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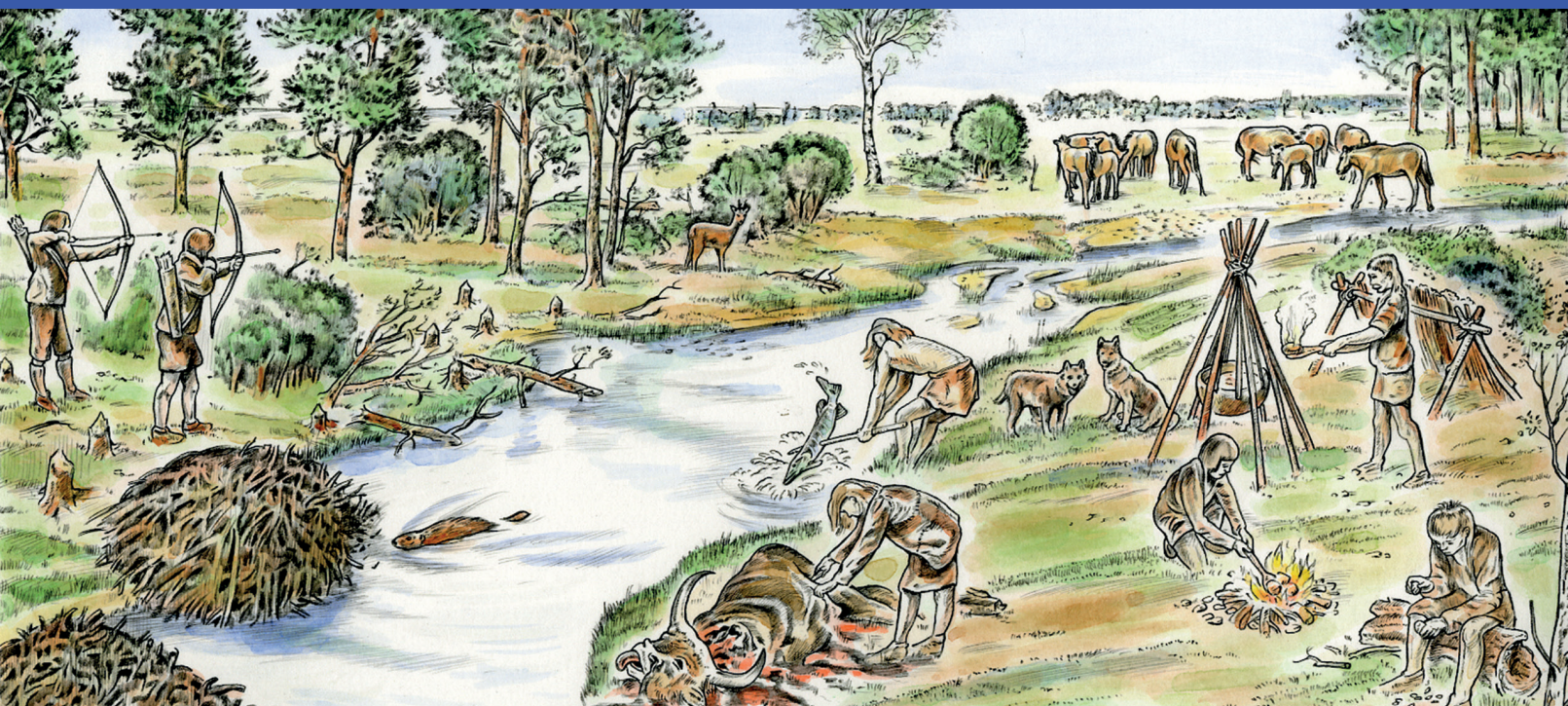
Annabell Zander and Birgit Gehlen
(eds.)

From the Early Preboreal to the Subboreal period
– Current Mesolithic research in Europe

Studies in honour of Bernhard Gramsch

Vom frühen Präboreal bis zum Subboreal
– Aktuelle Forschungen zum Mesolithikum in Europa

Studien zu Ehren von Bernhard Gramsch



»Our Way
to Europe«

CRC 806

Mesolithic Edition

5

Edition Mesolithikum
Édition Mésolithique
Mesolithic Edition

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herausgegeben von

Birgit Gehlen und Werner Schön

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Bernhard Gramsch
** 11. April 1934 in Berlin*

Dear Benno,

Thank you for decades of passionate Mesolithic research
and the sites of Friesack 4 and 27.

