Daniel Groß · Harald Lübke · John Meadows · Detlef Jantzen (eds.)

Working at the Sharp End: From Bone and Antler to Early Mesolithic Life in Northern Europe

10

Untersuchungen und Materialien
zur Steinzeit in Schleswig-Holstein
und im Ostseeraum

Untersuchungen und Materialien zur Steinzeit
in Schleswig-Holstein und im Ostseeraum

Band 10

Untersuchungen und Materialien zur Steinzeit in Schleswig-Holstein und im Ostseeraum
aus dem Museum für Archäologie Schloss Gottorf und dem Zentrum für Baltische und Skandinavische Archäologie
in der Stiftung Schleswig-Holsteinische Landesmuseen Schloss Gottorf
Band 10

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Herausgegeben von
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Working at the Sharp End: From Bone and Antler to Early Mesolithic Life in Northern Europe

Daniel Groß, Harald Lübke, John Meadows and Detlef Jantzen (eds.)

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Laserscan of the wooden sign that was attached to the excavation hut during the Hohen Viecheln excavations ('To the sharp harpoon'; Laserscan: J. Nowotny, ZBSA).

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Vorwort der Herausgeber

Die Schriftenreihe „Untersuchungen und Materialien zur Steinzeit in Schleswig-Holstein“ wurde von dem ursprünglichen Herausgeber Jürgen Hoika vor mittlerweile 25 Jahren im Jahre 1994 begründet, um am damaligen Archäologischen Landesmuseum Schleswig (ALM) und heutigem Museum für Archäologie Schloss Gottorf (MfA) ein Publikationsorgan für die Veröffentlichung von Forschungsergebnissen zur Steinzeit Schleswig-Holsteins zu schaffen. Dabei sollte es sich zum einen um Sammelwerke mit Beiträgen von vorzugsweise auf Schloss Gottorf veranstalteten Symposien, Workshops und Tagungen mit steinzeitlicher Thematik und zum anderen um zumeist in Dissertationen zusammengestellte ausführliche Materialvorlagen handeln. Entsprechend enthielt der 1994 vorgelegte erste Band der Reihe die Beiträge zum 1. Internationalen Trichterbechersymposium, welches, von Jürgen Hoika gemeinsam mit Jutta Meurers-Balke initiiert, 1984 am Archäologischen Landesmuseum in Schleswig stattgefunden hatte. In der Folge wurden dann aber beginnend mit den Arbeiten der beiden heutigen Herausgeber nunmehr acht überwiegend am Institut für Ur- und Frühgeschichte der Christian-Albrechts-Universität zu Kiel fertiggestellte Dissertationen veröffentlicht, die ganz wesentlich mit der wissenschaftlichen Vorlage und Auswertung von Forschungsgrabungen in Schleswig-Holstein und – seit der Beteiligung des Zentrums für Baltische und Skandinavische Archäologie an der Herausgeberschaft – aus dem gesamten Ostseeraum befasst sind.

Deshalb ist es eine besondere Freude für die Herausgeber, mit dem vorliegenden Band 10 „Working at the Sharp End: From Bone and Antler to Early Mesolithic Life in Northern Europe“ der Schriftenreihe „Untersuchungen und Materialien zur Steinzeit in Schleswig-Holstein und im Ostseeraum“ wiederum einen Sammelband mit den Beiträgen eines Workshops vorlegen zu können, der vom 14. bis 16. März 2016 auf Schloss Gottorf stattgefunden hat. Dabei handelt es sich um den Abschlussworkshop des von der Deutschen Forschungsgemeinschaft geförderten Projektes „Neubewertung von Chronologie und Stratigraphie des frühholozänen Fundplatzes Hohen Viecheln (Mecklenburg-Vorpommern) unter besonderer Berücksichtigung der diagnostischen Knochenartefakte“ (DFG-Projektnummer 271652103) unter Leitung von Daniel Groß, Harald Lübke, John Meadows (alle ZBSA) und Detlef Jantzen (Landesamt für Kultur und Denkmalpflege Mecklenburg-Vorpommern; Landesarchäologie). Entsprechend enthält dieser Band neben dem Abschlussbericht des Forschungsprojektes insgesamt 17 Beiträge der eingeladenen Workshop-Teilnehmer, die entweder ergänzende Studien zum Fundplatz Hohen Viecheln enthalten oder sich grundsätzlich mit verwandten Themen zur Erforschung des frühholozänen Mesolithikums im nördlichen Europa befassen.

Alle Beiträge wurden nach internationalem Standard von jeweils zwei anonymen Gutachtern in einem Peer-review-Verfahren bewertet und danach den Autoren zur erneuten Überarbeitung übergeben, bevor die abschließende redaktionelle Bearbeitung der Manuskripte erfolgte. Die Textredaktion für alle Beiträge wurde von Gundula Lidke durchgeführt, Jana Elisa Freigang und Jorna Titel leisteten dabei unterstützende Arbeiten. Das Layout übernahm Daniel Groß, Titelbild und Umschlag entwarf Jürgen Schüller. Die meisten Karten und Zeichnungen wurden von den Autoren selbst bereitgestellt. In einzelnen Fällen erfolgte eine Überarbeitung durch Daniel Groß. Allen sei dafür an dieser Stelle herzlich gedankt.

