par excellence* (also of later epochs) are titles such as OP *x. vazṛka* ("Great King") and OP *x. xšāyaθiyānām* ("King of Kings"), a designation that was borrowed from the Mesopotamian area, most probably via Urartu (Kienast 1979; Schmitt 1977).

Although the rulers' titles are well-known, questions remain: a) What was the relationship between the ruler's claim and the geographical and ideological 'world view' of his time (see below)? – b) How do royal titulature and the effectively ruled territory relate to one another (see, for example, Wiesehöfer 2004b), or how do rulers, subjects and tradition react to the fact that the royal sphere of influence did not extend to the ends of the world, but was limited through the demands of foreign rulers (question of aspiration and reality)? – c) What about the fact that kings tried to imitate great rulers of former times (for the role of Sargon of Akkad as a historical model, see Liverani 1993)? Despite numerous individual contributions on specific times, areas and rulers, a summarising answer to those questions is still missing, an answer that compiles, analyses and evaluates the respective contemporary Ancient Near Eastern material. M. Oellig's almost completed dissertation will try to remedy this desideratum. It will undoubtedly also be useful in this context to make a comparison between the Ancient Near Eastern ideas about kingship and the Roman tradition of the *princeps* as the master of the *orbis terrarum*. The emperor (and his contemporaries) had also to come to terms with the fact that there was a power beyond the Euphrates that, as regards 'world domination', competed with the Roman ruler.

Closely linked with the problem of world domination is the question of Ancient Near Eastern ideas of the shape and structure of the earth (the world) and the local-

isation of sites on or in it (Kuhrt 2002; Horowitz 1998). In this context, it seems to be particularly important to answer the question of the relation between centre and periphery, inner and outer world; in the Ancient Near East, the latter was mostly viewed as hostile and uncivilised. Characteristic of these 'world views' and their literary and pictorial implementation (*cf.* the famous Babylonian *mappa mundi*) is the close connection between myth and history.

2. The tendency of Ancient Near Eastern rulers to equate their empires with the boundaries of the world probably lies at the root of the idea of a series of empires – an idea that was developed in the 5th century BCE and quickly became an ideology. The initial introduction of this scheme of empires, which first can be grasped in Herodotus as a sequence of three empires (Assyria-Media-Persia), is usually attributed by modern research to the Persian kings (Cyrus the Great or late Achaemenid kings). On the basis of three reasons, however, it seems more plausible to attribute the scheme to Herodotus: firstly, the scheme is missing in the royal inscriptions; secondly, the historical existence of the middle element – a fully developed 'Median kingdom' – remains doubtful; and thirdly, the model corresponds to the Herodotean view of the history of the *oikumene*. After the destruction of the Achaemenid Empire by the Macedonian Alexander III, a similarly optimistic 'four-empire-scheme' must have evolved. This is indicated by the four empires in the OT book of Daniel (Dan 2: Babylonia – Media – Persia – Greece/Macedon, but here combined with the wish of overcoming the present situation) and by the five-empire scheme of Roman historiography. Although the sequence Assyria-Media-Persia-Macedon is not documented in Hellenism, much speaks for attributing the Seleucids expanding the three-empire scheme (and not already Alexander or even an anti-Hellenic oriental opposition).

Beginning with the 1st century BCE (following the reorganization of the East in 63 BCE by Pompeius), Rome appears as the uncontested fifth member in the chain of empires, even though the Romans probably had claimed world rulership even earlier. There is no connection between the pagan scheme of four or five empires and the documents from Jewish-apocalyptic, rabbinical, and Christian literature, which are almost exclusively based on the four-empire scheme from the Book of Daniel (with a subsequent Messianic Kingdom and/or Kingdom of God). Clearly separate from Pompeius Trogus' idea of a *translatio imperii* is also the notion communicated by Jerome (in his translations of the texts from the OT and in his history of the world) of a *regna transferre* – with the notion of God as the creator and of sin and *virtus* as the reason for the *translatio* – as well as the later Christian *translatio* theories (Wiesehöfer 2013).

3. The third aspect of the research field is also closely linked to the first two. It is about views of history, not least those of world history and the Near Eastern countries' role in it. This research field is already quite well opened up for Mesopotamia and Egypt; for the regions at the edges of Mesopotamia, however, studies are still missing. Again, the relationship between myth and history is remarkable, as is the question how individuals or dynasties obtained access to an existing tradition. Besides, it seems interesting to find out how the tradition itself changed over time – due to its nature (in Iran: as oral tradition), the taste of the audience or the circumstances of the time.

Achaemenid water provision and water use

In pre-Islamic Iran, water was, not least because of its value as a food and life-giving juice, of outstanding factual and ideological significance. The maintenance and securing of the water resources of the land and the food supply of the population were proof of the Great King's power and the legitimacy of his rule. The enjoyment of exquisite water and the splendour of his irrigated parks and gardens (Greek *paradeisos* < Old Persian *paridaida-*) were signs of his wealth and his superior position alike, blossoming and useful plants and abundant game species reflected the favour of the gods (Tuplin 1996). The image of the 'good gardener' and the royal hunt in the hunting parks became determinants of royal and aristocratic identity and self-representation in Iran, water, plant and animal motifs have until today determined the imagery of the products of Iranian craftsmanship.

To create a paradise-like situation, most gardens and game parks of the Persian kings and satraps, and even the gardens and orchards of simple Persians, required, given the climate in the Near East, uninterrupted care and constant irrigation. The king and his officials not only made this care part of their ideology of rule, but were also actually much concerned with the maintenance of all irrigation systems and waterways of the Empire. In the conquered territories, they usually made use of the local techniques (for example, in Mesopotamia or Egypt: Joannès 2002; Wuttman 2002; Manning 2002; Briant 2002), while in Iran they extended and further developed the common system of the *qanat*, a gently sloping underground channel with a series of vertical access shafts, used to transport water from an aquifer under a hill or mountain into areas that needed irrigation (Francfort/Lecomte 2002).

Unlike Babylonia, where – according to pre-Achaemenid tradition – the ruler could oblige the local population to hydraulic engineering measures, the Great Kings in Iran pursued a different policy: The hitherto non-irrigated land, which was entitled to the king, was lent out to village populations for independent use for an extended period if these people took the necessary measures for irrigation. This policy must have paid off for both sides since those qanats were created and used for centuries.

The Marxist theorem, proposed in the context of the theory of the 'Asiatic mode of production', that rural communities in Asia might not have been able to govern the complexity of the water supply without mediation by the state is refuted by the Achaemenid example. Karl Wittfogel's thesis that governmental regulation of irrigation leads to state control of large sections of the society and thereby to "oriental despotism", a thesis developed on the Chinese example, but conferred by some scholars also on Iran, is wrong in two respects for Iran: On the one hand, the scholar referred to hydraulic engineering measures on a grand scale that need enormous resources of capital and manpower, not to irrigation measures. On the other, he did not reflect irrigation but rather water safety measures, such as the elimination of hazards caused by flooding (Hunt 1996).

For many parts of Achaemenid Iran and Afghanistan, archaeological research has not only detected qanats but also smaller dams and reservoirs that should obviously serve, apart from the irrigation of the land, the channelling of water and the storage of drinking water (Kleiss 1988; Hartung/Kuros 1987). It is only in this way and by the natural forest cover that was then still observable, that we can explain the Alexander historians' view of an extremely fertile Persis (Fars), the southwest Iranian home region of the Achaemenids. There are modern estimates of the population close to Persepolis of up to 44,000 people (Sumner 1986).

Rum and Iran: East and west in Iranian tradition

In the Late Sasanian or even Islamic period, Middle Persian texts were written which either emulated the Avesta as commentating literature or were part of the court tradition with their epic form or as oral poetry. At the end of the reign of Husraw II (590-628), something similar to an 'Iranian National History' in the form of the *Khwadāy-nāmag* ("Book of Lords") originated, a semi-official history of Iran dating from the first world king Gayomard to the regency of Husraw and which for the first time set down in writing a long oral tradition of relating history. This history, conceived as well to satisfy the needs of Iranian subjects by remembering Iran's glorious past in the face of a rather gloomy present, and which is preserved only in excerpts, translations and later revisions, relates of the reigns of fifty kings and queens and is defined by certain 'cycles of legends or myths'. What is interesting in it is that 'heroic' times generally make way for periods in which visionaries, holy persons or 'prophets' pose ethical and moral questions and allow the wars to slip to the background. With regard to genre, the 'National History' is a mixture of heroic material, maxims of kings and 'wise men', priestly discussions, philosophical observations, moral dictates, royal testaments and speeches from the throne, referring again and again to questions of justice, religiosity and exemplary life. The "Book of Lords" was not only a semi-official 'history book' but also an instrument of literary entertainment and social education. It was supposed to proclaim the moral and politically based social ideals or the virtues of the subjects on which the Sasanian kings saw their sovereignty established and with whose help it was to survive. The lives of kings, heroes and 'wise men' formed the background against which such ideals could be illustrated, with the difference between myth, legend and historical fact being of secondary importance.

In this 'National History', Rum has become a metaphor for the neighbouring states and, for the most part, opponents of the Iranians in the West, similar to Turan in the East. In one manuscript, Salm, a son of Fredon, even becomes the founder of the dynasty of Rum. Time and again, the rulers and inhabitants of Rum play a role in Iranian history (Alexander; Kawus and Gushtasp at the 'emperor's court'; Humay triumphs over Rum and has prisoners erect buildings in Stakhr, etc.).

The account of Romano-Sasanian relations in the *Khwadāy-nāmag* and its oral forerunners did not aim at determining the exact reasons for the conflicts between Iran and Rome. Where allusions to historical events are discernible at all and events and characters are not confused and mixed up, everything is determined by the effort to make Rum appear as the arch-enemy of Iran and to be able to tell entertaining and didactic stories about the encounters between East and West. A good example of this is the account of the life of the famous Sasanian king Shabuhr II in Firdausi's *Shāhnāmeh*. His biography is nothing more than a description of his (unhistorical) rescue from Roman captivity with the help of a pretty young maiden of Iranian descent, and of his punitive Arabian war and two campaigns against the Romans which prove to be a mixture of the wars of his time and those of the time of Shabuhr I. It is also in the reign of Shabuhr II that Mani, coming from China, is said to have been killed.

Initially unwilling to make themselves stand out at the cost of their royal Parthian predecessors, the new kings, in the course of time and in collaboration with the Zoroastrian clergy, gave the 'National History' a special Sasanian touch. They did so especially in the second half of their reign, then with obviously anti-Parthian inten-

tions. Rum, as a metaphor for the neighbours and the historical as well as contemporary enemies in the West, now included the Byzantines. As with the Romans, we do not get much reliable historical information about them. The special character of the Sasanian view of history becomes particularly obvious through episodes which are related to Byzantium, but are anachronistically moved back to the time of the Kayanids. Thus, Kai Kawus is said to have dispatched an envoy to the Roman emperor, the young Gushtasp to have made a journey to Rum and to have married a Byzantine princess. However, the Late Sasanian revision of the 'National History' led to two remarkable changes, as far as the enemies of Iran are concerned: On the one hand, probably as a result of the disastrous invasions of Hephthalites and Turks, the role of Turan became more important than that of Rum (finally leading to an identification of Turanians and Turks). On the other hand, within secular tradition, the pseudo-Callisthenic Alexander in Iranian shape supplemented Alexander the Great as the destroyer of Iranian greatness; he thus became a son of Dara and of the daughter of the king of Rum (Wiesehöfer 2005a).

Pre-Islamic Iranian traditions of that kind, for a long time subject to the rules of oral transmission and put into writing usually only in Late Sasanian times, were probably less uniform than scholars have thought when suggesting a multiform, normative and semi-official "Book of Lords" (*Khwadāy-nāmag*), and their ways into Early Islamic historiography were probably much more varied and intertwined than is commonly assumed. The *Khwadāy-nāmag* has sometimes even simply been reconstructed from Firdausi's *Shāhnāmeh*. In reality, there were centuries in between with great margins for various literary plans and imaginations of authors, for diverse interests, preferences or legitimization efforts of princely principals or consumers, for the compliance with or the abandonment of genre-specific requirements, rules and expectations.

Conclusion

The Ancient Near East under Iranian domination has offered many opportunities for landscape studies, i.e., the study of the complex human-environment relationships. This has, of course, not only been true for historical but also for archaeological or scientific studies. For an ancient historian, studies on the impact of landscape on the human mind and/or society and on the cultural mechanisms and transformations of mental and social reflection on landscape and on human development in it have proven to be particularly rewarding. Thus, e.g., the water management policy of Cyrus and his successors suggests that the Persian kings did create and probably also export within their realm a fundamentally new way of representing rulership, by creating new imperial landscapes (administrative centres within or near *paradeisoi* for the control of dependent territories). Besides, the above-mentioned projects and case studies clearly show that, apart from scholarly progress in issues of detail, transdisciplinary approaches and the collaboration of scholars from different disciplines, even that of historians and natural scientists, have been able to open up hitherto untrodden paths to a better understanding of human-environment relations in antiquity. For example, the data of palynologists, palaeobotanists, palaeozoologists, etc., have been able to help the historian to detect *topoi* in texts, to identify hitherto unclear terms of plants or animals or to date sites or finds with the help of methods of ceram-

ic chronology. Conversely, a critical appreciation of the written source material by ancient historians has been able to help the scientist to get a better understanding of the historical background of changing environments or alleged environmental crises, of processes of increasing urbanisation (like in Parthian and Late Sasanian times) or of the dangers of an uncritical trust in literary texts on the Iran-dominated Ancient Near East between 550 BCE and 650 CE. The French-German interdisciplinary project of Human-Climate-Ecosystem interactions in Fars during the Holocene, thus also of the Achaemenid period (M. Djamali/O. Nelle/J. Wiesehöfer), which started in 2015, will help to prove these mutual forms of support.

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The Bronze Age in the East – The Hittites and Their Environment

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Abstract

Different sources for the reconstruction of the environmental conditions during the flourishing Bronze Age Hittite Empire are applied and compared. From charcoal analyses, a north-south transect from Turkey to Syria shows a transition from woodland to open steppe woodland and steppe environments. In the vicinity of the investigated Hittite capitals Boğazkale/Hattuša and Kuşaklı/Sarissa, woodland seems not to have been eradicated, thus fuel and timber could be collected in the vicinity of the cities even though indications of steppe expansion can be recognised. Archaeozoological data point in the same direction as steppe elements occur rarely and primarily together with woodland indicators. This picture is supported by palynological data that describe the Middle Bronze Age as a time of favourable conditions for deciduous trees that had a much wider distribution than today. The Hittite country may not have been a land of prosperity and plenteousness, but it experienced a time of favourable conditions during the Bronze Age – demonstrably interrupted by a number of droughts and a general trend to dryer conditions. The breakdown of the civilisations cannot directly be connected to a strong climatic shift or event.

Introduction

> "So I have come down to rescue them from the hand of the Egyptians and to bring them up out of that land into a good and spacious land, a land flowing with milk and honey – the home of the Canaanites, Hittites, Amorites, Perizzites, Hivites and Jebusites" (Exodus 3:8)

Is this a myth or was the land of the Hittites really a land of prosperity and plenteousness in the Late Bronze Age and the Early Iron Age? For a long time, the Hittites were merely known from the Bible (Cancik 2002), but nowadays many toponyms can be

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localised and we can refer to a number of archaeological excavations (Seeher 2002a; Genz/Mielke 2011) and philological studies on clay tablets (Wilhelm 2002; Klinger 2002). Even though the reference in the Bible regards the Phrygian followers of the Hittites, the topos may provide a link to the old Hittite empire of the Bronze Age. The archaeological and philological studies reveal a complex hierarchic society with a strong bureaucracy (van den Hout 2011), a well-organized army (Lorenz/Schrakamp 2011) and a representative architecture (Seeher 2002b; Mielke 2011). All these institutions and features require an economic surplus as a backbone as well as stable social, economic, and environmental conditions. This explains why economic and environmental studies are one essential aspect for an interpretation of the Hittite Culture (Dörfler *et al.* 2000; 2011).

The Central Anatolian Bronze Age can be chronologically divided into the Early Bronze Age (2600-2000 cal. BC), the Middle Bronze Age (2000-1600 cal. BC), and the Late Bronze Age (1600-1200 cal. BC) (Bittel 1976). Hittite history starts with the establishment of a centralised kingdom in the 17th century BC. According to the chronology of Horst Klengel (1999), we can historically distinguish between the Old Period, the Middle Period and the Great Empire, which ends with Šuppiluliuma II as the 28th name in the list of Hittite kings at ca. 1180 BC. As the Anatolian chronology is linked to the problems of the Short, Middle, and Long Chronology of the Near East, no absolute dates for these periods are provided (Genz/Mielke 2011).