Wishing you all the best for the future !

Foreword / Vorwort

Foreword by the Editors of the
Mesolithic Edition Series

In 2005 we started the series 'Mesolithic Edition' with Martin Heinen's dissertation. So far, four volumes have appeared in the series, which was designed to be trilingual. We are therefore very happy to continue the series with the present volume. This was only made possible by the financial support of the Collaborative Research Centre 806 'Our Way to Europe – Culture-Environment Interaction and Human Mobility in the Late Quaternary'. Nevertheless, unlike the previous volumes, there are unfortunately no French-language summaries and figure captions. For one thing, the financial outlay for the translations and the larger book size would no longer have been possible for our small publishing house, which we now only run on a voluntary basis, in view of declining sales numbers. On the other hand, it would have taken a long time to finish the book.

We would like to thank all the authors for their almost endless patience. The vast majority of contributions were finished two years ago, but life's ups and downs kept preventing the editors from completing the volume in a more timely manner.

Special thanks are due to Robert Gramsch-Stehfest for obtaining pictures of his father and for his friendly and always motivating correspondence.

The idea of dedicating this volume to our universally respected research colleague and dear friend Bernhard 'Benno' Gramsch arose early on. For many decades he has enriched and promoted Mesolithic research through his own research, the support of young researchers and the preparation of important congresses. We are all indebted to him.

Vorwort der Herausgeber der Reihe
Edition Mesolithikum

2005 haben wir die Reihe „Edition Mesolithikum“ mit der Dissertation von Martin Heinen begonnen. Bisher sind vier Bände in der Reihe erschienen, die dreisprachig angelegt war. Wir sind daher sehr glücklich, dass wir mit dem vorliegenden Band die Reihe fortsetzen können. Dies wurde nur durch die finanzielle Unterstützung des Sonderforschungsbereiches 806 „Our Way to Europe – Culture-Environment Interaction and Human Mobility in the Late Quaternary“ ermöglicht. Trotzdem gibt es leider – anders als bei den bisherigen Bänden – keine französischsprachigen Zusammenfassungen und Abbildungsunterschriften. Zum einen wäre der finanzielle Aufwand für die Übersetzungen und den größeren Buchumfang für unseren kleinen Verlag, den wir nur noch ehrenamtlich betreiben, nicht mehr möglich gewesen, denn die Verkaufszahlen der Bücher gehen stetig stark zurück. Zum anderen hätte es noch mehr Zeit gekostet, die Herstellung des Buch abzuschließen.

Wir bedanken uns bei alle Autorinnen und Autoren für ihre nahezu endlose Geduld. Die allermeisten Beiträge waren schon vor zwei Jahren fertig, aber die Höhen und Tiefen des Lebens haben die Herausgeberinnen immer wieder daran gehindert, den Band früher fertig zu stellen.

Besonderer Dank gebührt Robert Gramsch-Stehfest für die Beschaffung von Bildern seines Vaters und seinen freundlichen und immer wieder motivierenden Schriftwechsel.

Schon früh entstand die Idee, diesen Band unserem allseits geschätzten Forscherkollegen und lieben Freund Bernhard „Benno“ Gramsch zu widmen. Er hat über viele Jahrzehnte die Mittelsteinzeitforschung durch eigene Forschungen, die Unterstützung des Nachwuchses und die Vorbereitungen von wichtigen Kongressen bereichert und gefördert. Wir alle sind ihm zu größtem Dank verpflichtet.

*Birgit Gehlen and Werner Schön
Kerpen-Loogh, December 2020*

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Introduction to this volume

Annabell Zander & Birgit Gehlen

Defining the Mesolithic

During the 26th meeting of the AG-Mesolithic in March 2017 in Wuppertal, Germany, four lectures were held during a workshop on the topic: 'How do we define the Mesolithic today?' This workshop dealt with a critical evaluation of the division between the Palaeolithic, Mesolithic and Neolithic. We would like to take up these topics again briefly here.