Neu im Rahmen der Schriftenreihe ist, dass die Beiträge unmittelbar nach Fertigstellung und Freigabe der Autoren in einem „online-first“-Verfahren auf der Homepage des Verlages im Open Access zum freien Download bereitgestellt wurden. Für die Umsetzung dieser Forderung der Herausgeber danken wir dem Wachholtz Verlag, insbesondere Herrn Henner Wachholtz, sehr.

Besonderer Dank gilt dem Vorstand des Zentrums für Baltische und Skandinavische Archäologie Schleswig, besonders dem Direktor, Claus von Carnap-Bornheim, und der Forschungsleiterin, Berit Valentin Eriksen, die die Veröffentlichung dieses Bandes durch die Bereitstellung der erforderlichen Mittel für den Druck der Arbeit maßgeblich unterstützten.

Sönke Hartz und Harald Lübke
Schleswig, im Oktober 2019

Editors' Preface

The series 'Untersuchungen und Materialien zur Steinzeit in Schleswig-Holstein' was founded by its first editor, Jürgen Hoika, in 1994, 25 years ago, in order to establish a possibilty to publish Stone Age research results from Schleswig-Holstein at the then Archaeological State Museum (Archäologisches Landesmuseum [ALM]), today's Museum for Archaeology (Museum für Archäologie, Schloss Gottorf [MfA]). Publications should, on the one hand, reflect proceedings of symposia, conferences and workshops with Stone Age topics primarily held at Gottorf Castle, on the other hand, dissertations presenting comprehensive material. According to that, the first volume, published in 1994, contained the contributions to the 1st International Funnelbeaker Symposium, which, initiated by Jürgen Hoika and Jutta Meurers-Balke, had taken place at the Archaeological State Museum in 1984. Following that, eight dissertations, mainly accomplished at the Institute for Pre- and early History at the Christian-Abrechts-University Kiel, were published, starting with those by today's editors. All these volumes contributed substantially to the scientific presentation and analysis of excavation materials from Schleswig-Holstein and – since 2012, when the Centre for Baltic and Scandinavian Archaeology (ZBSA) also became involved in editig the series – the whole of the Baltic Sea area.

Therefore the editors are especially happy to once more present conference proceedings with volume 10 of the series 'Untersuchungen und Materialien zur Steinzeit in Schleswig-Holstein und im Ostseeraum': 'Working at the Sharp End: From Bone and Antler to Early Mesolithic Life in Northern Europe' collects contributions to a workshop held at Gottorf Castle on 14th–16th March, 2016. This represented the closing workshop of the DFG-funded project 'Neubewertung von Chronologie und Stratigraphie des frühholozänen Fundplatzes Hohen Viecheln (Mecklenburg-Vorpommern) unter besonderer Berücksichtigung der diagnostischen Knochenartefakte' (DFG project no. 271652103), directed by Daniel Groß, Harald Lübke, John Meadows (all ZBSA) und Detlef Jantzen (Landesamt für Kultur und Denkmalpflege Mecklenburg-Vorpommern; Landesarchäologie). In addition to the project's final report the volume contains 17 papers by researchers invited to participate in the workshop, representing either additional studies on material from the site Hohen Viecheln or related topics in research of the early Holocene Mesolithic in northern Europe.

Each paper was, according to international standards, peer-reviewed by two anonymous reviewers and then returned to the author for reworking before final editorial work. Copy-editing was performed by Gundula Lide, supported by Jana Elisa Freigang and Jorna Titel. Daniel Groß realised the layout; cover and cover illustration were designed by Jürgen Schüller. Most maps and figures were provided by the authors themselves, some were reworked by Daniel Groß. We express our sincere thanks to all involved!

It is a novelty for the series to have papers published online first immediately after completion and authors' approval in open access for free download on the website of Wachholtz Publishers. We would like to thank Henner Wachholtz, Wachholtz Publishers, very much for making this possible!

Special thanks are due to the board of the Centre for Baltic and Scandinavian Archaeology (ZBSA) Schleswig, particularly to the director, Claus von Carnap-Bornheim, and the head-of-research, Berit Valentin Eriksen, who substantially supported this publication by providing financial means for its printing.

Sönke Hartz and Harald Lübke
Schleswig, October 2019

Grusswort des Landesarchäologen von Mecklenburg-Vorpommern

Mit seinen großflächigen, oft noch weitgehend unberührten Niederungen und Binnengewässern bietet Mecklenburg-Vorpommern beste Voraussetzungen, um die gewässeraffinen Kulturen des Mesolithikums zu erforschen. Die Überreste ihrer Wohn- und Jagdstationen sind im feuchten Milieu hervorragend erhalten geblieben. Störungen durch Torfabbau, Begradigung von Gewässern oder Meliorationsmaßnahmen blieben im Wesentlichen auf das 19. und 20. Jahrhundert beschränkt. Sie haben zwar einen gewissen Schaden angerichtet, aber, weil sie zumindest im 20. Jahrhundert oft von aufmerksamen ehrenamtlichen Bodendenkmalpflegern beobachtet wurden, überhaupt erst zur Entdeckung vieler Fundstellen geführt.