In order to gain information about the environment and the economy of the Hittites, natural sciences are applied. Plant and animal remains of archaeological excavations are ideal means to reconstruct the food supply and in combination with pollen analyses they enable a reconstruction of environmental conditions. Central Anatolia is a region with a long research tradition on these topics, including numerous archaeological excavations and some pollen diagrams produced from lake sediments. Whereas older palaeo-environmental studies have low time resolution and weak dating, modern studies enable us to critically review these reports and provide a reconstruction of Bronze Age climate and vegetation and thereby of living conditions in the third and second millennia BC. In the framework of a project on "Environmental History and Agrarian Economy in the Surrounding of Hittite Cities", supported by the German Science Foundation (DO 482/2), pollen analyses as well as the analyses of botanical macro remains and charcoal fragments from excavations were carried out. Research was concentrated on two major regions: 1) the area of Boğazkale, representing the Hittite capital named Hattuša (Neve 1993; Seeher 2002b), and 2) a region south of Sivas near the village of Kuşaklı, representing the basis of the local kingdom of Sarissa (Müller-Karpe 2002; 2017). Whereas the first region is located at the edge of the modern forest area at an elevation of ca. 1000 m a.s.l., the second region is situated in the modern Central Anatolian steppe zone with elevations between 1600 and 1900 m a.s.l.

The study area

Apart from the Black Sea coastal area and some parts of the Aegean coast, most of Anatolia was part of the Hittite empire in the 13th century BC. Thus, the following description will focus on the environment of Asia Minor/Anatolia. Figure 1 shows the outline of the Hittite sphere of influence in the 13th century according to Frank Starke (2002).

Recent climate

Generally, Asia Minor can be divided into four climatic regimes: The Black Sea region (Pontic climate), the area along the coast with Mediterranean influence (Mediterranean climate), the inner-Anatolian area with a continental climate, and the extreme conti-

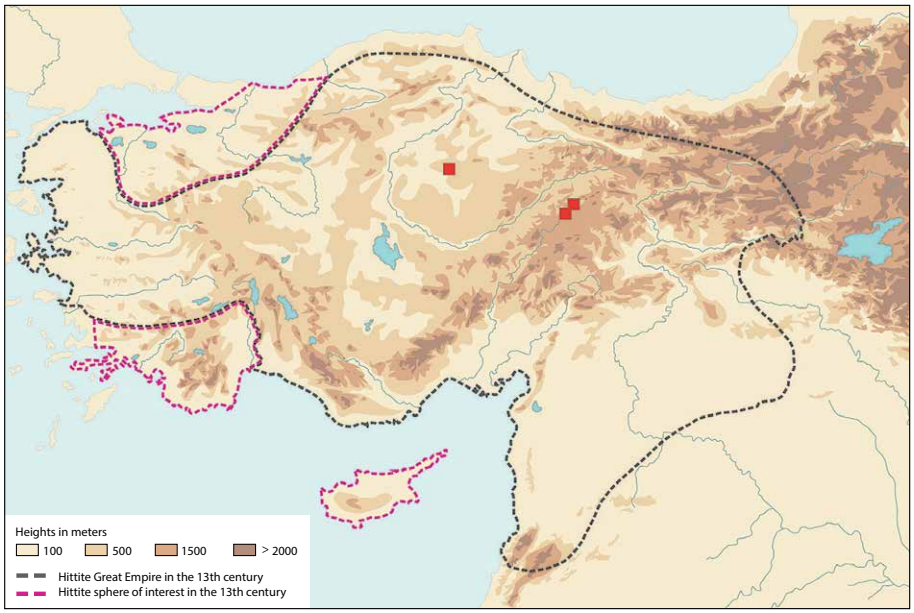

Figure 1: Map of Anatolia with the outline of the Hittite empire in the 13th century BC (after Starke 2002). Red squares show palynological investigation sites.

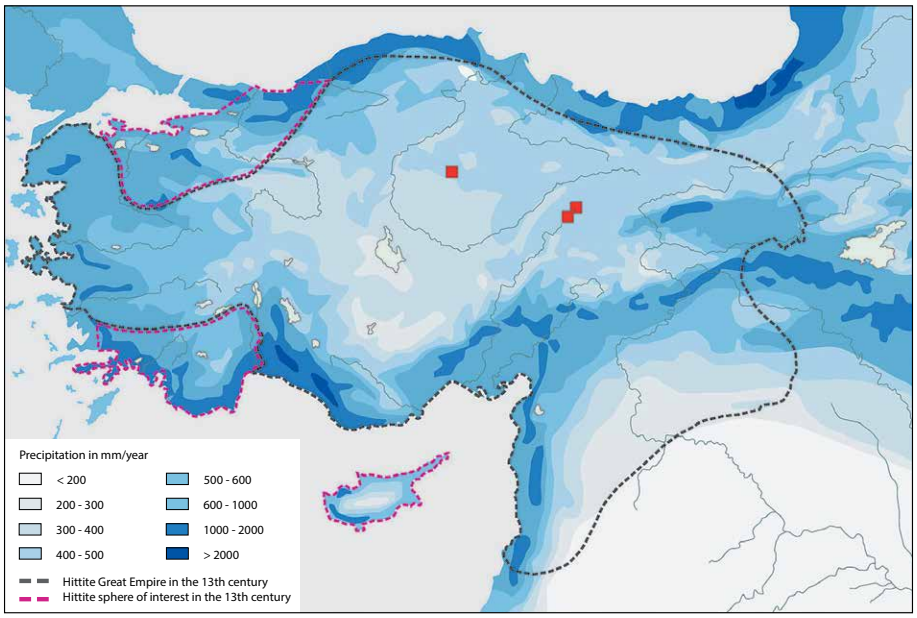

Figure 2: Recent regional distribution of precipitation in Anatolia (after Hütteroth/Höhfeld 2002).

nental Eastern Anatolian region (Kürschner *et al.* 1997). Whereas the Pontic region and the Mediterranean are characterized by potential wood cover, inner-Anatolia is currently dominated by steppe and steppe forest environments. Closed forests need a yearly precipitation of 300 mm. Thus, closed high forests are assumed to be restricted to higher elevations in Central Anatolia with sufficient rainfall and lower summer temperatures. Thus, in contrast to mountain ranges like the Alps, the tree-limit is not an upper but a lower tree-limit.

The main factors influencing the four general climatic regimes are, on the one hand, the seasonal distribution and the total amount of rainfall (Fig. 2) and, on the other hand, the annual temperatures.

Plant distribution (Fig. 3) and agrarian economy are to a high degree dependent on these two factors.

The Anatolian rainfall regime primarily depends on the strength and polarity of the North-Atlantic-Oscillation (NAO) with its typical distribution of high and low-pressure cells during wintertime. A negative NAO with strong low-pressure cells in the North Atlantic transports wet air masses to the south with a lot of precipitation over the Mediterranean and Anatolia. With positive NAO situations and weak lows in the North Atlantic, the wet air masses stay in Central Europe and as a consequence the Mediterranean is relatively dry. Additionally, the summer climate is controlled to some degree by the monsoonal regime in Southern Asia. Thus, the normal dry summers can be of long duration and droughts strike Anatolia regularly. Figure 4 shows the yield of wheat harvest in Turkey as an effect of droughts in the years between 1928 and 1961 according to Wolf D. Hütteroth and Volker Höhfeld (2002).

Aside from these more or less regular droughts, extreme events are recorded for historical times. In 1873/74, for instance, a severe drought occurred over two consecutive years. Ca. 250,000 people wasted away and in the district of Keskin 82 % of cattle and 96 % of sheep and goats died (Christiansen-Weniger 1966, after Hütteroth/Höhfeld 2002). As shown in such historical examples, the agrarian economy in Central Anatolia is sensitive to climatic shifts and needs strategies to diminish its vulnerability. Even if we do not know details of the Bronze Age climate, we have to envisage such short-term weather extremes in addition to a general trend of increasing aridity during the Holocene (Klengel 1974; Müller-Karpe 2009; Roberts *et al.* 2011). The big storage facilities in Hittite towns are one example of such strategies that implement centralized safeguarding of food resources (Seeher/Neef 2001).

Temperature is the second important factor. Thus, continentality but also the elevation and exposition of a site are important for local climate conditions and the associated vegetation. In summary, climate is an important factor for plant distribution and the agrarian economy, whereby the amount and seasonal dispersion of precipitation and the annual temperatures are significant. The lengths of summer heat and winter coldness are also of significance. The higher the region, the longer the snow cover lasts in spring and the shorter the potential growing season. Thus, today there are specific limitations for arable farming and the cultivation of fruits such as olives, vine or hazelnuts. In principal, we can expect regional adaptations of economic strategies – also in Hittite times. Animal husbandry, for instance, depends today to a lesser extent on temperature, but to a higher degree on sufficient precipitation. Traditionally, transhumance is widely practiced to manage the livestock and

to exploit remote resources but also to protect farmland in the vicinity of villages from grazing animals. Therefore, mountainous regions are also strongly influenced by anthropo-zoogene activities and natural woodland nowadays is restricted in many regions to non-accessible slopes and gorges. From a potential forest cover of Turkish territory of 70 %, currently just 5 % is still existent as high forest and another 8 % is recorded as copses (Kürschner *et al.* 1997). In the autumn season after the harvest, cattle, sheep and goat are back in the villages and browse the stubble fields. As wood for fuel is rare or in some areas even non-existent, in many regions chaff and dung are collected, mixed and dried as fuel for winter.

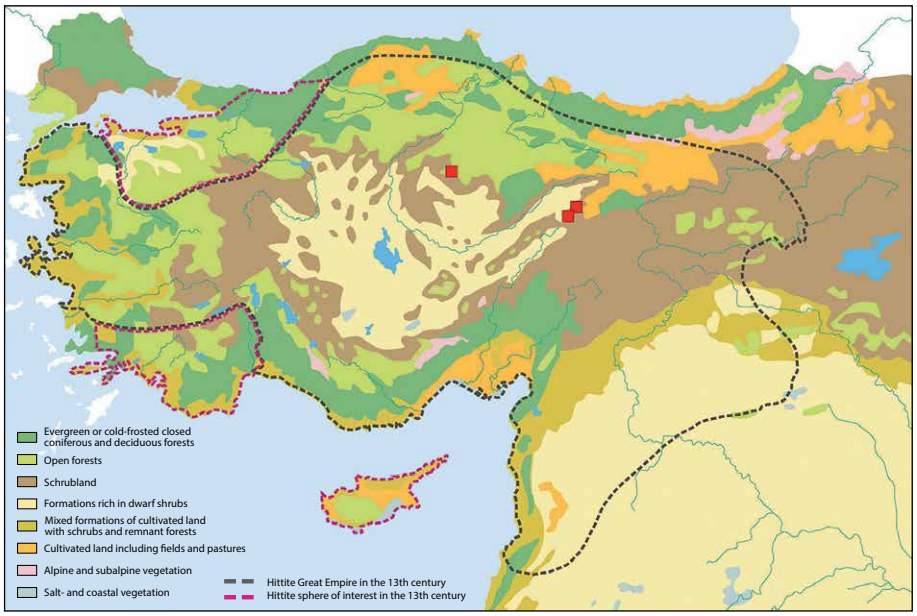

Figure 3: Recent regional distribution of vegetation in Anatolia (after Kürschner et al. 1997; based on Frey/Kürschner1989).

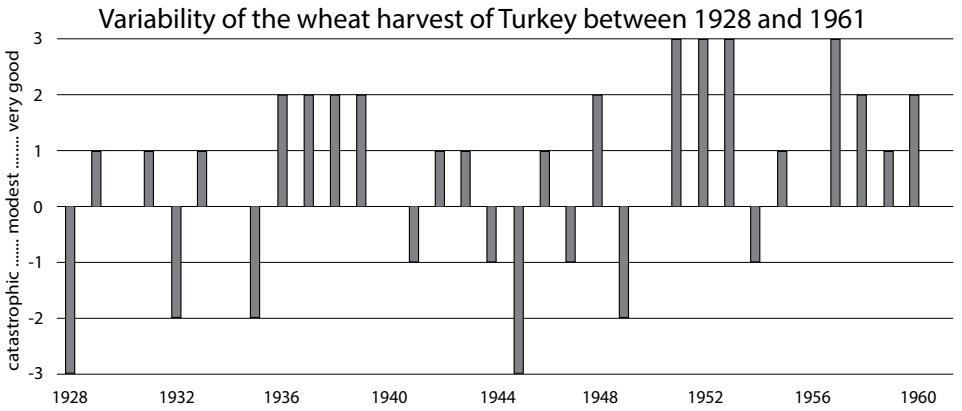

Figure 4: Yield of wheat harvest in Turkey in the years between 1928 and 1961 (after Hütteroth/Höhfeld 2002).

Climate in the third and second millennia BC

The mid-Holocene climate of the eastern Mediterranean has recently been summarised by Neil Roberts *et al.* (2011). The authors describe the mid-Holocene as "a three millennia long transition between the humid early Holocene and the drier late Holocene. This transition seems to have occurred in three main steps, each ending in periods of drier climate around 3300 to 3000 BC (5.3-5.0 ka BP) 2500 to 1950 BC (4.5-3.9 ka BP), and from 1200 to 850 BC (3.2-2.8 ka BP)" (Roberts *et al.* 2011, 151). As the time resolution and dating of most of the palaeoclimate archives (lake sediments, marine sediments and cave speleothemes) do not allow a reconstruction of short events (apart from Soreq Cave; Bar-Matthews/Ayalon 2011), this is just a general trend and little is known about the seasonal and annual variability. Studies by Catherine Kuzucuoğlu (2009) indicate that "each of these dry phases comprised several drought episodes interspersed with years of wetter climate" (Roberts *et al.* 2011, 151). Thus, the increasing aridity may have had disastrous effects from time to time comparable to those of the late 19th and early 20th century mentioned above.

As the Central Anatolian Bronze Age dates between 2600 and 1200 BC, the increasing aridity and the wetter phases in between can be linked to specific archaeological periods. The Early Bronze Age (2600-2000 cal BC) falls into the drier climate between 2500 and 1950 BC with an extreme drought around 2200 BC. In contrast, the Middle Bronze Age (2000-1600 cal BC) and the Late Bronze Age (1600-1200 cal BC) seem to fall into a phase of generally more favourable climate conditions. From region to region these dates may vary (Roberts *et al.* 2011). Thus, in Syria, for example, a climate shift towards higher aridity occurs around 2000 BC (Riehl *et al.* 2008), whereas in many other regions a strong climate incident, the 4.2-event, is dated some 200 years earlier (*e.g.* Dörfler 2015). Many authors have tried to link the climate shifts with cultural

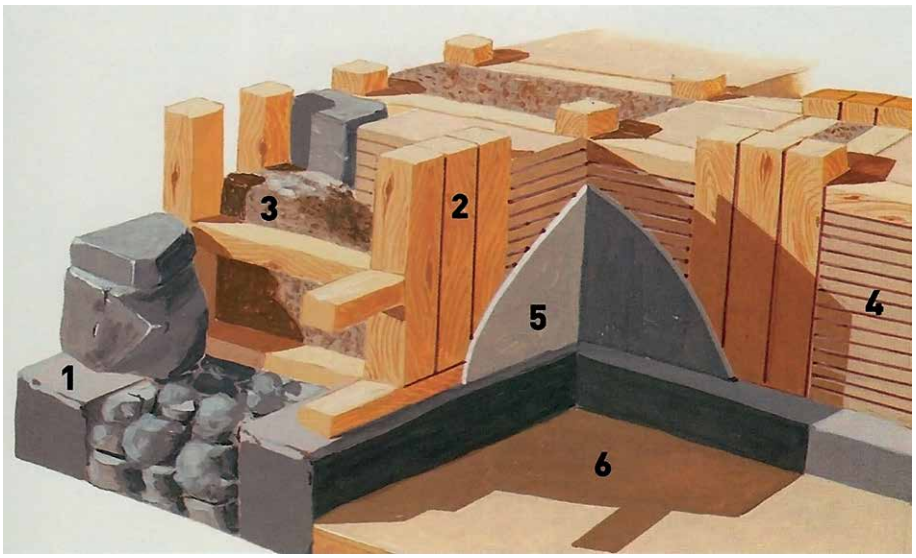

Figure 5: Reconstruction of a temple wall in Boğazköy – Hattuša (after Seeher 1999): 1: foundation and basic stones; 2: wooden framework; 3: filling of earth and stones; 4: mud bricks; 5: plaster; 6: floor of tamped loam and lime.

transitions, but the time resolution of the different environmental and archaeological records rarely allow for a causal conjunction (*e.g.* Bryson *et al.* 1974; Weiss/Bradley 2001; Kirleis/Herles 2007; Wiener 2014).