The end of the last Ice Age at ca. 9640 cal BC was characterised by an episode of intense climatic warming from about 16,000 years ago (14,000 cal BC) which transformed vegetation and fauna. The general warming trend was intermingled by a succession of short episodes of warm (interstadial) and cold (stadial) phases throughout the final stages of the Pleistocene which meant hunter-gatherers were continuously challenged by a fluctuating climate (Fig. 1). As a result of climatic warming and increased precipitation large parts of northwestern Europe were re-forested throughout the beginning of our current warm period, the Holocene.

Correlating with this transformation of the vegetation were changes in the Postglacial fauna across large parts of northwestern Europe. The Pleistocene-Holocene transition has traditionally been used by archaeologists to divide the Stone Age of hunter-gatherers into two separate periods: the Palaeolithic during the Ice Age and the Mesolithic following the climate change. Associated with this Palaeolithic-Mesolithic transition is a change in lithic technology towards the production of microliths which are small composite tools probably mainly used for tips or barbs for arrows (cf. RUST 1943). These microliths are often seen as diagnostic artefacts of the European Mesolithic (PETERSSON 1951; ROZOV 1978; HEINEN 2013).

But when does this Mesolithic tradition develop and how can we actually define the 'Mesolithic'?

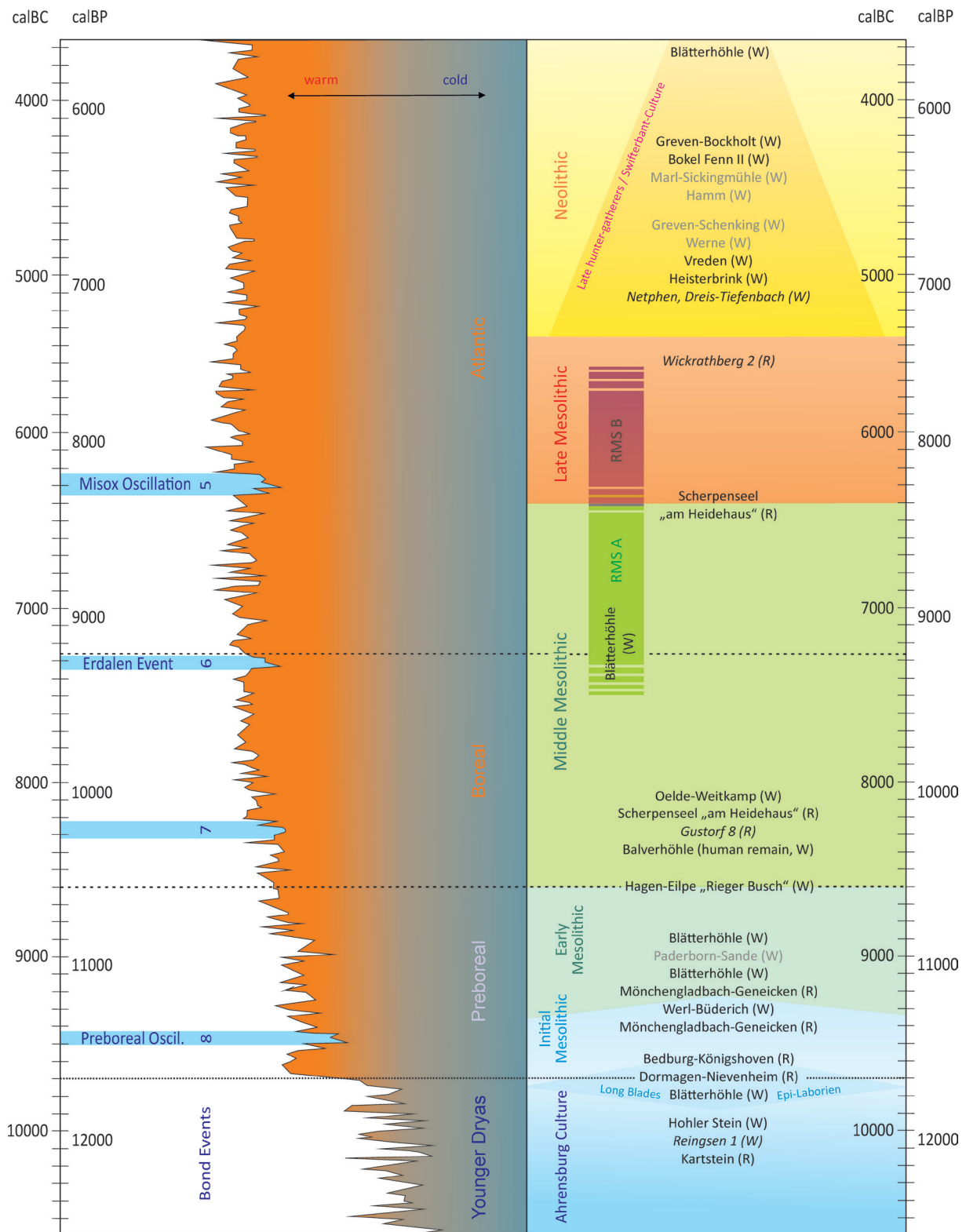
Hodder WESTROPP (1872, 35) once defined the Mesolithic period as the link between the Palaeolithic and Neolithic. Grahame CLARK (1932, 5) and Gordon CHILDE (1958, 3) confirmed this trichotomy of the Stone Age and placed the beginning of the Mesolithic at the end of the last Ice Age. Despite the broadly undefined complex developments of cultural traditions at this interface, this arbitrary division between Palaeolithic, glacial archaeology, and Mesolithic, post-glacial archaeology, remains the status quo (MITHEN 1999; 2001; SCARRE 2005, 393–397). In recent years, several scholars have begun to question this artificial division suggesting instead that these technological changes at the Pleistocene-Holocene interface are far more complex than previously thought (GROSS 2016; ZANDER 2016; see also GRIMM et al. 2020 and BRINCH PETERSEN 2020, this volume).