Welche Fundstellen eingehender erforscht werden und damit das Bild einer Epoche besonders prägen, unterliegt oft dem Zufall. Hohen Viecheln rückte in den Fokus der Forschung, weil die Entdeckung mehrerer Knochenharpunen zu Beginn der 1950er Jahre auf eine günstige Konstellation traf: 1953 war aus der Vorgeschichtlichen Abteilung des Staatlichen Museums das Museum für Ur- und Frühgeschichte Schwerin entstanden, das auch für die Bodendenkmalpflege in den drei Nordbezirken der DDR zuständig war. Der ehrgeizige Direktor des Museums, Ewald Schuldt, hatte sich durch Ausgrabungen auf der Burgwallinsel Teterow einen Namen gemacht und war nun auf der Suche nach einem geeigneten Fundplatz für ein eigenes Forschungsprojekt.

Wegen der sehr guten Erhaltungsbedingungen versprach Hohen Viecheln, zusätzlich zu dem bekannten Spektrum an Steinartefakten auch ein umfangreiches Geräteinventar aus organischen Materialien bergen zu können. Die ebenfalls ausgezeichnet erhaltenen Tierknochen sollten Aufschluss über das Jagdwild geben. Hinzu kam die Aussicht, aus der Stratigraphie neue Erkenntnisse zur Chronologie und zu den Veränderungen der naturräumlichen Verhältnisse zu gewinnen. Diese Erwartungen wurden nicht enttäuscht: Hohen Viecheln entwickelte sich zu einem der bedeutendsten Plätze mesolithischer Forschung, gleichrangig mit Duvensee, und inspirierte weitere Forschungen, u. a. in Friesack und Rothenklempenow.

Hohen Viecheln gehört nach wie vor zu den legendären archäologischen Fundstellen in Mecklenburg-Vorpommern, auch wenn es aus heutiger Sicht nicht mehr so einzigartig dasteht. Dank einer intensiv betriebenen ehrenamtlichen Bodendenkmalpflege ist die Zahl der bekannten mesolithischen Fundplätze im Land deutlich gestiegen, von denen vermutlich mehrere ein ähnliches Potenzial wie Hohen Viecheln aufweisen. Verändert haben sich aber nicht nur die Verbreitungskarten, sondern auch die Möglichkeiten archäologischer Forschung. Es drängte sich deshalb geradezu auf, Hohen Viecheln noch einmal unter die Lupe zu nehmen, bisherige Erkenntnisse kritisch zu prüfen und neue hinzuzufügen. Der DFG und allen Projektpartnern gebührt herzlicher Dank dafür, dass sie das ermöglicht haben.

So wird Hohen Viecheln auch weiterhin als exemplarischer Fundplatz für das Mesolithikum in der norddeutschen Tiefebene stehen – eine hochinteressante Umbruchszeit, in der Klimawandel, Anstieg des Meeresspiegels und andere Veränderungen eine ständige Anpassung der Menschen an ihre Umwelt erzwangen.

Detlef Jantzen
Schwerin, im September 2019

Welcome address by the State Archaeologist of Mecklenburg-Western Pomerania

Mecklenburg-Western Pomerania with its large, often unspoiled lowlands and inland waters offers outstanding possibilities for research into the water-oriented cultural groups of the Mesolithic. Remains of their settlement and hunting sites are often well preserved in wet conditions. Disturbances by peat extraction, straightening of watercourses or melioration measures mainly took place during the 19th and 20th centuries. They did some damage, but – as at least during the 20th century they were often supervised by vigilant amateur archaeologists – many sites were discovered this way in the first place.

But often it is left to chance which sites can be thoroughly investigated to largely characterise the picture of a whole timespan. Hohen Viecheln became the focal point of research interest under favourable circumstances: the discovery of several bone points there at the beginning of the 1950s fell together with the establishment of the Museum of Pre- and Early History in Schwerin (out of the former Department of Prehistory at the State Museum) which was also responsible for the preservation and care of field monuments in the three northern districts of the GDR.

The ambitious museum director, Ewald Schuldt, had already gained reputation through his excavations of the Slavic ring wall island near Teterow, and he was looking for a suitable site for another research project. Due to the very good preservation conditions at the site, Hohen Viecheln promised, in addition to the spectrum of artefacts known from other places, a substantial organic inventory. The well-preserved animal bones were expected to shed light on game species and hunting strategies. Furthermore, important results were expected concerning chronology and environmental changes. These hopes were not disappointed: Hohen Viecheln has become, alongside Duvensee, one of the most important sites for Mesolithic research, and research there has inspired further excavations, e.g. at Friesack or Rothenklempenow.