With our palaeoecological investigations in Central Anatolia, we can contribute to this ongoing discussion. Different approaches enable us to reconstruct the former environment. Plant macro remains and charcoal from archaeological excavations give a spotlight on the economy and wood consumption in certain times. These on-site studies (Jacomet/Kreuz 1999) enable a detailed investigation of local conditions for relatively short time spans. The same applies to animal remains – in particular bones – from excavations that can provide evidence on environmental and economic conditions (*e.g.* von den Driesch/Boessneck 1981; von den Driesch/Pöllath 2004; von den Driesch/Vagedes 1997). In contrast, natural archives, such as lake sediments or peats, provide long-lasting records. Here, palaeoenvironmental studies, in particular pollen analysis, can be applied to reconstruct developments along a wider time-frame. These off-site studies do not have high spatial resolution, but often provide a reasonable temporal resolution.

Charcoal analyses as a source of vegetation history in Anatolia

Anthracological studies support the palaeoenvironmental analyses as they give an impression of the timber used either for fuel or for architectural purposes. As revealed in Bronze Age half-timber house constructions, a large amount of wood was necessary for building purposes (Fig. 5).

Thus, the composition of wood taxa in the charcoal record can provide evidence about local tree vegetation. A prerequisite is the assumption that, if available, wood was collected and chopped in the vicinity of settlements. For each investigated location and time window, we can evaluate if we can expect closed woodland, half open steppe-forest or if steppe vegetation prevailed. The species composition is typical for the different environments (Willcox 2002; Wright *et al.* 2015). As woodland is nowadays very rare in most parts of Central Anatolia, dried dung mixed with chaff represents the most common fuel up to recent times. This also could have been a source of burning material in prehistory. The occurrence of large amounts of firewood in archaeological excavations in relation to charred seeds that may originate from burning dung speaks in this sense for a local existence of woodland. Unfortunately, just a few archaeological sites have revealed anthracological studies.

From the excavations at Gordion, some 80 km west-southwest of Ankara, charcoal from the Bronze Age to the Hellenistic period was investigated by Naomi F. Miller *et al.* (2009). The lowermost layers date to the Late Bronze Age (from 1500 to the 12th century BC) and are supposed to represent a small political and economic centre on the edge of the Hittite empire. According to the authors, most of the charred wood is assumed to originate from fuel and not from timber. Additionally, dung pellets are supposed to play a minor role in fuel supply – but a major role in the assemblage of charred seeds. An overall number of 13 botanical samples could be linked to the Late Bronze Age. Juniper (67 %) is by far the dominating species in this early stage of the settlement, whereas pine (27 %) and oak (5 %) are second and third with regard to the summed up charcoal weight. Other wood taxa weigh less than 1 % of the total

identified charcoal. Later on, this relation shifts during the Iron Age towards oak, and juniper seems to be supplanted by an ongoing collection of firewood in the vicinity of the settlement. The change in wood composition is interpreted as the ongoing exploitation of the environment in the vicinity of the settlement with the use of local shrubby and half-open woodland in the early stages of Hittite times. The relation of the number of seeds to the weight of charcoal, taken as an indicator of the openness of the landscape, is far below values of a steppe environment and thus speaks for woodland in the surroundings of Gordion. Changing values of cereals, seeds and bones of domestic and hunted animals during the following phases indicate changes of the role of agriculture and pastoral activities as known from recent ethnographic observations of agro-pastoral societies (Miller *et al.* 2009; Gürsan-Salzmann 2005).

In comparison, Nathan J. Wright *et al.* (2015) describe the charcoal composition of the tell of Kaman-Kalehöyük from the Bronze Age to the Late Iron Age. Here, the oldest samples come from the Assyrian Colony Period (Middle Bronze Age I – III), thus a longer lasting development can be studied. Four pit complexes with an overall number of 1390 identified charcoals are investigated for the Late Bronze Age Hittite period. Oak is by far the dominant taxon with a value of 79 %, outshining willow/poplar (12 %) and pine (4 %). In comparison to the older phases, willow/poplar lost its relevance and oak strongly increased. Later in the Iron Age, oak loses this dominant role and pine becomes more important with pine values amounting to 38 % against 46 % for oak (percentage abundance). In addition to these three taxa, other tree species play a subordinate role with values around 1 %. Only Rosaceae reach higher values measuring up to 4.8 %, indicating shrubby vegetation and potential support of thorny shrubs by negative selection of browsing animals. Remarkable is the low diversity of taxa in the Late Bronze Age, which speaks for a biological depletion in this economically and politically flourishing time. The authors compare the results with pollen data from other sites in Anatolia, where they see an ongoing presence and partial dominance of pine pollen. In consequence, they claim a practice of selective wood consumption with adaptation to specific cultural and economic needs. Thus, the charcoal composition cannot reflect the local tree vegetation quantitatively as it is filtered by specific practices of wood consumption.

Another charcoal analysis is presented by George Willcox (1974) from Aşvan in Eastern Anatolia at the confluence of the Murat River with the Karasu River. Here, Early Bronze Age settlements have been excavated in addition to older (Chalcolithic) and younger (Hellenistic to modern) features. In an area, nowadays bare of any tree cover, oak dominates the record with a steadiness of 100 % (occurrence in 20 of 20 samples) ahead of elm (55 %) and Salicaceae (40 %). Other taxa occur just occasionally. Even though there are no identified Middle or Late Bronze Age layers, at least in the Early Bronze Age the species exploited for fuel and timber represent the climax vegetation of a deciduous forest before the expansion of the anthropogenic steppe.

These results are supported by further studies in Eastern Anatolia (Turkey and Syria) by Willcox (2002). Along a north-south transect, he shows the gradient of increasing steppe components in the charcoal analyses of archaeological features of different age according to the climatic gradient. During the Bronze Age, wood and timber supplies seem to be based on local sources. Compared to modern vegetation without a natural-like tree cover, all sites show clear indications of either deciduous woodland in the north or steppe-forest in the south.

The same region on both sides of the Turkish-Syrian border was studied by Katleen Deckers and Hugues Pessin (2010). Nine Bronze Age sites were investigated in time slices of the Early, the Middle, and the Late Bronze Age in the Euphrates and the Khabur Valleys. A strong north-south gradient is visible in the distribution of oak and pistachio, representing a climatic gradient measuring nowadays from 500 to less than 200 mm of annual precipitation. The authors interpret the decrease in oak and the relative increase in pistachio as an effect of increasing aridity during the Bronze Age. A northward expansion of the steppe and the steppe-forest environment would also have been supported by grazing and overexploitation of wood resources as an alternative explanation. This argument is supported by Elena Asouti and Ceren Kabukcu (2014), who have demonstrated that the semi-arid deciduous oak woodlands might have been a very old anthropo-zoogene vegetation type at the transition between closed woodland and the natural steppe.

Charcoal analyses are also provided from Bogazköy/Hattusa and from Kuşaklı/Sarissa (Dörfler *et al.* 2011). In Bogazköy, nowadays at the edge of the distribution of deciduous woodland, mainly Phrygian (Iron Age) features are investigated. The analyses were dominated by oak and pine (~35 % each). Juniper, willow/poplar and Rosaceae together amount to less than 30 %. From Hittite features, the botanical macro remains were not differentiated between the early, middle and late phases. Here, pine and oak also dominated (R. Neef pers. comm.). A shortage of fuel and timber does not seem to have been a limiting factor for the development of the city.

The species composition differs distinctly in Kuşaklı/Sarissa, nowadays located in the steppe zone. Here, oak plays a minor role, whereas the charcoal of the Hittite layers is dominated by pine. Juniper, willow/poplar and Rosaceae measure again less than 30 % of the determined wood residues. This reflects the potential natural vegetation: At higher altitudes, pine dominates and oak species, growing in a steppe-forest environment, would have been less suitable for house building than mountainous pines.

To sum up, wood for building purposes as well as for fuel seems, in comparison to modern conditions, not to be limited in most of the investigated sites. The species composition mainly depends on the local availability of wood in Hittite times. Imports of timber are rarely recorded, but in some areas a depletion of natural or semi-natural types of woodland can be seen due to continuous exploitation.

Archaeozoological studies as a source of vegetation history in Anatolia

Animal bones from many Hittite sites have been studied by Angela von den Driesch and colleagues (Boessneck/von den Driesch 1975; von den Driesch/Vagedes 1997; von den Driesch/Boessneck 1981; von den Driesch/Pöllath 2004; von den Driesch 2009) and are summarised by her in Walter Dörfler *et al.* 2011. Above all, they provide knowledge about the nutrition of different sub-groups of the Hittite population, and about offering practices in the Hittite empire according to different areas of excavations. For example, game is concentrated in temple areas. Secondly, bone assemblages also provide information about environmental conditions in the surroundings of an excavated town. Wild animals are adapted to specific types of landscapes, e.g., red deer and wild boar to woodland or crane, great bustard and squirrel to open grassland or steppe environments.

Cattle, sheep and goats were of major economic significance. Pigs, horses, mules, donkeys and dogs were also kept as domestic animals, but to a smaller extent and for different purposes. A great variety of other mammals and birds was hunted as the assemblages of bones of different excavated sites indicate (Dörfler *et al.* 2011, 120-121). The regular occurrence of red deer and wild boar at all investigated sites speaks for the existence of woodland in the vicinity of the Hittite towns. Additionally, at Kuşaklı/Sarissa some animals that are linked to open landscapes are recorded. Accordingly, a steppe environment additional to the woodland is probable for the surrounding of this local capital.

Palynological studies as a source of vegetation history in Anatolia

A large number of palynological studies from Anatolia have recently been compiled by Çetin Şenkul (2014). Many of the pollen diagrams cover Late Glacial and Holocene archives, but very few include a high temporal resolution for the Bronze Age and independent dating. Thus, the necessary basis to answer specific questions in certain regions is still weak. In the framework of the above-mentioned project on "Environmental history and agrarian economy in the surrounding of Hittite cities", three sites were investigated.

A small pond, Sülük Gölü, measuring 70 m by 30 m, lies 950 m southeast of the southern Yerkapı bastion in Boğazkale/Hattuša (40° 0' 9,59"N, 34° 37' 37,59"E) at an altitude of 1185 m above sea level. It revealed 370 cm of very dense and sticky clayey sediment. The water depth was 190 cm. Unfortunately, the Bronze Age layers were not represented in the cores. As it was not possible to enhance the coring depth, even with long lasting drives and a motor hammer, no detailed pollen studies could be carried out at this site. Two other sites some 50 km south of Sivas in Eastern Anatolia provided Bronze Age deposits.

One site was a pond of 120 m diameter, named Suppitassu Gölü according to one of the Hittite gods that was venerated at this place. It lies 2500 m south of the settlement mound of Kuşaklı/Sarissa (39° 17' 6,90"N, 36° 54' 54,32"E). Whereas the former city lies at 1600 m above sea level, the pond and a surrounding holy district overview the valley and the settlement from ca. 1900 m a.s.l. During the coring in July1999, the water depth measured 70 cm and the coring revealed 620 cm of calcareous gyttja and peaty sediments. This natural archive covers the last 12,000 years.

Nowadays, the landscape around Kuşaklı is dominated by steppe vegetation. Remnants of steppe-woodland are restricted to very few spots at steep slopes of the higher mountains. The landscape is bare of any tree cover except some poplar plantations around the houses and wells. The flat plains of the valleys are mainly used for cereal cultivation. Apart from these arable fields, extensive grazing forms the landscape. At the slopes and mountains, the vegetation is composed of plant genera such as *Artemisia*, *Astralagus*, *Acantholimon*, *Euphorbia*, and different kinds of Chenopodiaceae and Poaceae, a typical steppe habitat. Cattle, sheep and goats graze the mountain slopes during the growing season, and browse the fields after the harvest. As no wood is available for fuel, the traditional heating material consists of pellets made of dung and chaff. Thus, the modern economy is highly adapted to the steppe environment.

The second site, Tecer Gölü, is a small and shallow lake measuring 940 m by 610 m. It lies some 22 km northeast of Suppitassu Gölü near the village of Ulaş and is located at an elevation of 1404 m above sea level (39° 25' 51,61"N, 37° 5' 4,07"E). The water depth varies between 2 to 3 m in winter and spring and less than 1 m in the summer. Coring was conducted at a water depth of 80 cm in July 2002 and revealed an overall sediment sequence of 690 cm in the centre of the recent lake basin. The surrounding of the lake is dominated by arable fields in the valley floors and extensively grazed areas at the hill slopes. Geologically, the direct vicinity is built from Oligocene claystones. To the east of Tecer Gölü, Cretaceous-Paleocene limestone layers form the Tecer Dağ rising up to a height of 2000 m above sea level (Kuzucuoğlu *et al.* 2011). At the slopes of this mountain range, some areas with light tree cover exist. The slopes of the surrounding lower hills with relatively soft rocks show intensive erosion forms with very little steppe vegetation.

Material and methods

Coring was conducted with a "Usinger-Corer" (Mingram *et al.* 2007) from a swimming platform. Pollen samples were investigated in different intervals according to the focus on Bronze Age landscape reconstruction. In order to identify the pollen, Hans-Jürgen Beug (2004), Peter D. Moor *et al.* (1991) and Willem Punt and Stephen Blackmore (1991) were consulted. Additionally, a modern pollen reference collection from the German Archaeological Institute in Berlin was used to classify unknown types. A minimum sum of 400 grains was counted in almost each sample with a magnification of 500 and, when necessary, of 1000 under oil. The pollen diagram was constructed using TILIA and TILIAVIEW computer software (Grimm 1990). The calculated pollen percentages apply to the sum of total terrestrial plants except Liguliflorae and Matricaria-type as they were locally represented.

The chronological division of the core is based on ten AMS-^{14}C-dates in the case of Suppitassu Gölü and on thirteen such dates for Tecer Gölü. The dates were calibrated and a time depth dependency was calculated by the OXCAL software package (Bronk Ramsey 2008). For the scope of this article, the report focuses on the third and second millennia BC.

The pollen record from Suppitassu Gölü

The record of the Suppitassu Gölü spans the last 11,000 years. For this article, an extract of the time between 3000 and 1000 cal BC is selected, covering the pollen assemblage zones 4 to 6. Whereas an overall number of 10 ^{14}C-dates exist for the entire profile, the examined part covers three ^{14}C-dates (Dörfler 2015). They show a continuous growth of sediments and peat, but the pollen analysis has shown that pollen preservation and therefore the pollen concentration is poor in the peaty deposits. Thus, the calculation sum is very small in these layers as displayed in the second column in figure 6.