Another cultural transition is of greatest importance for the progress of prehistory: the Mesolithic-Neolithic transition. For a long time, the beginning of the Neolithic – the time of the oldest farming cultures in Europe – was equated with the first appearance of the oldest Bandkeramik culture about 7400 years ago. It was assumed that, at least in Central Europe, the indigenous hunter cultures of the Mesolithic disappeared relatively quickly under the pressure of the Neolithic populations and the new economic and land use practices. Although there were various scenarios, there was no evidence whatsoever as to how this happened. Genetic studies on remains of the hunter-gatherer groups and on those of farmers from the Early to the Late Neolithic show that physically these older populations can be expected to have survived well into the Late Neolithic in several regions of Europe (RIVOLLAT et al. 2020; BOLLONGINO et al. 2013). To date, it remains unclear to what extent Mesolithic hunter-gatherers contributed to the development of Neolithic societies and how this transformation happened. The genetic

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Fig. 1 The graph shows the chrono-cultural sequence from the end of the Ice Age to the end of the Atlantic Period in North Rhine-Westphalia. Recorded are all dated sites. R stands for Rhineland, W for Westphalia. The sites in italics are only typologically dated. The grey letters refer to C¹⁴-dated finds of antlers or bone (Graph: B. Gehlen 2020; site-dates after Baales et al. 2014 – different contributions; Baales et al. 2019; Gehlen et al. 2015; 2017; Gehlen et al. this volume; Street et al. 1994; Street et al. 2019; CRC 806 unpublished).

evidence proves that there must have been an intense cultural exchange with interactions and a symbiotic lifestyle in some regions, whereas a coexistence in different cultivable and natural areas with interbreeding barriers could be assumed for others. Before more detailed statements can be made on these issues, the chronological relationships must first be clarified. Initial results are already available for some regions (see **Fig. 1**), and it seems clear that people with a late Mesolithic lithic tradition (trapezes with and without facial retouch, regular bladelets) still inhabited some regions in Central Europe until the Late Neolithic cultures around 4200 calBC (GEHLEN et al. 2015; JEUNESSE et al. 2019; see also MEYER 2020, this volume). Future research should focus on the description and interpretation of intercultural exchange and intracultural developments in Mesolithic-Neolithic lifeways.