Hohen Viecheln is still one of the legendary archaeological sites in Mecklenburg-Western Pomerania, even if it no longer stands alone. Thanks to intensive voluntary archaeological surveys the number of Mesolithic sites has increased significantly; and several of these may have a potential similar to that of Hohen Viecheln. But not only distribution maps have changed during the last years, but also the possibilities of archaeological research. Therefore, the idea to have another look at Hohen Viecheln, to challenge old results and add new ones, suggested itself. I want to thank the German Research Foundation (DFG) and all project contributors for having made this possible. In this way, Hohen Viecheln will continue to be an exemplary North German Lowland site of the Mesolithic – a highly interesting time when climate change, sea-level rise and other changes enforced constant human adaptions to the environment.

Detlef Jantzen
Schwerin, September 2019

Acknowledgements

This volume of the series 'Untersuchungen und Materialien zur Steinzeit in Schleswig-Holstein und im Ostseeraum' represents the proceedings of a workshop held at the Centre for Baltic and Scandinavian Archaeology (ZBSA) in Schleswig in March 2016. It is a part of the editors' project 'Neubewertung von Chronologie und Stratigraphie des frühholozänen Fundplatzes Hohen Viecheln (Mecklenburg-Vorpommern) unter besonderer Berücksichtigung der diagnostischen Knochenartefakte', funded by the German Research Foundation (DFG) under the project number 271652103.

While the project was dealing with the re-evaluation of the site Hohen Viecheln 1 for chronological and stratigraphical aspects, this volume does not only cover its final publication but comprises additional modern studies about the site by different scholars. These are furthermore embedded into the international research landscape by adjacent studies covering an area from modern day Britain in the west to the Urals in the east.

All contributions are representing the authors' point of view and respective terminologies. Therefore differences in the vocabulary may appear to the careful reader. While a homogenisation of terms and data recording is relevant for comparative studies, it was beyond the scope and means of this project. As a consequence, terminologies may differ between the contributions, as exemplified by the terms 'uni-serial' and 'uni-lateral' bone points: both are characterised by barbs or notches on one lateral side. At the British site Star Carr those have ever since been named uni-serial, whereas uni-lateral is a more common term in other parts of Europe.

We, as editors, would like to thank all contributors for being part of this volume and their interesting and high-quality articles; also we are grateful for the voluntary support of all anonymous peer-reviewers and their help in improving the articles. Furthermore, we thank the German Research Foundation (DFG) for funding our research and the workshop as well as the Centre for Baltic and Scandinavian Archaeology represented by its director, Claus von Carnap-Bornheim, and the head-of-research, Berit Valentin Eriksen, for support of the project and its presentation in the current form. A tremendous help in the course of making this book was Gundula Lidke who was responsible for text editing, proof-reading, and correspondence with the authors and publishers. Thank you very much! Further editorial support was provided by Jana Elisa Freigang, Jorna Titel, Matthias Bolte, Isabel Sonnenschein and Jürgen Schüller. The latter is also responsible for the cover drawing. Much help and support was provided by Peter Teichert-Köster with respect to handling the finds and accessing them in the depot of the Landesamt für Kultur und Denkmalpflege Mecklenburg-Vorpommern; Landesarchäologie in Schwerin. Close collaboration with Mathieu Boudin of the Royal Institute for Cultural Heritage, Brussels, improved our radiocarbon measurements and the analysis of the consolidant.

We thank all people, mentioned and unmentioned here, who were involved in this book and the different research projects, who helped by further pushing the boundaries of our understanding of the cultural remains and chronologies of the past.

Daniel Groß, Harald Lübke, John Meadows, Detlef Jantzen
Schleswig, October 2019

An evaluation of the antler headdress evidence from Hohen Viecheln

Markus Wild

Abstract
Five possible antler headdresses have been reported from Hohen Viecheln over the last 60 years. This paper will address and discuss these objects in the light of new findings and discoveries. In the end, one of the five artefacts can, while another one may be assigned to the group of headdresses. Besides the long-known bifacially worked headdress HV1 this paper presents a finding that remained undiscussed over the last decades (HV5). Both show clear affinities to finds from other sites via typology and techniques involved in their manufacturing. Finally, HV1 as predating all other directly dated finished objects at Hohen Viecheln sheds light on the pioneering phase of occupation at the site in the Late Preboreal chronozone.

1 Introduction

Antler headdresses from Hohen Viecheln have been reported first from the 1955 field season (Schuldt 1955). The excavator compared two worked red deer (*Cervus elaphus*) crania (HV1 & HV2) with artefacts from Star Carr (Clark 1951). This interpretation became widely accepted – at least for one of the two artefacts (HV1; e.g. Conneller 2004; Street 1989). Nevertheless, it took 50 years for the antler headdresses from Hohen Viecheln to get back into the centre of attention. Éva David dealt with the osseous industries of the Early Mesolithic in northern Europe and made the first technical description of an antler headdress (HV1) from Hohen Viecheln (David 2005, 519 pl. 45), while Stefan Pratsch added two more red deer crania (HV3 & HV4) to the group of possible headdresses from Hohen Viecheln (Pratsch 2006, 71; 142). In addition, the author dealt with the general group of antler headdresses in recent years (Wild 2014). During work with the finds another possible headdress has been identified (HV5). The results of this research and a following dating project (Wild et al. in prep.) will be presented and discussed in this paper with a special focus on Hohen Viecheln.