The phases, indicated by horizontal lines in the diagram, are defined by stratigraphic changes in the deposits that change from clay at the bottom of the section into calcareous mud at 263 cm and into peat at 243.5 cm depth. The peat is again replaced by calcareous mud at 220 cm and then clay was deposited from 204.5 cm to 190.5 cm. The extracted sequence ends with calcareous mud at 180 cm. These sediments represent different envi-

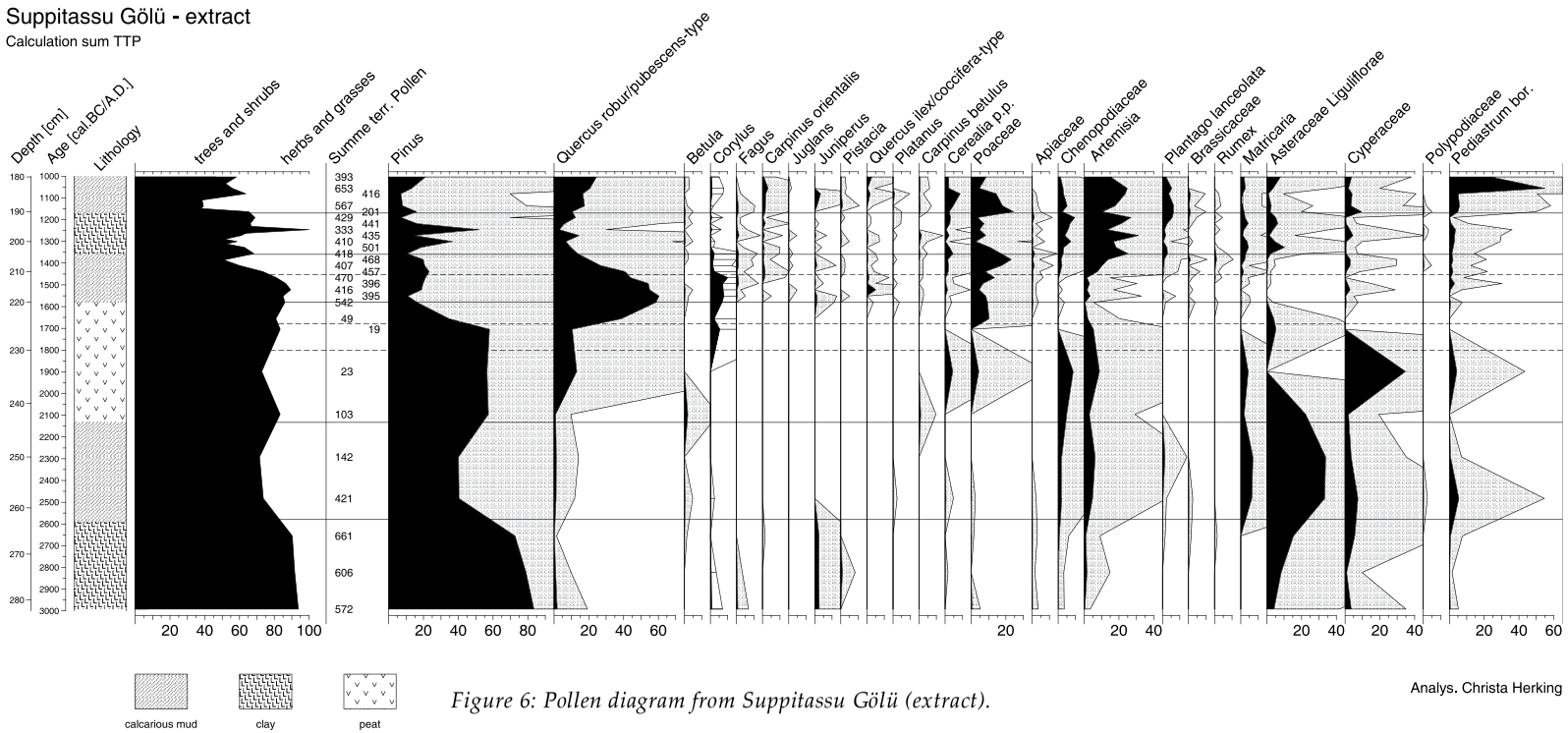

Figure 6: Pollen diagram from Suppitassu Gölü (extract).

ronmental conditions: The clay indicates the erosion of soil material from the slopes. This can occur in dry phases when little vegetation cover protects the soil from being washed away by strong rain events. The same applies for phases, for example, with strong grazing pressure by sheep, goat and cattle that may have cleared the vegetation from the surface. In the latter case, indicators of human activities, anthropogenic indicators according to Karl-Ernst Behre (1990), should be present in the pollen record. Calcareous sediments represent a lake stadium with little erosion and enough water cover for autochthonous calcium precipitation. In very arid phases, the lake went dry and peat started to grow, as the depression was still supplied by groundwater. Thus, the peat layers represent the driest phases in the Suppitassu record. According to ^{14}C-dating, clay sedimentation (dry conditions) end around 2600 BC. Very low values of deciduous trees are represented and the main components in the pollen record come from pine (*Pinus*) and juniper (*Juniperus*). Steppe indicators, such as *Artemisia* (mugwort) and Chenopodiaceae (Goosefoot-family), are low during this phase. The following wetter calcareous mud-phase ends at around 2150 BC. During this phase, summer-green oak (*Quercus robur/pubescens*-type) increases slightly. The high values of herbs can be explained by the local occurrence of composite plants of the Liguliflorae-subfamily at the shore of the pond. The transition to the arid conditions, indicating peat, can most probably be linked to the 4.2-event (Dörfler 2015). Higher values of Chenopodiaceae (Goosefoot-family) indicate the spread of steppe environments during this phase, whereas the high Cyceraceae-values (sedges) represent local bog vegetation. At around 1580 BC or, as the increase in the oak curve indicates even 100 years earlier, the dry climate is replaced by wet conditions, most favourable for the growth of deciduous trees. In addition to summer-green oak (*Quercus robur/pubescens*-type), also hazel (*Corylus*) and from 1580 onwards beech (*Fagus*) and oriental hornbeam (*Carpinus orientalis*) spread. Single pollen grains from walnut (*Juglans*) indicate the cultivation of this demanding tree during the 16th century BC. At around 1450 BC, some 70 years after the foundation of the settlement of Kuşaklı/Sarissa, the environmental conditions in the mountainous area change. The decrease of summer-green oak and hazel and the contemporaneous increase of mugwort indicate an ongoing transformation in the vegetation in the surroundings of the lake. As the sediments are still built up by calcareous mud there seems to be no climate shift that induced this transition. The increase of anthropogenic indicators, such as ribwort-plantain (*Plantago lanceolata*), sorrel (*Rumex*) and other herbs, and the contemporaneous increase in the curve of the *Cerealia*-type make an anthropogenic change reasonable. An over-exploitation of the sensitive mountainous woodland in the course the Hittite settlement boom is most probable. At around 1360 BC, the amount of clay in the sediments increase, indicating soil erosion in the surroundings of the pond that by now had high proportions of steppe plants like Chenopodiaceae and *Artemisia* – probably an anthropogenic steppe at this time. This phase ends around 1170 BC, nearly contemporaneous with the downturn of the Hittite empire. If a drought triggered this process (Kirleis/Herles 2007), it must have been of short duration as no long-lasting effect of increasing aridity can be seen in the Suppitassu Gölü record. From ca. 1170 BC onwards, a calcareous mud indicates water coverage of the pond with decreasing soil erosion but ongoing or even rising settlement indicators (*Cerealia*-type and ribwort-plantain). Increasing values of summer-green oak and oriental hornbeam speak for wet conditions, favourable for deciduous trees. Even if the Hittite empire collapsed, the rural economy seems to have survived and land-use seems to go on during Phrygian times.

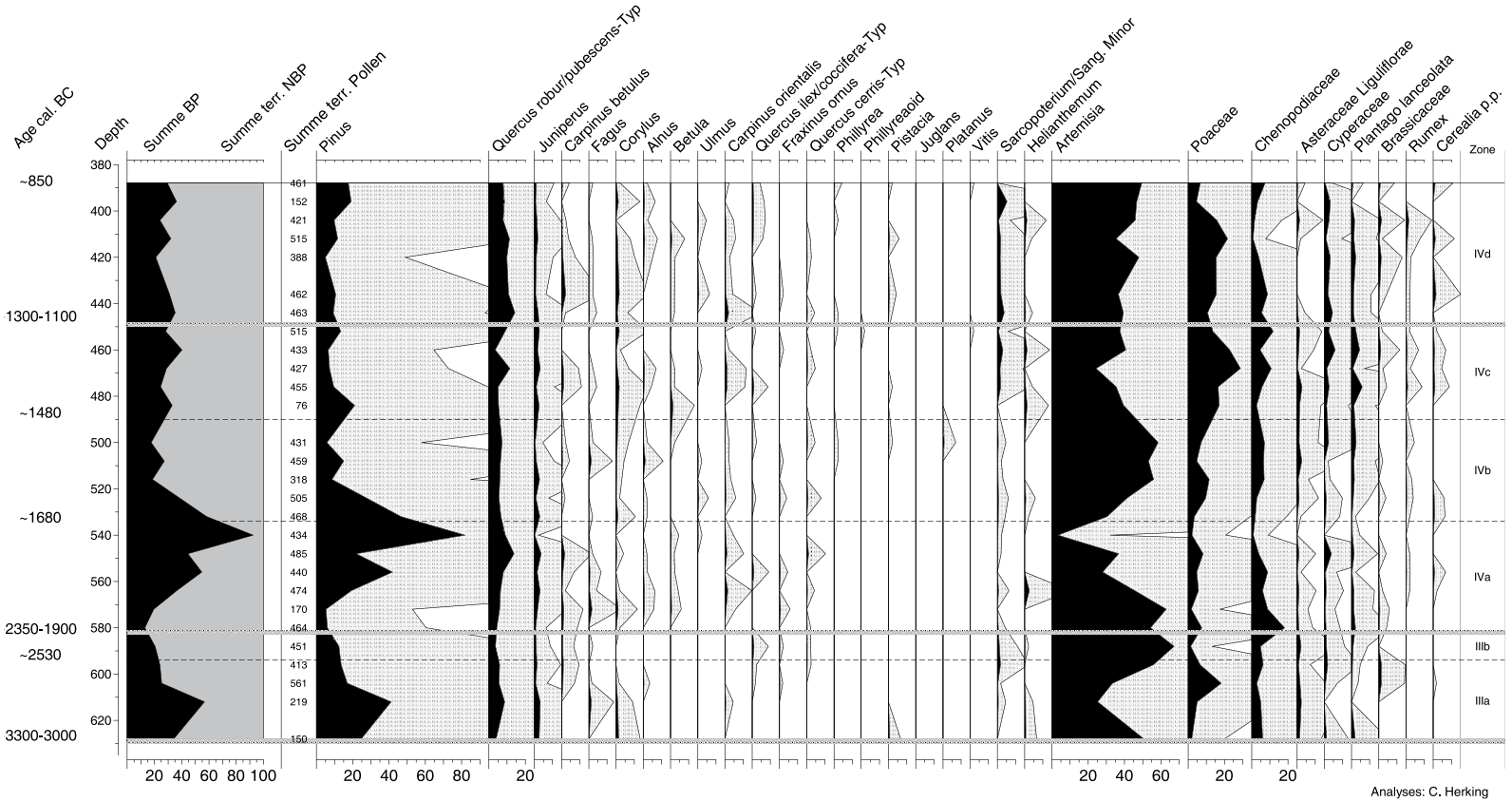

Figure 7: Pollen diagram from Tecer Gölü (extract).

The pollen record from Tecer Gölü

In comparison to Suppitassu Gölü, Tecer Gölü is a small lake in the lowland even if it is located at an elevation of 1404 m a.s.l. The 7 m long record of Tecer Gölü spans the last 6000 years. For this article, an extract of the time between 3000 and 1000 cal BC is selected that covers the sediments from 635 cm to 385 cm. Whereas an overall number of thirteen ^{14}C-dates exist for the entire profile, the examined part is covered by five ^{14}C-dates. One of them is treated as an outlier according to age inversion (see Kuzucuoğlu *et al.* 2011), probably due to re-deposited material. The dates point to a continuous growth of sediments but the detailed sedimentological analyses showed that three hiatus occurred for the time between 3300 and 3000 cal BC (level 629 cm), 2350 and 1900 cal BC (level 582 cm), and 1300 to 1100 cal BC (level 449) (Kuzucuoğlu *et al.* 2011). The sedimentological study was made for climate reconstruction.

The sedimentology shows a division of ten different zones with 21 subzones. The discussed section spans 7 such subzones, displayed in the last column to the right (Fig. 7).

According to the sedimentology and the dating model described by Kuzucuoğlu *et al.* (2011), the lake had an arid phase without sedimentation from 3300 to 3000 cal BC (hiatus 1). The following Phase IIIa starts with an input of sand and gypsum and high values of aragonite in the middle of the phase, indicating arid climatic conditions and brackish conditions in the lake. Phase IIIb shows an increase in clay and a decrease of aragonite and gypsum, indicating freshwater conditions. The pollen composition is dominated during Phase III by pine (*Pinus*) and oak (*Quercus*). Traces of beech (*Fagus*) and hazel (*Corylus*) speak for the existence of some deciduous trees in favourable positions like springs at the foot of mountain slopes. Even though the sediments indicate more moisture during the second phase (IIIb), the pollen record indicates increasing steppe components with higher values of *Sarcopoterium/Sanguisorba minor* as an indicator of Phrygana-vegetation and high values of mugwort (*Artemisia*). As settlement indicators, such as ribwort plantain (*Plantago lanceolata*) and *Cerealia*-type pollen grains, are rare, there is no strong indication for human pressure inducing this aridification in the vegetation. A second hiatus occurs at the level of 583 cm to 581 cm in form of a gypsum rich sandy layer indicating very low lake levels at this stage between 2350 and 1900 cal BC. High values of Chenopodiaceae (goosefoot family) and *Artemisia* (mugwort) prevail during Phase IVa with gypsum-rich sand layers and an increase in aragonite, all pointing to brackish conditions in the lake and arid conditions in its surroundings. Pine (*Pinus*) and (just slightly) oak (*Quercus*) increase again during Phase IVa. This can be a regional effect of regenerating woodland in the high mountains. The contemporaneous decrease of mugwort (*Artemisia*) and the goosefoot family (Chenopodiaceae) might be an effect of the calculation sum (total terrestrial plants) as pine dominates the figure during this stage.

Phase IVb starts, according to the sedimentological record, with a climatic improvement between ca. 1680 and 1600 cal BC. Unlike Suppitassu Gölü, here an increasing clay content in conjunction with further precipitation of aragonite point to increasing humidity during the summer months. But the second part of this phase (ca. 1600 to 1480 cal BC) shows increasing aridity again with high aragonite values. In the pollen record, we see higher values of steppe plants like *Artemisia* and Chenopodiaceae as a statistical effect of decreasing pine values at the same time. Thus, the short moist episode is not reflected in the pollen record apart from an

increase of indicators of arable activity like *Plantago lanceolata* (ribwort plantain) and pollen of the *Cerealia*-type in the early moister interval.

Phase IVc again shows a fluctuating lake level with a general trend to increasing aridity. The phase starts around 1480 cal BC with an increase in settlement indicators and *Corylus* (hazel) but also *Sarcopoterium/ Sanguisorba minor* as an indicator of Phrygana-vegetation indicating high anthropo-zoogene pressure on the landscape. The increase of wild grasses (Poaceae) and the decrease of mugwort (*Artemisia*) may point in the same direction. This may reflect the high degree of land use activities during the Hittite phase. Around ca. 1300 cal BC, at the beginning of Phase IVd, oak (*Quercus*) increases, indicating some wood regeneration whereas settlement indicators decrease slightly. This might be connected with the collapse of the Hittite empire, although the vegetational changes are weak for this time. According to the sediment record, a drought of some 200 years (from 1300 to 1100 cal BC) occurs, but the pollen record does not reflect this as steppe indicators stay at more or less the same values.

During the course of Phase IVd, anthropogenic indicators rise again slightly, indicating an ongoing cultivation of the area by Phrygian tribes in the succession of the Hittites.

Thus, the Tecer Gölü record shows very variable climatic conditions with a general trend towards increasing aridity with relatively short wet phases during the second and third millennia BC. Nevertheless, these short phases, as also indicated in the Suppitassu Gölü record, enabled the Hittite farmers to build the economic basis for the complex empire.

Discussion and conclusions

Comparing the record of Suppitassu Gölü with Tecer Gölü shows some good agreement, even if the absolute dating varies slightly due to uncertainties in the age depth models. The wet Phase IIIb (2530 to 2350 cal BC) in Tecer Gölü can be linked with the wet Phase between 2600 and 2150 cal BC in Suppitssu Gölü. Here, the dry phase that might be linked to the 4.2-event (Dörfler 2015) starts nearly 200 years later than at Tecer Gölü. As both dates are based on interpolation, they may represent the same phenomenon. Two short wet phases are represented in Tecer Gölü at the beginning of Phase IVb and IVc around 1680 and 1480 cal BC. They can be linked to the sedimentological transition in Suppitassu Gölü around 1580. The vegetation (*Quercus* increase) reacts already 100 years earlier, which would fit to Tecer Gölü perfectly. Whereas at Suppitassu Gölü the record seems to be influenced by human activity in the surroundings, Tecer Gölü shows a bit more variability in the second half of the second millennium BC. In general, both records reflect the same climate with local variations. We can describe the Late Bronze Age with the expansion of the Hittite empire as a time of favour but with regularly occurring droughts or phases of unfavourable conditions that had to be endured by an adaptation in economic strategies. Roberts *et al.* (2001) summarize that Holocene climate changes occurring in the circum-Mediterranean region are rather different. Similar climate changes become apparent in lake sediments in Central Turkey and in Western Iran as well as in Sicily and Spain, but there are also some records in which an opposite climate trend appears to have applied. Data from charcoal analyses as well as archaeozoological results support this reconstruction. Wood obviously was not limited during Hittite times even though steppe environment

expanded, mainly due to anthropogenic pressure. The Hittite country may not have been a land of prosperity and plenteousness but it experienced a time of favourable conditions during the Bronze Age, which were interrupted by a number of droughts and a general trend to dryer conditions. The breakdown of the civilisations does not seem to be connected with a strong climatic shift or event.