Mesolithic studies from the Early Preboreal to the Subboreal period

This volume is based on research presented at the 26th Annual Meeting of the Mesolithic Workgroup (AG Mesolithikum) which was held in Wuppertal, Germany from 10-12 March 2017. The conference was organised and hosted by Annabell Zander M.A., PhD student at the University of York, and Dr. Birgit Gehlen, Post-doctoral Research Associate at the Collaborative Research Centre 806, Project D4, at the University of Cologne. The Mesolithic Workgroup was founded during the Obermaier Conference in Blaubeuren, Germany, in April 1991 (CZIESLA 2017). The founders, Wolfgang Taute, Andreas Tillmann, Claus-Joachim Kind, Joachim Hahn and Erwin Cziesla, felt this often 'overlooked' period would benefit from an annual national and international exchange of the latest research projects and methods. The meeting was also aimed to inform the delegates about the respective regional Mesolithic archaeology by offering a fieldtrip to local sites. Since 1991 the Annual Meeting has been held in more than 20 different locations in Germany, Denmark, Czech Republic and Switzerland.

The conference was made possible by the private financial commitment of A. Zander and B. Gehlen and a grant from the CRC 806 at the University of Cologne, which also covered part of the publication costs. A conference report

with short summaries of all presentations is already published (ZANDER et al. 2017).

This volume brings together 14 international papers which cover the Mesolithic period from the Palaeolithic-Mesolithic transition to the potential contributions of Mesolithic hunter-gatherers to the development of Neolithic societies. In addition to the question of cross-cultural transitions, several papers also present important new approaches to investigating Mesolithic hunter-gatherers in northwestern Europe (see POSCH 2020; MAHLSTEDT 2020; GEHLEN, ROTH, SCHNEID & ZANDER 2020, all this volume). In terms of geographical areas, the papers of this volume mainly focus on Mesolithic studies in Germany but also include contributions covering neighbouring regions, including Denmark, the Netherlands, Austria and Italy.

Sonja Grimm, Daniel Groß, Klaus Gerken and Mara-Julia Weber analyse the Palaeolithic-Mesolithic transition on the North German Plain with respect to chronological evidence. Based on several well-dated sites from the area preconditions and consequences for the spreading of Early Mesolithic technocomplexes are discussed. It is shown that the onset of the Mesolithic in this area occurred in the Late Preboreal, after the Preboreal Oscillation, and that the Pleistocene/Holocene border should not generally be parallelized with the Ahrensburgian/Early Mesolithic on the North German Plain.

Another paper which explores Early Mesolithic evidence from Northern Europe is Erik Brinch Petersen's contribution about Mørke Enge, the only excavated fishing site from the Early Mesolithic in Denmark. He defines a fishing site as a former lake area in a bog where barbed bone points have been found apart from the defined settlement. The impetus for this investigation was the discovery of a dozen barbed bone points during peat-cutting, and the hope that they might be dated by pollen statistics.

Benjamin Spies' paper also draws on Early Mesolithic research. In particular, he investigates borders, groups and territories in the Early Mesolithic in Main Franconia and neighbouring regions in southern Germany. On the basis of lithic and raw material analyses, it is shown that the spectrum of raw materials is a suitable marker to identify separate territories of Early Mesolithic groups in this region.

Marcel Niekus, Roderick Geerts, Axel Müller and Femke Vermue present preliminary results of a large-scale excavation with a dwelling-structure along the Reevediep near Kampen, Netherlands. Excavations at 'site 9' were carried out in 2016 and revealed part of an extended zone with remains of Mesolithic activities. The earliest finds date to the Palaeolithic-Mesolithic transition while Late Mesolithic and Early Swifterband are also present at the site.

Erwin Cziesla presents a critical assessment of potential Mesolithic dwelling structures. Based on recent investigations of the Mesolithic site of Jühnsdorf, near Berlin, and the Mesolithic site of Rottenburg-Siebenlinden, in the Neckar valley in southwestern Germany, he offers new insights into the reconstruction of Mesolithic dwelling places. At both sites a rectangular longhouse with approx. 40 m² living area can be reconstructed. Therefore, Cziesla proposes that the former interpretations of tiny Mesolithic pit-dwellings must be rejected. It is particularly interesting that these longhouses potentially occur more than a thousand years prior to the LBK.