2 Description of the finds

HV1 (Fig. 1) has parts of the frontal and both parietal bones preserved. Between them the interparietal bone is fully preserved. In contrast, only the split pedicle (antler nomenclature after Pratsch 2006, 17 fig. 8) and beam of both antlers are present. Traces of anthropogenic modifications are clear and abundant. The inner layer of cranial bone (*Tabula interna*) was scraped down, thus the spongy layer underneath

Fig. 1. HV1: a – dorsal view, b – ventral view.

(*Diploë*) shows up partly. This modification extends from the frontonasal suture to the caudal end of the artefact and covers its full width (Fig. 1b). On the upper side the supraorbital foramens (natural holes at the inner part of the orbits) seem artificially widened. This action left no macroscopically visible stigmata. While the rest of the frontal part of the artefact shows no modifications the caudal part does. The outer layer of cranial bone (*Tabula externa*) between the pedicles and the parietal bones was scraped similar to the inner layer. At the transition from the interparietal bone to the two parietal bones two perforations of 1.4–1.7 cm diameter were cut into the bone. Only the stumps of the antler beams are preserved. They are halved diagonally. This modification continues through the burr and to the pedicles. The burr was removed and the surface smoothed.

HV2 (Fig. 2) consists of parts of the frontal, left parietal, interparietal and sphenoidal bones. Both medaillons are fully preserved, beams and brow tines only partially. Anthropogenic modifications are indicated by only few working traces. Single cut marks on the frontal and interparietal bone as well as the antler beams possibly indicate butchering. The left pedicle furthermore shows a depression with sharp edges on its caudal part right under the burr (Fig. 2b).

The left part of the frontal bone is preserved in HV3 (Fig. 3). The unfused frontonasal suture indicates the taphonomical loss of the right half of the cranium. While the medaillon is fully preserved, only parts of

Fig. 2. HV2: a – dorso-frontal view, b – caudal view.

the burr and beam with brow and bez tine are present. Anthropogenic modifications are indicated by scarce stigmata. On the medial side of the pedicle and directly under the burr lies a narrow longitudinal surface modification. Sharp edges indicate its recent origin. The antler shows a single cut mark.

Fig. 3. HV3: a – dorso-frontal view, b – medial view (photos H. Lübke/M.Wild).

HV4 (Fig. 4) consists of parts of the frontal, parietal and temporal bones. While the interparietal bone is missing, some lower bones are preserved: the supraoccipital bone partially, and the exoccipital and sphenoidale bone as well as the *Basioccipatale* fully. Medaillons are preserved, the antlers themselves are not. Anthropogenic modifications are indicated by abundant but diffuse stigmata. The inner layer of cranial bone, both temporal bones, and the supraoccipital and exoccipital bone show multiple cuts. Furthermore an artifical depression (cf. HV2) is located at the medio-caudal aspect of the right pedicle under the medaillon.

HV5 (Fig. 6) has its frontal and left parietal bone partly preserved. The unfused frontonasal and coronal sutures might indicate the accidental loss of important parts of the cranium. The left medaillon and burr are only partially preserved, just as beam, brow and bez tine are. Anthropogenic modifications are indicated by abundant stigmata which are partly diffuse, partly clear (Fig. 5). Cut marks are located on the frontal bone and the antler. Furthermore, several impact marks are distributed on the mediocaudal part of the pedicle. Scraping marks, cutting through the burr, cover the medial part of the beam and pedicle. Two grooves and the negative of a removed splinter indicate the extraction of an antler rod by 'groove and splinter technique' (Clark 1953).

All artefacts were studied and described (Table 3). In order to validate the headdress-character of HV1–5 the objects were tested on the five characteristics that have been shown to be relevant for the dermination of an artefact as antler headdress: (1) frontal, parietal and interparietal bones are always present; (2) antlers, frontal and parietal bones are only partially preserved; (3) a minimum of 75 % of the present bones of the cranium (including antlers and the inner layer of cranial bone) show anthropogenic