Of course, also short-term events can trigger environmental stress. Most often, cultural transformations are not mono-causal but are driven by a combination of technical developments, social conflicts, potential external stress, short-term effects like crop failures or plagues, and longer lasting climatic shifts with their environmental consequences.

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Nature and Perception of a Greek Landscape: Stymphalos

Ingmar Unkel

Abstract

Environmental and cultural changes and their mutual relationship or influence have been a subject of extensive research in the Eastern Mediterranean region with its long historical and prehistorical record. Focussing on Greece, the potential impact of the so-called 4.2 ka climate event (around 2200 BC) on the cultural shift from the Early Helladic II to the Early Helladic III period, or the role of the 2.7 ka climate event (around 750 BC) on the Bronze Age/Iron Age transition were and still are hot topics of transdisciplinary research. However, the determination of factors of forcing and response in the human-environment-interplay in that region is especially challenging, as Southern Greece faces a dearth of environmental records with a comparatively high temporal resolution which are sufficiently close to archaeological sites. In the Peloponnese, Lake Stymphalia is the only natural lake remaining today. It is located in the direct vicinity of well-known archaeological sites such as Mycene or Corinth. Settlement activity in the Valley of Stymphalia itself is known from at least the 5th century BC and is specified by Pausanias in his "Description of Greece" (ca. 160-175 AD). Hence, the lake provides an excellent archive for environmental studies in an archaeological context. To reconstruct archaeohydrological and palaeoenvironmental changes over the last 5000 years, covering the cultural periods of Greece until the Early Bronze Age (Early Helladic I), sediment cores were retrieved from the lake and geochemically analysed. First results indicate a rather limited contribution of climate to the transition from the Late Bronze Age to the Early Iron Age (ca. 1300-900 BC), while a more significant cold event recorded in the area seems to coincide with the Late Antiquity Little Ice Age in the 6th and 7th century AD. Beyond the questions on the impact of climate on the changing availability of water, ancient prose and poetry text sources dealing with Stymphalos yield interesting information on how the people of different cultural periods managed the water resources and how they perceived and reflected on different hydrological phenomena.

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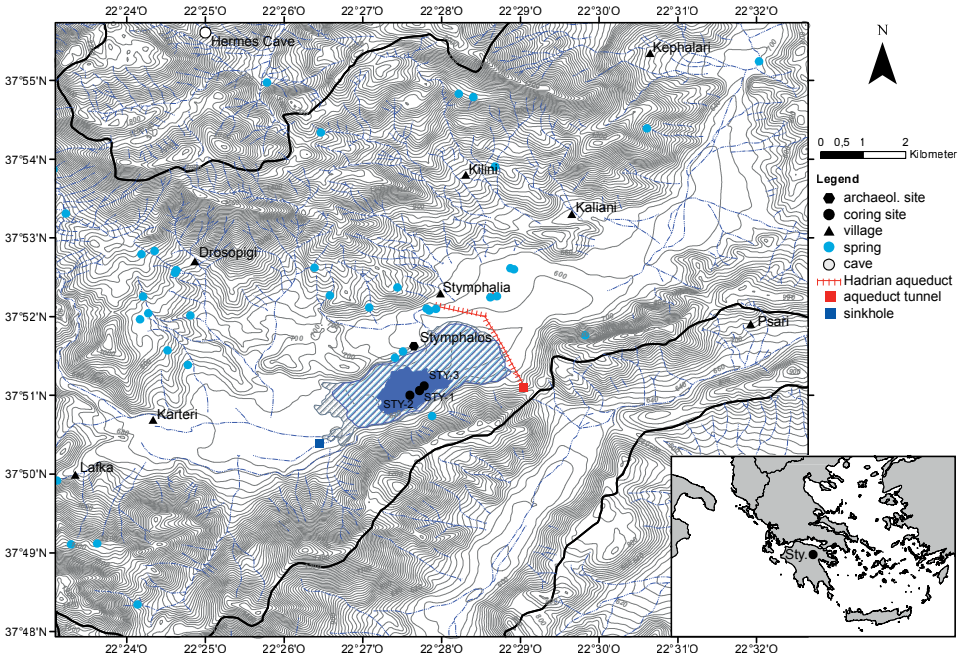

Figure 1: Map of the Stymphalia Basin in the Northern Peloponnese (after Heymann et al. 2013, modified).

Introduction – The mythical background

Lake Stymphalia, also referred to as Lake Stymphalos, located in the northern central Peloponnese (Fig. 1), is best known since ancient times as the setting of Heracles' laborious fight against the "Stymphalian birds".

Pausanias provides a report of the mythological story about this fight in his "Description of Greece" (Ἑλλάδος Περιήγησις – Helládos Periēgēsis), dated to the 2nd century AD, as follows:

> "There is a story current about the water of the Stymphalus that at one time man-eating birds bred on it, which Heracles is said to have shot down. Peisander of Camira, however, says that Heracles did not kill the birds, but drove them away with the noise of rattles. The Arabian desert breeds among other wild creatures birds called Stymphalian, which are quite as savage against men as lions or leopards"[1].

Myths like this open a window into the past by providing insight on how people formerly perceived and reflected on their environment, the world directly around them. As in modern media, mythological stories often exaggerate (putative) events in the past, sometimes trying to provide "explanations" for situations arising in the present time of the audience. However, in the 1970s and the 1980s the first researchers started to turn to mythology in a search for ways to connect the ancient

1 Pausanias 8.22.4, translation: W.H.S Jones (1918).

narratives with modern views of geomorphology and environmental science (Back 1981; Vitaliano 1973). In recent years, Cindy Clendenon (2009a; 2009b) developed the concept of hydromythology as a way of studying "hydrologic origins of tales that historically explained natural water features in non-scientific terms". Applying that concept to Heracles' fighting the Stymphalian birds, the story could reflect the hard labour invested to turn a swampy plain into arable land with the birds resembling mosquitoes plaguing the local people.

Lake Stymphalia – a geoarchaeological archive

The karst environment

Lake Stymphalia is both embedded in a mythological landscape and in a geomorphological environment dominated by limestone which is widely karstified. Morphological features of a karst landscape are, for example, caves that often contain speleothems (stalagmites and stalactites) and poljes such as that of Stymphalia or of the neighbouring Pheneos and Phlious. Hydrologically, poljes are characterized by having water inflow at the surface, but only underground outflow through a sinkhole or ponor (Greek: *katavothre*), comparable to an oversized bathtub. Due to this limited outflow, which sometimes can also be blocked due to debris or rocks falling into the sinkhole, poljes are often flooded in springtime, but may also fall dry by the end of a long summer.

Even though Pausanias would not have known the term "polje", which was derived by modern geosciences from the languages of the Balkan, he describes the features of this specific landform pretty well as "idle plains" (Αργόν Πεδίον – Argón Pedíon):

> "After crossing into Mantinean country over Mount Artemisius you will come to a plain called the Untilled [Idle] Plain, whose name well describes it, for the rain-water coming down into it from the mountains prevents the plain from being tilled; nothing indeed could prevent it from being a lake, were it not that the water disappears into a chasm in the earth"[2].

The headwaters of Lake Stymphalia are dominated by Mt. Kyllini (also called Mt. Ziria), rising 2.374 m above sea level as the second highest mountain on the Peloponnese, which acts as a giant "cloud catcher" that directs most of the collected precipitation through an underground karst system towards the lake. On the western slope of Mt. Kyllini, the Hermes Cave (Spileo Ermi; Fig. 2) is hidden at an altitude of 1.614 m (Kusch 2000), and is believed to be the mythical birthplace of the god of travellers and traders.

Down at 620 m, the spring in ancient Stymphalos (Fig. 3), conveying water from the Mt. Kyllini catchment into the Stymphalian plain, is described by Pausanias as follows:

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2 Pausanias 8.7.1, translation: W.H.S Jones (1918).

> "In the Stymphalian territory is a spring, from which the emperor Hadrian brought water to Corinth. In winter the spring makes a small lake in Stymphalus, and the river Stymphalus issues from the lake; in summer there is no lake, but the river comes straight from the spring. This river descends into a chasm in the earth, and reappearing once more in Argolis it changes its name, and is called Erasinus instead of Stymphalus"[3].

The notion that the water of Lake Stymphalia disappearing in the sinkhole ("chasm") and re-appearing some 40 km away as Erasinos River in the Argivian Plain already appears in "the History of Herodotus" (Herodotus 1890) in the 5th century BC (Fig. 4):

> "[…] and came to the river Erasinos, which is said to flow from the Stymphalian lake; for this lake, they say, running out into a viewless chasm, appears again above ground in the land of Argos; and from thence onwards this water is called by the Argives Erasinos"[4].

This early idea or understanding of the hydrology of the region is even more astonishing when facing the fact that the underground connection between the sinkhole of Stymphalia and the karst springs of Kiveri in the Argolis was first scientifically verified in 1986 AD by a hydrological tracer test (Morfis/Zojer 1986). For a tracer test, a coloured marker liquid is flushed down the sinkhole and water samples are taken at regular intervals at several springs to determine where and when the tracer reappears (Käss 2004). Without these sophisticated modern techniques, it is difficult to imagine how Pausanias or even Herodotus were able to correctly describe the connection between the sinkhole of Stymphalia and springs in the Argolis. Clendenon (2009a) cites one possible explanation provided by William Gell (1823), who reports that local inhabitants believe that if a large number of cones from fir trees, growing on the southern slopes of the Stymphalia Valley just above the sinkhole, are thrown into the waters they will reappear in the Erasinos spring. Perhaps the people in ancient periods used similar objects to trace the flow of water.

The cultural context

But not only the mythical figure of Hermes connects the Stymphalia region with the world far beyond the natural boundaries of the Peloponnesian peninsula. The story of Arethusa and Alpheios (Ovid, Metamorphoses 5.572-642) establishes a narrative connection between the heart of the Peloponnese and the distant island of Sicily. Alpheios was an Arcadian hunter in love with Arethusa, herself a huntress. He surprised her as she was bathing in Lake Stymphalia. She fled across the Peloponnese, crossed the Ionian Sea and finally arrived in the area of Syracuse (Sicily), where Artemis turned her into a spring. Alpheios was turned into a river, followed her streaming underwater and united with her in Sicily. It seems likely that this story reflects a mental connection between emigrants, who left Greece during the Early Iron

3 Pausanias 8.22.3, translation: W.H.S Jones (1918).
4 Herodotus 6.76, translation: G.C. Macaulay (1890).

Age (Proto-Geometric and Geometric Periods, 1075-750 BC) and established new settlements at the Italian coast, and their homelands in the Central Peloponnese. The earliest version of the Arethusa myth goes back to the ancient Greek writer Pindar in the 5th/6th century BC.

Figure 2: Hermes Cave (photo: I. Unkel).

Figure 3: The "fountain house" (actually a walled karst spring) of ancient Stymphalos, ca. 4th century BC (photo: I. Unkel).

The transition from the Late Bronze Age (Late Helladic, 1700-1075 BC) to the Early Iron Age (1075-750 BC) in Greece and in large parts of the Eastern Mediterranean is a period of drastic social and political transformations (Fig. 5).

The majority of the main states and political entities of the LBA in Southern Greece declined significantly in the period around and following 1200 BC (Dickinson 2006). The following period was characterized by smaller scale regional political units in most

Figure 4: 1: The sinkhole (katavothre) of Stymphalia is currently protected by a concrete wall against debris and waste. 2: The spring of Erasinos River at Kephalari (Argolis) (photos: I. Unkel).

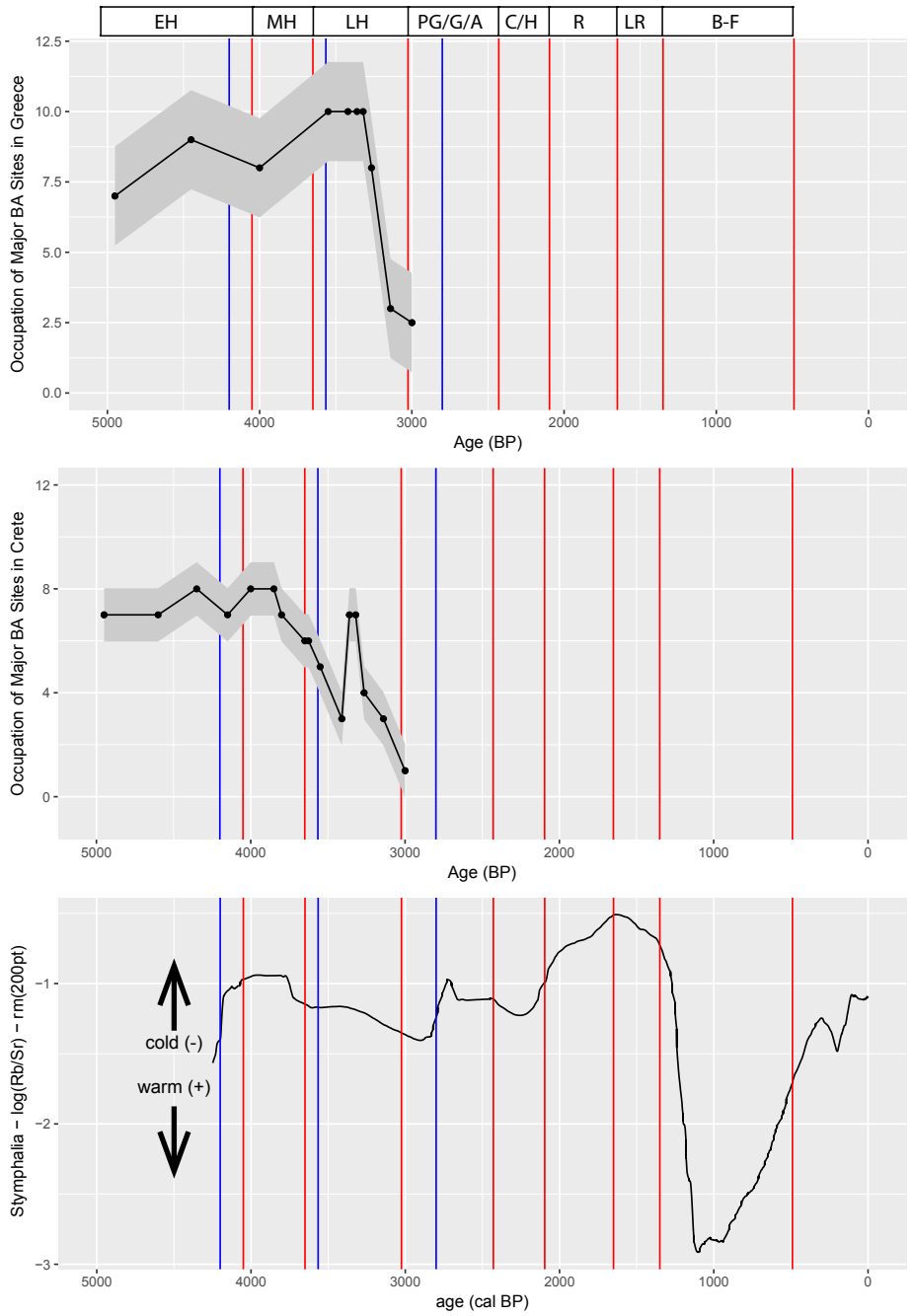

Figure 5: Occupation of palatial centres in Greece (top) and Crete (middle) show a sharp drop near the beginning of a period of drastic climatic change. Dark shading around lines represents 95 % confidence bands (data from Cline 2012, graph based on Drake 2012, modified). (Bottom) Rb/Sr ratio (200 pt running mean) derived from the lake sediment record of Lake Stymphalia showing a significant shift from cold (dry) to warm (wet) conditions around the 7th century AD. Red lines indicate the boundaries of cultural periods in mainland Greece (following Weiberg et al. 2016), blue lines indicate major climate events.

areas. The causes of this decline/transformation – may they have been naturally or human induced or both – have been widely discussed by many authors (*e.g.* Bintliff 2012; Dickinson 2006; Drake 2012) and should not be unfolded in detail here. However, this period of major transformation is the time when the narratives on land reclamation (Heracles) and migration (Arethusa) evolved, and it is the period of significant environmental changes.

The settlement of ancient Stymphalos was excavated by the Canadian archaeologist Hector Williams beginning in the early 1980s (Williams 1983). The site seems to have been in use since the 5th century BC, however, archaeological finds from this early period are limited to fragmentary sherds suggesting that any activity on the site was still minimal (Williams *et al.* 1998). Sometime later (precise dates are lacking), the village of Stymphalos was established and even fortified. The similarity of the fortifications with those of nearby Mantinea and the general trend of urbanization in Arcadia indicate a timeframe in the late 4th century BC (Williams 1983). Black debris layers in the area of ancient Stymphalos suggest that the settlement was given up after the middle of the 1st century AD (Williams *et al.* 1998), shortly after Pausanias reported on ancient Stymphalos in his description of Greece.