Thomas Richter and Hubert Raab explore potential cultural connections between Mesolithic sites in southern Germany and the Castelnuoviano of northern Italy. They discuss results of field surveys of the site Sielenbach-Weinberg (Bavaria, southern Germany) which yielded more than 3000 lithic artefacts, including 68 microliths. Despite the mixed assemblage, the microliths clearly point to a Late Mesolithic occupation of the site. On the basis of microlith typology and raw material studies Richter and Raab argue for a close connection to the northern Italian region which appears to only be recognisable in southern Bavaria.

Three papers in this volume focus on Late and Final Mesolithic studies in northern Germany. Mirjam Briel and Sönke Hartz draw on their research from a Late Mesolithic stratified site in the Satrupholmer Moor which features numerous flint artefacts and well-preserved bone and antler objects with artefact assemblages indicating occupation during the Kongemose and Ertebølle periods. As discussed in this paper, the exceptional preservation of the site offers a unique opportunity to explore dating episodes of the Prehistoric occupation and reconstruct the palaeoenvironment.

Ann-Kathrin Meyer addresses the Inland and West coast Ertebølle culture in Schleswig-Holstein, northern Germany. This is a phenomenon which is currently not well understood and which is usually referred to as a mere supplement to the assumed base camps on the coast. Meyer discusses the findings of her PhD project by presenting results from her analysis of several inland and westcoast sites in Schleswig-Holstein and central Jutland. This study develops a basis for dating the sites and addresses the important question of the onset of pottery production and use in the Ertebølle culture.

The third paper which focuses on Late Mesolithic studies in northern Germany explores subsistence strategies, settlement structure and communication in the Terminal Mesolithic in the Kiel Bay. Julia Goldhammer, Annika Müller, Laura Brandt, Steffen Wolters and Sönke Hartz present investigations of organogenic sediments with finds from the pre-pottery Ertebølle phase. Few records of in-situ preserved finds are known at the north German Baltic Sea coast. Goldhammer and colleagues present their results of an investigation of a well-preserved site, Strande LA 163, which was located on a shore of a lagoon where hunters, gatherers and fishermen produced tools made of flint, bone, antler and wood. Besides a large lithic and faunal assemblage, the site yielded human remains.

The final part of this volume features present five papers which propose new methodological and theoretical approaches for current Mesolithic studies. The first paper by Erwin Cziesla focuses on large Mesolithic implements, maximum flint distribution, and the area of the 'Se-Sa-Rhe-Tradition'. Cziesla presents a new distribution map of Mesolithic core and flake axes (referred to here as 'Mesolithic macro-tools'). The new maps show that such tools also occur south of the so-called 'flint-line' which has previously been seen as a border of the habitation area of a Mesolithic culture as defined by Hermann Schwabedissen in 1944. Interestingly, Cziesla notes that these macro-tools never appear in combination with dorsal-ventrally base-retouched microliths. These lithic implements can therefore be attributed to two different techno-complexes: the macro-tools of the 'Maglemosian-Duvensee-Tradition' and the dorsal-ventrally base-retouched armatures of the 'Seine-Saône-Rhine-Tradition'.

In the next paper Caroline Posch uses an integrated methodological approach to (re)examine the Mesolithic landscape of the Kleinwalsertal in the alpine region of western Austria. With more than 90 sites of various sizes and functions mainly dating to the Mesolithic, this region represents a rich mosaic of early Holocene sites. However, most of these sites have not been published before. In her paper Posch presents a comprehensive overview of the little-known archaeological region of the northern Alps. On the basis of raw material analyses her investigations reveal a complex early Holocene landscape with far reaching contacts to the Rhine region in the west.