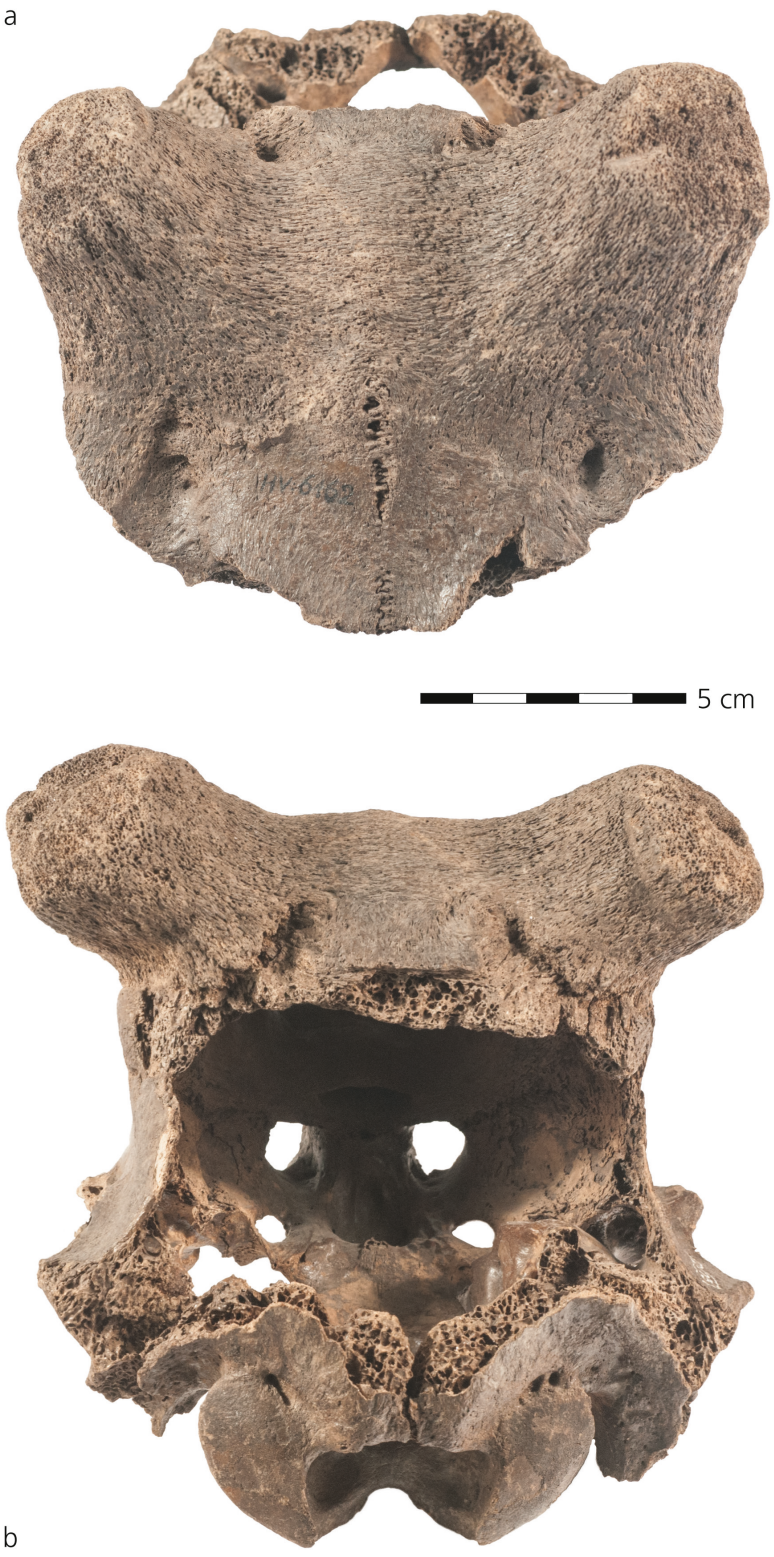

Fig. 4. HV4: a – dorsal view, b – caudal view (photos H. Lübke/M. Wild).

modifications; (4) temporal, parietal and interparietal bones show two artificial perforations. If one of these shows signs of breakage, another perforation was usually picked or cut into the bone; (5) the antler beams and tines present are longitudinally split (Wild in press).

This approach – based on generally valid characteristics – will be supplemented by qualitative data, e.g. a discussion of damage caused by taphonomic agents determined during the study and description of the artefacts.

3 Results

In total, a possible maximum of two headdresses can be determined within the faunal remains from Hohen Viecheln (Table 2), according to the characteristics mentioned above. HV1 is the only artefact fulfilling all required characteristics of an antler headdress, while HV5 corresponds to the required definition where possible in its present state of preservation. Unfortunately, in this case, the loss of some bones leads to ambiguity concerning the presence of perforations on these missing bones. In contrast, HV2 does not show any of the characteristic criteria. Due to the unfused sutures and the possible loss of parts of the object, HV3 can only fulfill two of three necessary requirements, as the longitudinally split antler is missing. HV4 fulfills the characteristics regarding the preservation of the artefact but not regarding its modifications.

Table 1. Itemisation of discussed artefacts from Hohen Viecheln and other sites, following Wild et al. in prep., and availability of information. Grey background: not included in the process of defining antler headdresses (Wild 2014). For a clear identification and better readability in this paper, the (possible) headdresses from Hohen Viecheln and other sites were re-termed. X – present.