So far, the only source suggesting a significant settlement in Stymphalia Valley during the Late Bronze Age is not archaeology, but rather Homer's Iliad, where the Stymphalians are mentioned to have contributed to the Arcadian contingent participating in the Trojan War:

> "And they that held Arcadia beneath the steep mountain of Cyllene, beside the tomb of Aepytus, where are warriors that fight in close combat; and they that dwelt in Pheneos and Orchomenus, rich in flocks, and Rhipe and Stratia and wind-swept Enispe; and that held Tegea and lovely Mantineia; and that held Stymphalus and dwelt in Parrhasia, – all these were led by the son of Ancaeus, Lord Agapenor"[5].

Discussion – climate versus history

Visitors of all time periods (*e.g.* Pausanias 8.22.3; Gell 1823) describe the pronounced seasonal variability of the lake. Depending on the amount of precipitation reaching the catchment during the winter, the lake either survives the dry summer or "there is no lake [in summer], but the river comes straight from the spring[s]", as Pausanias describes it (Fig. 6).

In two field campaigns in 2010 and 2011, three sediment cores were taken from the deepest part of Lake Stymphalia to investigate the reported climate variability in detail. Geochemical analyses of the cores, using mainly X-ray fluorescence (XRF), hence focused on gathering information concerning changes in precipitation and temperature patterns across the area, covering the last 15,000 years (Heymann *et al.* 2013).

The Southeastern Mediterranean precipitation regime in winter is partly influenced by the North Atlantic Oscillation (NAO), which is defined as the pressure difference between the Azores High and the Iceland Low, thus being the "motor" behind the winter

5 Homer: Iliad 2, 603–609, translation: A.T. Murray (1924).

cyclones distributing rain across Europe (Cullen/DeMenocal 2000). In a negative NAO mode, the cyclones are mainly directed into the Mediterranean region, bringing high precipitation over Greece accompanied by warmer winter temperatures (Feidas *et al.* 2007). In a positive NAO mode, the cyclones take a more northerly route and Greece becomes cooler and drier due to a northerly air flow which brings cool and dry continental air

Figure 6: 1: Lake Stymphalia in April 2011 after a strong NAO(-) winter with abundant precipitation. 2: The latter in April 2014 after a NAO(+) winter with reduced precipitation (photos: I. Unkel).

from Siberia (Feidas *et al.* 2007). The sediments of Lake Stymphalia record the mode of the NAO circulation during winter by accumulating allogenic clay and other siliciclastic minerals (represented by Rubidium, Rb, in the geochemical record) from surface run-off which is linked to catchment precipitation. Authigenic carbonate deposition (represented by Strontium, Sr, in the geochemical record) in the lake during the summer is controlled by evaporation, which is influenced by summer air temperatures and the water supply reaching the lake depending on winter precipitation. Hence, variations in the Rb/Sr-ratio of Lake Stymphalia (Fig. 5) record climate change over Greece and can be compared to similar archives in the Eastern Mediterranean region (Heymann *et al.* 2013).

First, still preliminary results indicate that there is no evidence for significant changes in climate in the area of Stymphalia during the Late Bronze Age (Fig. 5). However, a shift to colder (and potentially drier) conditions around 2700 BP coincides with the global 2.7 ka event (van Geel *et al.* 2000), which potentially has contributed to cultural changes in Italy (Mensing *et al.* 2015). A return to warmer, wetter and more stable climate conditions after that event may have fostered an Iron Age 'Renaissance' in the 8th century BC (Dickinson 2006; Snodgrass 1981). The climatic changes recorded at Lake Stymphalia during the Bronze Age/Iron Age transition appear, however, relatively small compared to the strong peak in Rb/Sr corresponding to a substantial cooling during the Late Antiquity Little Ice Age in the 6th and 7th centuries AD (Büntgen *et al.* 2016).

Conclusion

Returning to the key question on how changes in precipitation and lake water levels influenced the cultural development in the region, one has to admit that the impact of climate change on societal processes cannot be clearly determined for the Peloponnese, yet. A variety of hypotheses have been put forth to explain, for example, the inception of the Dark Ages in Greece, the most prominent being the so-called 3.2 ka climate event (~1200 BC), which according to some authors caused drier conditions in the Eastern Mediterranean resulting in a decrease in agricultural production and thus contributing to system collapse (*e.g.* Drake 2012). In contrast to the archaeological record, which rather uniformly shows a sharp drop in occupation sites (Fig. 5), a still very limited number of climate records available on the Peloponnese show some variability following the end of the Bronze Age (Weiberg *et al.* 2016). The contribution of the Late Antiquity cooling to the onset of the Justinian Plague and subsequently to the reduction of the East Roman Empire has recently been described by Ulf Büntgen *et al.* (2016). However, for the Peloponnese, it is still difficult to closely correlate changes in climate and the evidence of social dynamics, given the lack of precisely dated, high resolution data, both in terms of the archaeological/historical record and the available palaeoclimatic evidence (Weiberg *et al.* 2016). Hence, the challenge for future research is to develop integrated palaeoclimate, palaeoenvironmental, and archaeological approaches in order to enable an in-depth comparison between the records (Weiberg *et al.* 2016). The recently founded PELOPS research network connecting researchers from archaeology, palaeobotany, palaeoclimatology, and modelling from Greece, Germany, Sweden, and the U.S. is one big step towards effectively combining several projects across the Peloponnese to solve the burning questions of climate effects on cultural development and human-environment-interaction.

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Scenes and Actors of Historical Crises between Generalizing Synthesis Formation and Postmodern Fragmentation

Ulrich Müller and Donat Wehner

Abstract

Crisis is a guiding metaphor of the current dystopian social discourse about an expanding world, which is increasingly perceived as drifting and uncertain. It is a challenging concept that is loaded with many meanings. The following contribution addresses this topic from different levels and approaches within an archaeological point of view. In the process, actor and structure-focused perspectives are discussed between individuals, groups and systems, between perceptions and factualities, as well as between singular phenomena and general tendencies. Case examples which serve on different spatial, temporal and social scales include: 1) The settlement of Greenland and its nearly complete abandonment in the course of the 15th century; 2) the conflicts concerning a pilgrimage site for unborn children and the change of confessions during the 16th century in the small region near Oberbüren in Switzerland; and 3) the ups and downs in the life of a pastor of the North German parish of St. Catherine on the southern Eckernförde bay in the 17th century.

Introduction

Landscapes and crises – with this conceptual pair, ecological disasters or landscapes that are characterized by conflicts and war first come to mind. Furthermore, these terms are also used as a metaphor. In such cases, "economic landscapes" of the financial sector, fields of action of politics, or crises in the euro area are signified. Particularly, the latter also refers to the fact that "landscape", however it is defined, is the space and place of social practices and processes. In the following, such spaces and places will be investigated and examined as "landscapes" of crises, whereby the focus is not placed on the landscape, but on the concept of crisis.

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In the media landscape, crisis is currently omnipresent; here it often appears as something that occurs suddenly or unexpectedly and through its apparent purpose and inner logic it is something that cannot be hindered. At the same time, crisis often serves in retrospect as an approach that can explain caesura, upheavals or phases of change. Crisis is both situated in moments and phases, and is both a structural and processural factor. It is often the narrative lubricant for the great master narratives on change and upheaval.

There is hardly a term in culture and social sciences that is used as often as the word crisis (Meinhardt 2013). Historical scholarship in the 19th century evaluated crises, on the one hand, as a teleological basic concept and, on the other hand, as non-deterministic upheavals. With the beginning of the 20th century, the term crisis was conceptualised comprehensively, and often interpreted as cultural crisis against the background of world wars and economic changes. Crisis was often mentioned in connection with terms such as "catastrophe", "decline" or "conflict". Such attribution has survived into the post-war period. However, it has been increasingly fragmented, whereby the reflections of Reinhart Koselleck (1959) and those of Jürgen Habermas since the 1970s have developed a far-reaching potency. Habermas' rather systemic approach understood crises as disturbances of system integration (Prischung 1986). Kosseleck associated crisis with modernism and added that the term indicated "uncertainty, suffering and testing". The concept would refer to "an unknown future, whose conditions cannot be sufficiently explained" (Koselleck 1959, 105). The connection of the term crisis and crisis concepts to a western and modern (capitalistic) society has been differentiated, above all, by cultural anthropology and ethnology (Beck/Knecht 2012). In particular, the reflections of David Bidney (1946) dominated the notions of change and transformation in these disciplines until the 1970s and influenced archaeology as well. Thus, Bidney and others distinguished not only between natural and cultural crisis (Bidney 1946, 537). The concept put forth by Bidney also differentiated between simple and complex societies with respective differing action options. From a methodologically and conceptually different perspective, nevertheless also distinguishing between different social developments, Victor Turner (2003) interpreted crisis as a part of transitional phenomena that are associated with performative acts and enactments. In this context, he differentiated between "ritual" and "industrial societies". Thanks to ethnological and cultural anthropological research, the connection of the concept of crisis to modernity and western societies has been questioned. These different perspectives and paradigms are also mirrored in mediaeval studies (Sawilla 2013; Patzelt 2014). In the 1970s, in particular, numerous case studies on crisis in the Late Middle Ages were published, which did not only link crisis to traditional historical scientific concepts of ascent and decline but also highlighted crisis in the context of different subject areas or times (*cf.* Fouquet/Zeilinger 2011; Kleinjung/Albrecht 2014; Wittrock 2015). In addition, further traditional fields of mediaeval crisis research are worth mentioning, in which concepts of crisis have been linked to those of epochal change (Rösener 2012; Schenk 2013; Drendel 2015; Elvert 2015).

The criticism of the concept of crisis formulated by numerous disciplines has led both to the rejection of the concept or to its substitution with the more comprehensive concepts of transformation and transition. Moreover, it has stimulated a new discourse (Mergel 2011; Meyer *et al.* 2013; Kohl 2015) in which its construct and narrative

Figure 1: Map with the sites on Greenland, in Switzerland and St. Catharine's Church.

character is emphasized. Thus, Ansgar Nunning (2013, 126) explains that a crisis is "a particular form of narrative pattern and sense making or […] 'cultural description'", which "always refers to 'descriptive culture'"[1]. Whether interpreted narratively or functionally, crisis always oscillates between a moment and a phase. Common to all these perspectives is that crises are understood as processes, which alter structures and require decision-making and subject-specific evaluation. Critique of the concept of crisis, but also varied methodological approaches concerning moments, phases and actors of change have meanwhile led, on the one hand, to a focus on transformations and transitions instead of crises and, on the other hand, to a search for social patterns in a crisis and thus indicators of these (Frie/Meyer 2014; Frie/Nieswand 2017).

The engagement of historical archaeology with terminology and concepts such as "crisis" is complex (Meier 2005; Schreg 2011b; Lagerås 2016; Müller 2003; 2016). In the following, three case studies will be presented, which represent different spatial reference systems, condensed sources and different conceptionalisations (Fig. 1).

Hereby, a detailed model is implemented in which a distinction is made between macro, meso and micro levels. This multi-level model satisfies both the scalability of archaeological data and the network character, since it provides space across the analysis level for different aggregation levels (society, collective, individual).

1 German text: "[…] eine bestimmte Form von narrativen Ordnungs- und Sinnstiftungsmustern bzw. […] 'Kulturbeschreibungen' ist, die ihrerseits immer auf 'Beschreibungskulturen' verweisen".

The macro-historical level: Greenland, the third biggest desert of the Earth in the Northern Atlantic

On the 4th of September, 1408, Captain Þórsteinn Óláfsson and Sigríður Bjarnardóttir were married. The ceremony took place in the Church of Hvalsey, today's Qaqortukulooq, on Greenland (Kalaallit Nunaat). This was not only a change for the couple. The report on the ceremony is found in the Nýi Annáll and is the last written account of persons, who had been to Greenland at that time. For archaeological research on Greenland, this event has a central meaning. For research, it was certainly clear that the ceremony was not the end of settlement on Greenland. Nevertheless, the turning point in the life of the couple is not seldom the background for the narrative of decline (Seaver 1996), which in both scientific and non-scientific perception is considered as a case example of 'crisis' (Diamond 2005, 248-275). The occupation of Eric the Red from the middle of the 10th century, on the one hand, and the abandonment of the settlement of the Europeans during the 15th century, on the other hand, make the island into a laboratory for caesura and crises and into an model example of the methodological handling of sources and data (Müller-Wille 1994; Kristiansen 2008; Arneborg 2015). Near to today's Narsaq and Qaqortoq, the so-called eastern settlement (Eystribyggð) developed, which included up to 560 farms. About 575 km north of today's Nuuk, the western settlement (Vestribyggð) was founded with up to 75 farms. Initially, its secular centre was Brattahlíð (Quaaiarsuk) and its spiritual centre was Garðar (Igaliku), where in 1126 the seat of a bishopric under the archbishopric of Nidaros (Trondheim) was established. Greenland was never a territorial entity, even though it became a part of the Norwegian Kingdom in 1261 AD under Haakon Haakonsson and retained its own law. The abandonment of the settlements occurred step by step. The western settlement was probably already deserted during the 14th century and the eastern settlement in the middle to second half of the 15th century. In the discourses that have circulated since the 19th century, various foci have been emphasised. In general, both palaeoecological factors (Fig. 2) and economic-social factors can be highlighted.

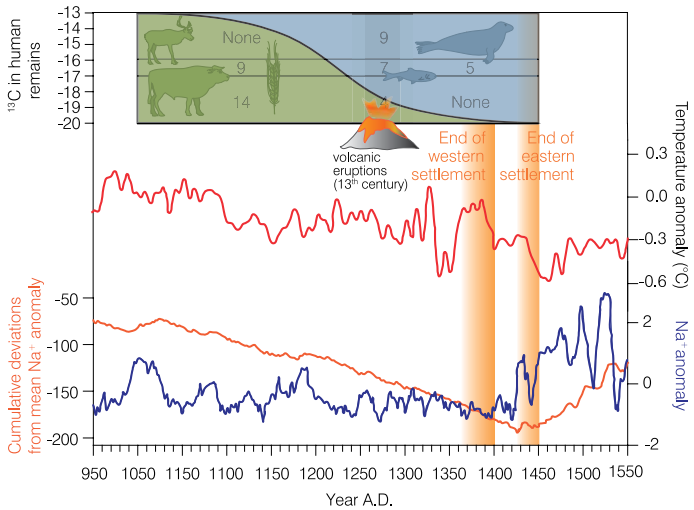

Figure 2: Greenland. Correlation between settlement abandonment and ecological factors (after Dugmore et al. 2007, 3361, fig. 3; diagram: I. Reese).

Controversially discussed aspects include: 1) climate and weather; 2) agricultural structures and lifestyle; 3) demographical developments: 4) social factors; and 5) economical issues.

While the Scandinavians were faced with a comparatively mild climate during the middle of the 10th century, this abated during the course of the Middle Ages towards increasingly colder temperatures. In the meanwhile, extensive and differentiated analyses on sediments, ice cores, foraminifers (diatoms) and further 'proxies' provide a very accurate estimate of climate development (Dugmore *et al.* 2012, 3661 fig. 3). At the time of settlement, a climatic optimum was prevalent on the island, which was already followed by a noticeable cooling in the middle of the 12th century. Around 1300 AD, a marked change to colder conditions occurred, which culminated around 1500 AD. The impact of these changes affected nearly all areas of life including both short and long-term perspectives. Climatic fluctuations are readily cited as the trigger of social changes that can persist until the collapse of societies (Glaser 2013). In spite of this – not least due to recent examples – a more differentiated assessment of 'climate' and 'weather' is necessary. This is also essential since palaeoclimatic 'proxies' are derived from very diverse data, tend to indicate trends, and can often show large dating spans for historical periods.

On Greenland, the choice of settlements was essentially driven by the traditional settlement method known from Scandinavia (Henriksen 2016). The economy of the *Grænlendingar* was based on a mix of traditional pasturalism, according to Scandinavian patterns, and the hunting of, in particular, sea mammals. The intensified analysis of animal bones since the 1970s has resulted in an assessment of a differentiated agriculture quite prone to interferences, which is best described by the so-called TEK model (*traditional ecological knowledge*) (Arneborg *et al.* 2012a; Dugmore *et al.* 2012, 3660ff). This system was supported by the *Saeter* economy that is comparable to the transhumance of alpine pasture farming. Analyses of stable isotopes indicate an increase of marine resources in human nutrition; differences between and within the settlements can be recognised (Arneborg *et al.* 2012b). The data clearly show how the settlers attempted to adjust to the changed conditions and that they were initially successful (Dugmore *et al.* 2012, 3661).