Svea Mahlstedt explores new approaches to investigate mobility and orientation in Mesolithic northwestern Germany. Traditionally, hunter-gatherer mobility in the Mesolithic can only be traced through raw material studies or isotope analysis on human remains. In this paper Mahlstedt combines results from some of these studies to an area where neither foreign raw material nor human remains have been found so far with ethnological observations on hunter-gatherer mobility and theoretical approaches to mobility and orientation. She argues that archaeological data of assemblage or site size and site distribution together with information on the Mesolithic environment may lead to some distinct impressions on the mobility of regional hunter-gatherer groups during the Mesolithic.

The paper by Birgit Gehlen, Eileen Eckmeier, Klaus Gerken, Werner Schön and Annabell Zander offers an overview and a first database of Mesolithic pits in Germany. As shown in their discussion, nearly 80% of the known single pits derive from settlement context. Interestingly, although features are also known from Early and Final Mesolithic contexts, the majority of pits date to the Middle and Late Mesolithic. The most intriguing features are the accumulations of small pits with up to 390 features, discovered in the last decades in sandy soils in Northern and Eastern Germany.

The final paper by Birgit Gehlen, Nele Schneid, Georg Roth and Annabell Zander presents a typo-chronology for the ancient Mesolithic in Central Europe using a Canonical Correspondence Analysis (CCA). The basis of the CCA are 10 microlithic inventories of the complex stratigraphy of Friesack 4 in Brandenburg and

25 further C¹⁴-dated microlith-complexes from Germany and the BeNeLux-countries.

Finally, we would like to thank all authors for their great contributions, their patience and their professional cooperation.

References

- BAALES et al. 2014
M. Baales, H.-O. Pollmann & B. Stapel (Hrsg.), Westfalen in der Alt- und Mittelsteinzeit (Münster 2014).
- BAALES et al. 2019
M. Baales, W. Heuschen & J. Orschiedt, Steinzeitliches Networking. Europäische Einflüsse an der Blätterhöhle in Hagen. Jahrbuch Westfalen 2019, 48–54.
- BOLLONGINO et al. 2013
R. Bollongino, O. Nehlich, M.P. Richards, J. Orschiedt, M.G. Thomas, C. Sell, Z. Fajko, Th. A. Powell & J. Burger, 2000 years of parallel societies in Stone Age Central Europe. *Science* 342, 2013, 479–481.
- CHILDE 1958
V.G. Childe, *The Dawn of European Civilisation*, Sixth edition (New York 1958).
- CLARK 1932
J.G.D. Clark, *The Mesolithic Age in Britain* (Cambridge 1932).
- CZIESLA 2017
E. CZIESLA, Vor 25 Jahren: Gründung der Arbeitsgemeinschaft Mesolithikum. *Archäologische Informationen* 40, 397–400.
- GEHLEN et al. 2015
B. Gehlen, K. Banghard & W. Schön, Bokel Fenn II bei Oerlinghausen. Ein Siedlungsplatz des Endmesolithikums mit Hüttenbefund in Lippe. In: Th. Otten, J. Kunow, M.M. Rind & M. Trier (Hrsg.), *Begleitkatalog zur Ausstellung Revolution jungSteinzeit*. Archäologische Landesausstellung Nordrhein-Westfalen. Schiften zur Bodendenkmalpflege in Nordrhein-Westfalen. Bd. 11,1 (Darmstadt 2015) 288–292.
- GEHLEN et al. 2017
B. Gehlen, W. Schön, K. Banghard & H.-D. Zutz, Ein endmesolithisch-neolithischer Fundplatz auf dem Heisterbrink in der Senne im ehemaligen Amt Brackwede. *Archäologie in Ostwestfalen* 13, 2017, 16–29.
- GROSS 2016
D. Groß, Welt und Umwelt frühmesolithischer Jäger- und Sammler. *Mensch-Umwelt-Interaktion im Frühholozän in der nordmitteleuropäischen Tiefebene*.

Untersuchungen und Materialien zur Steinzeit in Schleswig-Holstein und im Ostseeraum. Bd. 8 (Kiel 2016).

HEINEN 2013

M. Heinen, Mikrolithen. In: H. Floss (Hrsg.), Steinartefakte vom Altpaläolithikum bis in die Neuzeit. 2. Auflage (Tübingen 2013) 599–620.