Site	In-text ID	Official ID	Reference	Artefact	Cast/Replica	Literature	Museum	Detailed drawings
Hohen Viecheln	HV1	H.V. 5863	Schuldt 1956	X	X	X	-	X
	HV2	HV 3412	Schuldt 1956	X	X	X	-	-
	HV3	HV 5774	Pratsch 2006; (Schuldt 1961, 140)	X	-	X	-	-
	HV4	HV 6162	Pratsch 2006	X	-	X	-	-
	HV5	HoVi 387	Pers. observation	X	-	-	-	-
Bedburg-Königshoven	BK1	indet.	Street 1989	X	X	X	X	X
	BK2	E115/91-1	Street 1989	X	X	X	X	X
Berlin-Biesdorf	BB1	I/82/26	Reinbacher 1956	X	X	X	X	-
Star Carr	SC2	AF2	Clark 1954	-	X	X	-	-
	SC8	AF8	Clark 1954; Street/Wild 2015	-	-	X	-	X
				6	4	7	1	2

4 Discussion

Defining HV1 as an antler headdress is partly a vicious circle reasoning. In the basic study of the overall group (Wild 2014; 2018) it was one of three artefacts that met all the standards of a headdress *sensu stricto*. Hence, it eminently influenced this definition. Nevertheless, its special and unique character with the intensive shaping of almost all sides is typical for what is called an antler headdress. The attribution of HV5 to the group of headdresses seems to be more difficult. This artefact was discovered in a box with faunal remains from Hohen Viecheln that were labelled as 'unworked'. The object was eye-catching as the antler showed clear signs of two grooved furrow planes deepened into the compact bone on its medio-caudal side (Fig. 6). This indicated a discarded antler modified by 'groove and splinter technique'. When studying the object it became obvious that its antler beam and pedicle show signs of a longitudinal loss of material. This modification, accompanied by several scraping and incising marks, intersects the burr; this is also known from other objects within the group of headdresses (e.g. BB1, SC2, SC8, SC22). Therefore the artefact was tested according to the criteria presented above. The absence of the bones that

Table 2. Artefacts tested on the definition of a headdress *sensu stricto*. 1 – Presence of *Os frontale*, *Os parietale* and *Os interparietale*; 2 – *Os frontale*, *Os parietale* and antler just partially present; 3 – 75 % of the bones of the cranium (including antler and inner layer of cranial bone) are anthropogenically modified; 4 – Perforations on the caudal part (*Os temporale*, *Os parietale*, *Os interparietale*); 5 – Antler is longitudinally split. Grey background: impossible to determine because of breakage/unfused sutures. Leight grey background: applicable and tested only on preserved bones.

Feature/find	HV1	HV2	HV3	HV4	HV5
1	X	-	-	X	-
2	X	-	X	X	X
3	X	-	X	-	X
4	X	-	-	-	-
5	X	-	-	-	X