It is certainly understandable that an island covered with ice during the climate optimum can only support a limited number of people, but that problems can also occur with only a small number of people. A demographic decline effects not only the availability of labour but also family structures or communal activities, among which hunting must have played a particular role. In earlier research, population declines were still associated with war-like events (Inuit/pirates), inner conflicts or epidemics, but interpretations are more differentiated now (Lynnerup 1998; Gulløv 1997). For individual cases, the concrete effects are difficult to estimate. Thus, a decline of the working force – particularly in a society with marked seasonal agricultural activities and a highly dispersed distribution of the farms – can lead to problems. Conversely, a population decline can have positive effects in light of pastoralism, an increasingly limited availability of productive land, erosion and landscape degradation. The social structures on Greenland are accessible on the basis of written sources and archaeological finds, but are occasionally evaluated differently (Keller 1989; Vésteinsson 2010; Skaaning Høegsberg 2013). In any case, Greenland was never organized as a territorial

entity. Rather, the original system based on chieftainship under Erich the Red shifted in the direction of an 'oligarchy', with both the bishop's seat and the chieftainship in Brattahlíð and major estates that existed in the eastern settlement. At the farms of the western settlement, archaeological excavations were able to recover churches and banquet halls. The influence of the bishop and the *Lögsögumaður* ('law-keeper') and their position as landlords are disputed. This is related to specific possessions of pastureland, income through trade or also jurisprudence and relations with the western settlement.

The *Grænlendingar* were dependent on external contacts. Andrew Dugmore, Christoph Keller and Thomas McGovern, in particular, presented ideas that point to economic relations as a decisive factor (Dugmore *et al.* 2007). Thus, the export of prestige and luxury goods, such as walrus ivory, narwhal ivory, and polar bear pelts, had vital significance. It proved to be a disadvantage that African ivory and ivory from the Scandinavian Polar Regions were increasingly used in Europe. In addition, walrus hunting became more complicated because their habitat had shifted due to climate change. Moreover, the Greenlanders were not included in the trading of North Atlantic dried cod. This must have led to the progressive economic isolation of the colony on Greenland, which was increasingly excluded due to the expansion of the Hanseatic network. Conversely, it is difficult to assess the influence of the various 'crises' of 14th century Europe. This is indirectly reflected in written sources that report fewer visits to the island. Whether this is due to climatic reasons is difficult to estimate. Data concerning changes of flow conditions (North Atlantic Oscillation) are available, but they are difficult to estimate with regard to their time resolution and their concrete effects (Touret *et al.* 2012).

The discussion on the 'decline' of Greenland reflects the different scientific approaches as well as archaeological and historical paradigm shifts or national perspectives (Berglund 2010; Harrison/Maher 2014). It is also an example for a transformation or, in the understanding of John Grin, a *transition*, if one interprets it embedded in a fundamental change of society in the long 14th century. With Greenland as an example, it can be illustrated that neither a short-term caesura (catastrophe, crisis) led

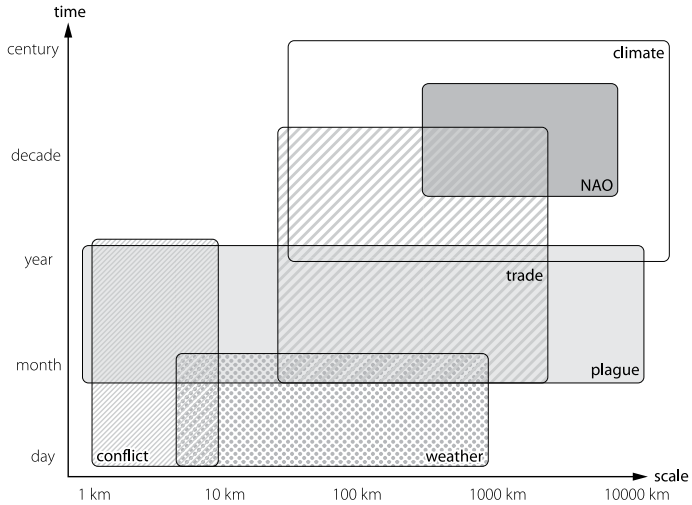

Figure 3: Greenland. Impact factors on different scales of measurement (after Dugmore et al. 2007, 3362, fig. 4B; diagram: I. Reese).

to the abandonment of the island, nor that mono-causal explanatory models, which also act at very different spatial-temporal levels, are viable (Fig. 3).

Andrew Dugmore and others assume that the *Grænlendingar* mastered the crisis situation in the 13th and 14th century through adjustments and changes at various levels (Dugmore *et al.* 2009, 111 fig. 6). Their adaptive behaviour, however, increased the vulnerability of the entire system. Influences, such as climatic changes, export dependencies, or hunting and animal husbandry, which the Greenlanders could previously offset, increasingly led to negative effects. "In this respect, the seeds of the 15th century collapse of Norse Greenland were sown in the successful adaptations of the 13th and 14th centuries […]. The Norse Greenlanders were ultimately as much victims of conjunctures of global economic change, regional political change, culture contact, and major environmental change as the victims of any individual threat" (Dugmore *et al.* 2012, 3662). Medieval Greenland represents – like hardly any other example – crisis and transformations that equally have "natural" and "cultural" origins and whose interdependence leads to a dynamic, which develops into a long disaster, recognised as such, however, only in a retrospective narrative.

From the macro-level to the meso-level: The pilgrimage for stillborn children

The Bishop of Constance, Bisoph Otto von Sonnenberg, sent a letter to Rome in 1486, in which he complained about monstrosities (Gutscher *et al.* 1999). In Oberbüren, a Marian pilgrimage site near Bern, dead children were said to have been revived "to the derision of the orthodox Christian faith and the sacraments of the Church". At first warmed in an adjacent room of the church and then carried to a Madonna in the chancel of the cold church, a feather was then held over a baby's lips to confirm the successful revival. The unbaptised children could then be buried according to traditional Christian ceremonies. About 40 years later and right after the initiation of the Reformation in 1528, this practice still seems to have been carried out. Under threat of drastic punishment, the Bern Council demanded that the altars be demolished.

Stillborn or unbaptised children could significantly interfere with the order of the pre-modern world (Gélis 2006; Hausmair 2017). The concern for the salvation of the unbaptized children is first understandable when one considers the re-evaluation of the topography of the afterlife since the 11th/12th century. While baptised children go directly to heaven and pray there for their parents, unbaptised children enter the "*limbus puerorum*", where they are excluded from beatific vision near hell in inner and outer darkness (Lett 1997; Prosser 2008). In "*limbus puerorum*", they are neither in heaven nor in hell. The unbaptised children become journeyers in the hereafter. As outsiders, the unbaptised children are not only destined to ghost around but also become the catalysts of all sorts of hardships. Accordingly, the social pressure on parents – especially the mothers – to provide for baptism and concern for the welfare of souls led to the development of various baptismal practices. In contemporaneous written sources, numerous procedures are described, which could contribute to the salvation of the unborn and stillborn. In addition to various equipment and measures, such as baptism *in utero*, pilgrimages for the revivification of stillborn children were established (Pahud de Mortagnes 2004; Labouvie 2008). The fact that the children died "again" during

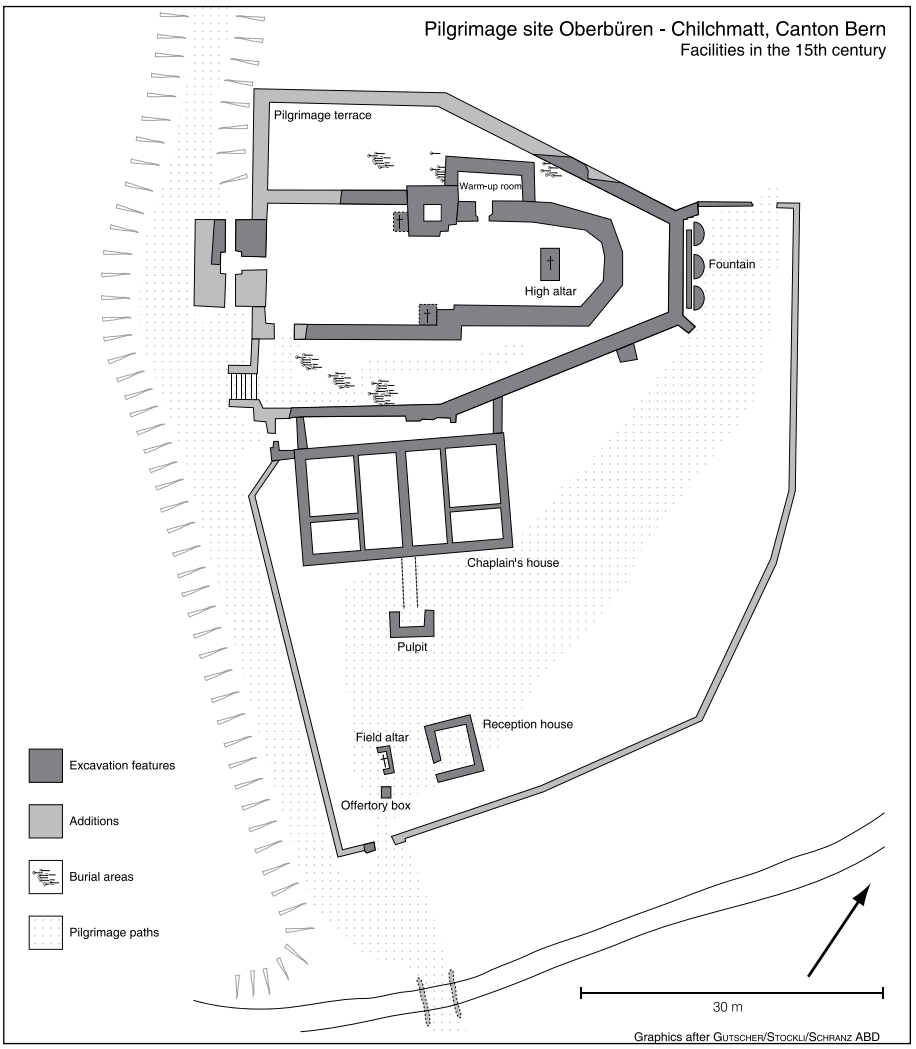

Figure 4: Oberbüren, Switzerland. Layout of the excavation features (map: I. Reese).

reawakening was accepted without complaint and collided neither with the expectations of those searching for wonders, nor with theological principles. Ultimately, the declared goal was not revivification to an earthly life, but revival for baptism and thus eternal life.

Pilgrimage sites, where stillborn children could be revived, are not only known from written sources (Pahud de Mortanges 2004; Santschi 1985) but also constitute a remarkable group of monuments, some of which have been archaeologically and anthropologically investigated (Tzortzis/Séguy 2008). Such a remarkable place is Oberbüren in the canton of Bern (Ulrich-Bochsler 2009; Utz-Tremp 2010; Müller 2013). According to the written sources, a chapel has existed since 1302 in Oberbüren and the site was regarded to be miraculous due to a statue of Mary. However, a shift of meaning first occurred in 1485. A church thief, who had drowned in the floods of the Aare, reappeared from the floods due to a Marie miracle. In light of this miracle,

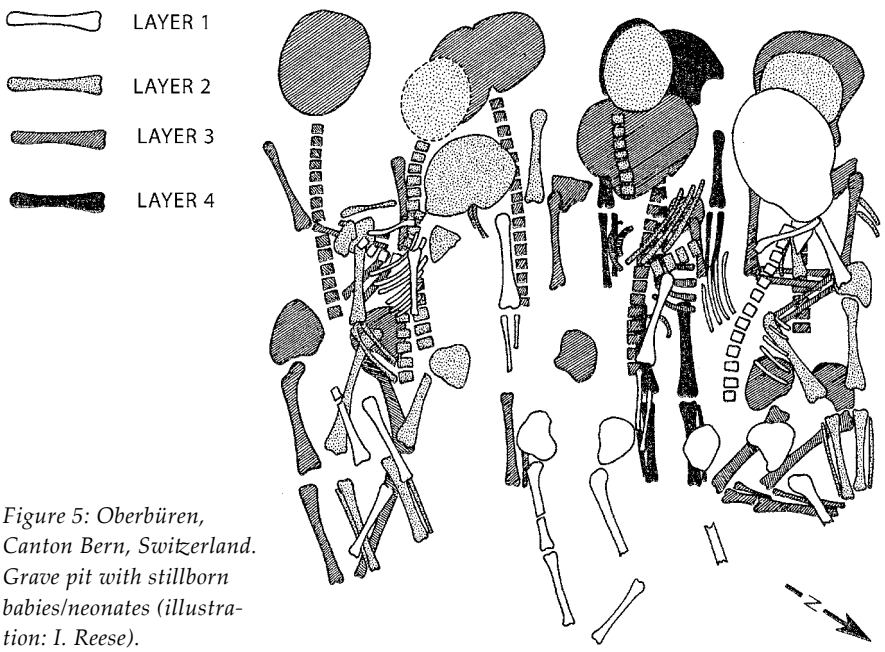

Figure 5: Oberbüren, Canton Bern, Switzerland. Grave pit with stillborn babies/neonates (illustration: I. Reese).

the pilgrimage for stillborn children developed. The sanctuary was abolished by the council after Bern had accepted the Reformation in 1528. On February 22nd of that year, the church was to be closed and – according to a claim from May 30, 1528 – the altars demolished. Due to various, but surely above all economic interests, the small town strongly resisted. First pressure on the part of Berners led to the demolition of the church in 1530 and to the slighting of the entire structure two years later. However, information from 1534 shows that the pilgrimage still had followers. Until now, four burial grounds for reawakened children have been detected on the northern and southern sides of the church (Fig. 4).

Although the Bishop of Constance mentions 2000 children, who were reawakened in the context of the pilgrimage, it can possibly be assumed that this figure was set too high for church policy reasons. It can nevertheless be understood as evidence that numerous children were returned to their hometowns after reawakening and baptism. Furthermore, many parents were likely unable to make such a pilgrimage for various reasons. Accordingly, there are also numerous documents on burials of babies, toddlers and presumed stillborn babies at cemeteries and in churches. The majority of the 250 burials at Oberbüren were carried out with an orientation to the east, without coffins and probably only wrapped in cloth. With a share of ca. 44 %, neonates constitute a significant proportion. On the one hand, efforts were made to perform pious burials according to Christian faith with heads lying to the west and arms positioned in abdominal region, indicating a corresponding prayer situation. On the other hand, layered occupancy, a deviation from medieval and early modern burial practice, indicates certain pilgrimage cycles (Fig. 5).

The extent to which single burials enable us to draw conclusions about the social-economic topography of the living remains questionable, even if written sources for other pilgrimage sites list variable fees and donation sums. Conceivable are also

burials in times of reduced frequency. The revival of foetuses and neonates did not occur with undivided approval, as mentioned above in the initial report. However, the pilgrimage in Bern – as elsewhere (Gélis 1981; Santschi 1985; Pahud de Mortagnes 2004) – represented a welcome source of income for the town of Bern. As a result of the Reformation, mass was terminated, the church was closed, the miraculous image was burnt publicly and the demolition of the altars was demanded. The potency of the old tradition as a broad religious practice is seen in the burial of at least 20 children on the southern side of the church in empty fundament graves after 1528 and thus of the survival of the custom of reawakening in spite of sanctions on the part of the authorities. The example of Oberbüren illustrates a regional sphere of faith, which is part of a confessionalisation of the landscape. However, with its diverse materiality and immateriality it is not just the physical space but also the relational space in which the actors act both with each other and against each other.

From the meso-level to the individual level: Christian Lexovi – a pastor of the St. Catharine Parish

About 200 years after the marriage in Hvalsey and ca. 60 years after the events in Oberbüren, Christian Lexovi was born. A dense conveyance of data from anthropological, archaeological and written sources enables the description of ups and downs in his life in connection with his social context. According to the inscription on the excavated grave plate (Fig. 6), Christian Lexovi was born in 1568.