JEUNESSE et al. 2019

Christian Jeunesse, R.-M. Arbogast, M. Mauvilly & A. Denaire, La couche 5 de Lutter. Le second Mésolithique et la transition avec le Néolithique dans la zone Jura – Plateau suisse (6300 – 4300 av. J.-C.). In : R.-M. Arbogast, S. Griselin, C. Jeunesse et F. Séara (dir.), Le second Mésolithique des Alpes à l'Atlantique (VII^e-V^e millénaires), table ronde internationale de Strasbourg, novembre 2015, Strasbourg, Mémoires d'Archéologie du Grand-Est n°3, 55–108.

MITHEN 1999

S. Mithen, Hunter-gatherers of the Mesolithic. In: J. Hunter & I. Ralston (eds.), The Archaeology of Britain: An Introduction from the Upper Palaeolithic to the Industrial Revolution (London 1999) 35–59.

MITHEN 2001

S. Mithen, The Mesolithic Age. In: B. Cunliffe (ed.), The Oxford Illustrated History of Prehistoric Europe (Oxford) 79–135.

PETERSSON 1951

M. Petersson, Mikrolithen als Pfeilspitzen: ein Fund aus dem Lilla Loshult-Moor, Ksp. Loshult, Skåne. Meddelande från Lunds universitets historia museum 1951, 1–15.

RIVOLLAT et al. 2020

M. Rivollat, C. Jeong, St. Schiffels, İ. Küçükkalıpçı, M.-H. Pemonge, A.B. Rohrlach, K.W. Alt, D. Binder, S. Friederich, E. Ghesquière, D. Gronenborn, L. Laporte, Ph. Lefranc, H. Meller, H. Réveillas, E. Rosenstock, St. Rottier, Ch. Scarre, L. Soler, J. Wahl, J. Krause, M.-F. Deguilloux & W. Haak, Ancient genome-wide DNA from France highlights the complexity of interactions between Mesolithic hunter-gatherers and Neolithic farmers. *Science Advances*. 2020, 6 : eaaz5344. Downloaded from <https://advances.sciencemag.org/> 30th May 2020, 1–16.

ROZOY 1978

J.-G. Rozoy, Les derniers chasseurs : l'Épipaléolithique en France et en Belgique, essai de synthèse. Numéro spécial juin 1978. *Bulletin de la Société archéologique champenoise (Mémoire)*. 3 vol. (Charleville 1978).

RUST 1943

A. Rust, Die alt- und mittelsteinzeitlichen Funde von Stellmoor (Neumünster 1943).

SCARRE 2005

C. Scarre, Holocene Europe. In: C. Scarre (ed.), *The Human Past. World Prehistory and the Development of Human Societies* (London) 392–431.

STREET et al. 2019

M. Street, M. Baales, B. Gehlen, M. Heinen, W. Heuschen, J. Orschiedt, N. Schneid & A. Zander, Archaeology across the Pleistocene-Holocene boundary in western Germany: Human responses to rapid environmental change. In: C. Montoya, J.-P. Fagnart & J.-L. Locht (éds.), *Préhistoire de l'Europe du Nord-Ouest: mobilité, climats et entités culturelles. Actes du 27e congrès préhistorique de France* (Amiens, 30 mai-4 juin 2016), vol. 2. *Société préhistorique française* (Paris 2019) 491–510.

STREET et al. 1994

M. Street, M. Baales & B. Weninger, Absolute Chronologie des späten Paläolithikums und Frühmesolithikums im nördlichen Rheinland. *Archäologisches Korrespondenzblatt* 24 (1), 1994, 1–28.

WESTROPP 1872

H. Westropp, *Pre-historic Phases; or, Introductory Essays on Pre-historic Archaeology* (London 1872).

ZANDER 2016

A. Zander, Heek-Nienborg and Werl-Büderich: The transition from Palaeolithic to Mesolithic in Westphalia, *Archäologische Informationen* 39, 2016, 285–291.

ZANDER et al. 2017

A. Zander, B. Gehlen and 71 further authors, Conference report: The 26th Annual Meeting of the German Mesolithic Workgroup. *Archäologische Informationen* 40, 2017, Early View, 1–22. DOI: <https://doi.org/10.11588/ai.2017.1.42527>

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