The Rostock University registry from 1599 mentions a Christian Lexovius from Waren (http://matrikel.uni-rostock.de), who is most likely identical with the person referred to here. Both the professional and family life of Christian Lexovi were arranged in the following years. At the age of 35, he became the pastor of the St. Catharine parish, located on the southern Bay of Eckernförde in the Duchy of Schleswig. He was married at the age of 35 and became the father of 11 children. These details are confirmed by the grave plate. As a revered member of the rural community, he took part in disconcerting interrogations of alleged criminals. For example, he is mentioned as an honourable and learned pastor in connection with an interrogation under torture, which had occurred on March 20, 1613 at the estate of Dänisch-Nienhof in the neighbouring parish of Dänischenhagen: "*Anno 1613 den 20. Marty up des Edlen und Druesten Claus von der Wische Haue thon Nienhaue [Dänischen – Nienhof], in Genwardt der Ehrwürdigen und wolgelerten H. Andrees und H. Christian Pastoren thom Hagen [Dänischen – Hagen] und Zillenbeke [Jellebek with St. Catharine Church], ock nederer umbstahende gude Lude mehr, ist Antcke Basche in der Tortur verhöret wurden und hefft nafolges bekennet:* […]" (Leisner 2008)[2].

In the following decades, the economic situation and the health of the pastor appears to have deteriorated. At the age of 70, his life reached a state, which could undoubtedly be noted as a veritable crisis. Victor W. Turner (2003) describes this as a

2 "On the 20th of March, 1613, at the house of the noble and faithful Claus von der Wisch from Nienhaue [Danischen - Nienhof] and in the presence of the venerable and well-taught H. Andrees and H. Christian Pastoren from Hagen [Danischen - Hagen] and Zillebeke [Jellebek with St. Catharine Church] and other lower-ranking honourable persons from the area, Antcke Basche was interrogated under torture and confessed the following: […]".

H. CHRISTIAN LEXOVI SENIOR, PASTOR AL HIE GEWESEN 48 JAHR IM EHESTANDE. DARINEN ER MIT SEINER FRAWEN GEZEÜGET 11 KINDER. GELEBET 46 VNDIM 83 SEINES ALTERS DES 1651 SELIG ENTSCHLAFEN.

FÜR SICH UND SEINER FRAWEN DIESEN STEIN ZUM GEDECHTNIS HINLEGEN LASEN.

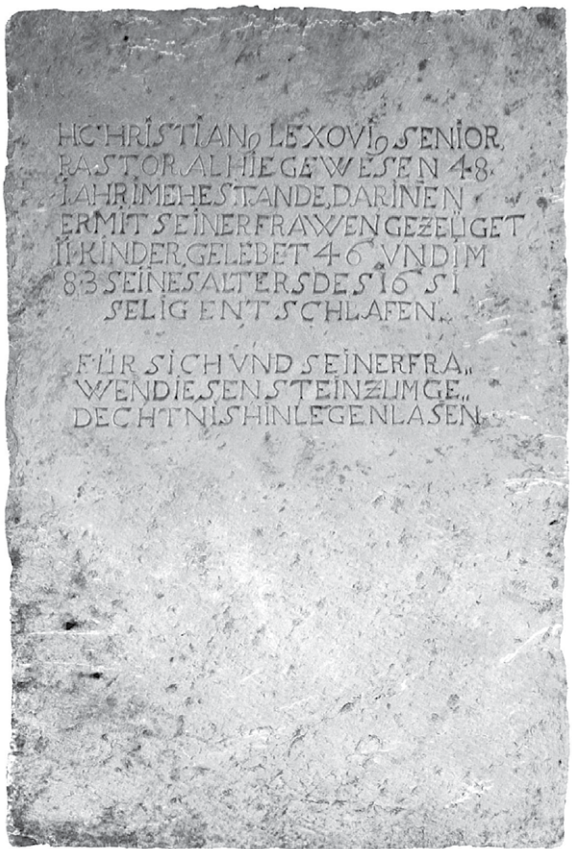

Figure 6: St. Catherine's Church, District of Rendsburg-Eckernforde. Grave slab of Christian Lexovi (image: J. Cordts/D. Wehner).

liminal phase in the sense of an involuntary threshold condition. The personal misery of the pastor can be described by a few points.

First, the pastor did not have a sufficient income and had to perform hard manual labour in order to support himself and his family. A visitation report from 1639 states that the: "*Pastor diese Ohrtes* […] *hat einen sehr schlechten und geringen Dienst, muss sich mit seinen Kindern sehr kümmerlich behelfen, welches auch seine Hände genügsamb ausweisen*" (Fabricius 1639)[3]. Strongly marked muscle attachment marks on his skeleton, which were anthropologically determined, confirmed that Christian Lexovi was engaged in hard physical labour (expert report of B. Teßmann, Berlin). In addition, the pastor was afflicted with physical disabilities. Bone material exhibits strong signs of wear on the spine and on the large joints. A report from the superintendent, a church supervisor, in 1641 states that the pastor is in bad health "*Pastor dieses Ortes wird allgemählich sehr schwach und baufällig, wie er selber beweglich darüber klagt* […]. *Weil aber die Kirche von seinem Hause weit entlegen und er nicht wohl gehen kann, auch oft geschehen, dass er vergeblich hab die Nachmittagsstunden in der Kirche, da niemand komme, zubringen müssen*"

3 "The pastor of this village […] has a poor and medial position, thus he manages very miserably with his children, which is revealed by his modest hands".

(Fabricius 1641)[4]. Third, it did not appear that there would be a successor among his offspring, who could assume the duties of the pastor after his death. According to the above-mentioned visitation report in 1639, the acting pastor requested that "[…] *eine seiner Töchter (weil keine Söhne vorhanden, die hietzu tüchtig) nach seinem Tode mit seinem successore verehelicht und beyen Ambte gelassen werden*" (Fabricius 1639)[5]. Thus, there were either no sons among his children, or none that were eligible to be a successor. In addition, the assistant of the pastor, the sexton, seems to have had a drinking problem: "*Der Küster hat auch bisher so gelebet, dass er besser taugte. Patronus klagte und brachte wider ihn ein allerhand ärgerliche Sachen, wie dass er in Krügen gesessen und gesoffen, bei solchem Gesöff* […] *geistliche Psalmen um die Wette gesungen, mit weiß nicht was für Leuten Brüderschaft getrunken*" (Fabricius 1641)[6]. Furthermore, the church building was left to deteriorate: "*Wie das ganze Kirchengebäude schlecht und gering, also sieht der Glockenthurmb erbärmlich aus und hängt an etlichen Stützen, sonst er längst darnieder gelegen wäre*" (Fabricius 1641)[7]. The description of the situation is plausible, since it can be archaeologically underpinned. In the 16th/17th century, the foundations of the church were damaged by the construction of graves within the church, which inevitably led to the formation of cracks. It must have been very humiliating for the pastor that his worshippers rather visited the neighbouring parish in Gettorf – a practice which was completely beyond church law – in spite of the threat of punishment, because there was good beer ("*gut Bier daselbst haben*)" and during his worship service they would spend most of the time with sleeping ("*die meiste Zeit mit Schlafen*") (Fabricius 1641).

The transitional phase itself – the break with the community and the personal decline of the pastor – is barely recognizable in the archaeological material, if one ignores the anthropological data. This is different for social activities and enactments, which mark the attempt to re-establish not only the threatened and, in the view of the pastor, completely unravelled order beyond his death.

This can be identified in the burial ritual celebrated for Christian Lexovi, the form of which the pastor must have significantly influenced himself. Thus, he most likely ordered his own coffin, as was customary at that time (*cf.* Neumann/Linnebach 1993, 51; Ströbl 2002, 55; Ströbl 2014, 64-65), and the gravestone of Scandinavian quartzite. In comparison, a coffin was unaffordable for most of the population in many regions well into the 19th century (Diefenbach/Sörries 1994, 37; for a critical assessment Kenzler 2011, 18-19). The present example is extravagant above average for rural areas (Fig. 7).

By means of the position of the coffin nails and the shadows of deteriorated wood, a chest coffin ('*Truhensarg*') could be recorded in the documentary plans. On both ends of the coffin, massive iron handles were attached; on the long sides, two handles were

4 "The pastor of this village is gradually very weak and rickety as he complains himself in a moving way […]. But because the church is located quite far from his house, it occurs often that he unavailingly spends the afternoon in the church even if no one comes".

5 "[…] one of his daughters (since he has no sons that are capable), should marry his successor and remain to assume the position after his death".

6 "The sexton has lived a non-suitable life thus far. Patronus complained and brought a number of annoying things against him, such as that he often sits in the pub and drank, whereby he sang the psalms as if in a race, and drank brotherhood with questionable persons".

7 "Just as the church structure, which is in bad condition itself, the bell tower is pathetic and hangs on quite a few supports. Otherwise, it would have fallen down long ago".

Figure 7: St. Catherine's Church, District of Rendsburg-Eckernforde. Handle of the coffin of Christian Lexovi (photo: J. Cordts/D. Wehner).

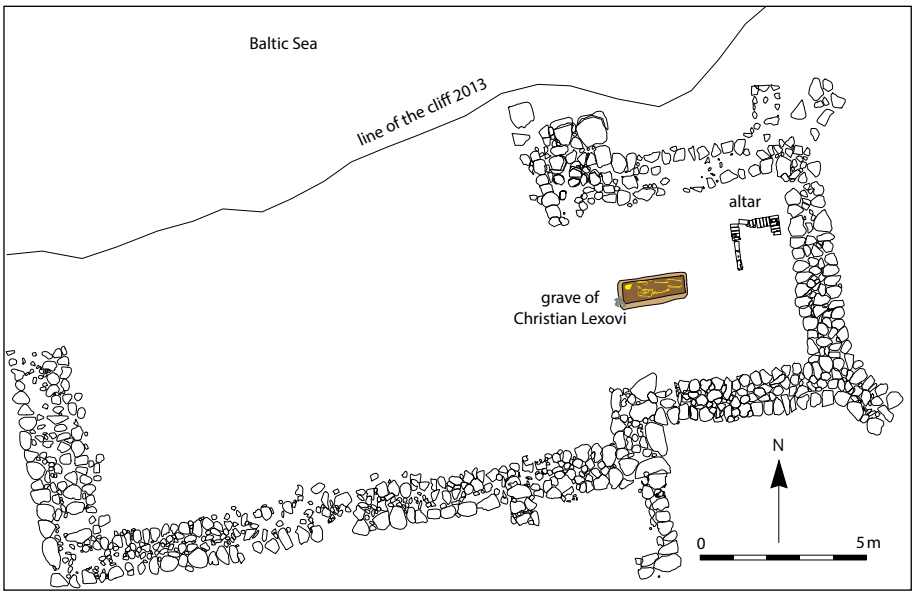

Figure 8: St. Catherine's Church, District of Rendsburg-Eckernforde. Position of the grave of Christian Lexovi (illustration: J. Cordts/D. Wehner).

affixed. The heavily corroded specimens were identified as handles ('*Bügelgriffe*') with a node in the middle. The transition point between the handles and the body of the coffin is equipped with two-pieced, rosette-shaped fittings. In the St. Catharine parish, comparable coffins are only known from notables. Due to public viewing, which became common in the Baroque period, the coffin was publicly visible and increasingly gained representative significance (Kenzler 2011, 19, 24). By means of the coffin, Christian Lexovi's self-sought, due position is manifested in the community of the village inhabitants. In addition, Lexovi associated himself with other preachers, who also emphasized their central position within the respective parishes. In this context,

the statement applies that the pastor "had just been there" ("*Pastor eben hier gewesen*") and that he had the stone positioned "in memory" ("*zum Gedächtnis*") of himself and his wife. The visible memorial plate on the floor registers his professional and family status in stone for the public and for eternity. Moreover, the exposed and very favoured position of the grave in the chancel of the church directly near the altar (Fig. 8) attests a privileged status and serves to clarify the "right" social order.

Perspective linkage

If we grasp crises and transformations as significant deviations of routines in space, which range from cultural entirety to everyday individual practice, then the multi-scalability of archaeological data enables multifaceted access in order to make these stabilized cultural and social practices comprehensible. These can be visualised by a multi-level model, which provides enough space for both social and individual courses of action and logic of action. Social orders with their logic of action and practices, which can be deduced through archaeological methods, are diverse and reflect human action – from individual actors through collectives to entire societies – as action in space.

The individual experience of the marriage at Hvalsey on Greenland is both a societal event and is linked to the crises that have shaken the island on the edge of the world since the 13th century. This example demonstrates how crises can be put into perspective on a processual basis by means of a systemic analysis on the macro level. At the same time, a systemic analysis enables a comparative structural view. Thus, it is not surprising that the Greenland case is repeatedly used in order to discuss collapses over time and space (Diamond 2005, 248-275). Regardless if one considers *The Collapse of Complex Societies* (Tainter 1988), *Renewal of Civilization* (Homer-Dixon 2006) or *Collapse of Western Civilization* (Oreskes/Conway 2014), just as Jared Diamond, these authors reach well beyond specific historical constellations and question culturally dependent, ultimately anthropogenic factors of human behaviour and also emphasize natural system reactions as important factors (Butzer 2012).

Crises appear as the culmination of numerous triggering factors with their linkages and interdependencies (*triggers* or *concatenations*) within certain time periods. Depending on resilience, either a gradual and subsequently final *collapse* may occur and stabilisation with the maintenance of the original state (*reconstruction*) is realized, or a new system state is achieved. Such models cannot deny their origins in rational choice theories (Clemens 2007, 534), but remain open-ended in a panarchical way (Gunderson/Holling 2002). While interactions and reciprocal influences are effectual between the fields of dynamic systems, cross-scale processes can be captured in the hierarchically structured and nested systems, which proceed with different rates (Butzer/Endfield 2012; Schreg 2011a; Curtis 2014).

The example of the pilgrimage for stillborn children shows us the deviation from routines on an intermediate level. It becomes clear how established routines in the form of traditions, customs and also norms with their underlying social patterns suddenly appear to dissolve. The Reformation and confessionalisation provided the framework for this example. The former is traditionally regarded as a building block of the epochal break between the Middle Ages and modern times (Elvert 2015). As

a process of confessionalisation in Europe, it is also embedded in a fundamental religious structural change, which leads to a plurality of offers of salvation that lasts far into modernity. In the view of the reformed authorities in Bern, the termination of the pilgrimage in Oberbüren does not appear to occur fast enough. In retrospect, even if they are a building block of a multi-level confessionalisation in a long pre-modern era, the events between 1528 and 1534 appear abrupt to all historical actors. Rather than a crisis, the example of Oberbüren reflects moments of a transition within a comprehensive transformation, which not only influences social sectors (niches and sectors, fields) but also society as a whole (Müller 2016). The pilgrimages, which took place in Oberbüren during the times of the confessional upheavals and existed elsewhere as "sanctuaires à répit" until the 17th and 18th century, are an expression of "dangered orders", in which the "actors come to the conclusion that the courses of action are unsteady" and within which "behaviour patterns and routines are questioned" (Frie/Meier 2014).

The example of the pastor Christian Lexovi is not particularly located on the level of a socially encompassing crisis and transformation, but rather represents the management of individual crisis experiences. In particular, cultural sciences and here ethnology have developed powerful concepts through the ritualistic theories in the works of Emilé Durkheim, Arnold van Gennep and especially Turner, in which crises are interpreted as part of transitional phenomena. Among these, the cultural anthropological considerations on liminality, social drama, or "communitas" by Turner (2003) have been taken up in archaeology (Beutmann *et al.* 2017). On the one hand, they place the individual in the foreground and enable, on the other hand, structural access, since the performative acts and enactments can be classified as general social "rituals". If not from a role as an outsider, but then nevertheless from a role that was difficult and, if you will, affected by personal crises, Christian Lexovi deliberately moved by means of material expressions to the middle of society. He demanded respect from the latter – also beyond his death in 1651 – by way of the presence and spatial arrangement of the memorial plate. With every church visit, one is aware of his person and reminded that a pastor presides over the congregation.

It is a question of standpoint choice, whether crises or transformations are considered from a rather strictly systemic perspective and the specific cultural or historical constellations tend to fall in the background or if these are made fruitful in the sense of a praxeological or actor-centred approach. In both cases, significant deviations from routines enable crises and transformations to become visible in their materiality. In contrast, a loss of trust in norms, as in the case of Christian Lexovi, can absolutely lead to a targeted staging of long-standing norms by means of materiality with the desire to re-establish order, which is considered to be disturbed. Both deviations and norms are not to be thought of as static or one-dimensional. From the perspective of historical actors and retrospective viewers, they can be judged differently, whereby this narrative is to be taken into account in archaeological interpretations.

With the help of archaeology, transformations and re-ordering processes can be identified in their materiality. A multi-disciplinary approach enables crises, the diagnoses of threat and coping practices to be highlighted within their contextual boundedness and in perspective within related discourses.

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