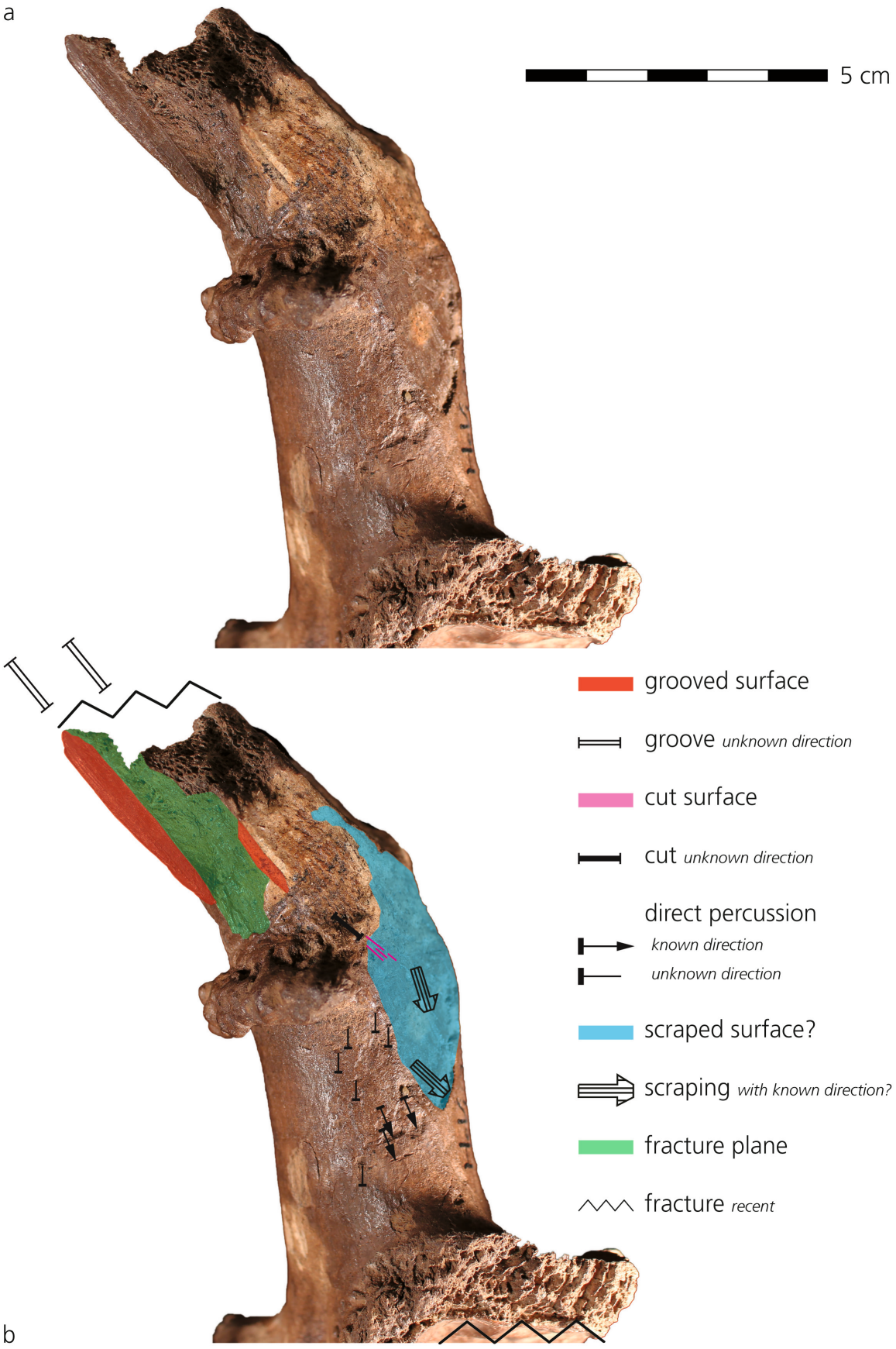

Fig. 5. HV5: a – caudo-medial view, b – technological description of anthropogenic modifications.

usually show the perforations is striking. In addition, it is important to mention that the intensive modification of the inner layer of the cranial bone, as displayed by headdress HV1, did not take place in this case. However, the variety of modifications on the different headdresses from several sites in Europe is huge. This situation also paraphrases the problems of defining and working with these objects. Following this argumentation, it is reasonable to state that at least HV5 shares important characteristics with other objects from the group of antler headdresses and so might well have been a headdress, too.

5 Dating results and succeeding implications for intra-site chronology

An important aspect of the headdresses is their age determination. HV1 was supposedly located in the lower of two main horizons of occupation at Hohen Viecheln (Schuldt 1961, 131). This older layer was typologically described as being dominated by notched points (after Clark 1936, 117) but lacking lithic flake axes (Schuldt 1961, 88). However, the palynologist on site, Heinz Schmitz, used microscopically determined charcoal particles to indicate human presence in this layer and correlate it with the chronostratigraphy at Hohen Viecheln. Besides a main phase of charcoal deposition, which was then assigned to the younger archaeological horizon, he discovered another short-time record of charcoal in two corresponding sediment cores (at 575 cm in sediment core HV4, and at 280 cm in sediment core HV7; Schmitz 1961, 32; figs. 3; 5). Schuldt rejected the correlation of these two charcoal occurrences with each other. He ignored the deeper charcoal deposition of sediment core HV7 and assigned the older archaeological horizon in correspondence with the lower charcoal peak in sediment core HV4 to the Preboreal/Boreal transition (Schuldt 1961, 89). According to Schmitz, the lower charcoal peak in the latter sediment core, however, correlates with the middle of the second half of the Preboreal (Schmitz 1961, fig. 3) and thus predates the Preboreal/Boreal transition. The described discordances might have been triggered by Schmitz himself, as his diagram of sediment core HV7 lacks a precise itemisation. Furthermore, he used three different types of

Fig. 6. HV5: dorso-frontal view.

Table 3. Revision of possible antler headdresses, resulting in the differentiation of 'real' antler headdresses from the rest. The presented data manifests this division: X – present; (X) – present but fragmented; O – not present. * ≤2 specimens. sin. – left; dex. – right.

Parameter	Antler headdresses	Other finds	HV1	HV2	HV3	HV4	HV5
Age determination							
Level of antler growth	4,67	2,30	2	3	5	0	2
Minimum age in years	3,00	2,40	3	3	3	–	3
Weight							
in g	1865	280	425	326	230	435	353
Preservation							
Os nasale	33,33 %	0 %	–	–	–	–	–
Os frontale	100 %	100 %	(X)	(X)	(X)	(X)	(X)
Os parietale (sin. + dex.)	100 %	50 %	(X)	(X)	–	(X)	(X)
Os temporale (sin. + dex.)	83,33 %	10 %	–	–	–	(X)	–
Os interparietale	100 %	60 %	X	(X)	–	–	–
Os supraoccipitale	0 %	14,29 %	–	–	–	(X)	–
Antler	100 %	85,17 %	(X)	(X)	(X)	–	(X)
Perforations							
Os temporale (sin. + dex.)	40 %	–	–	–		–	–
Os interparietale	60 %	–	X	–		–	–
Cut marks							
Os nasale	0 %*	–	–	–	–	–	–
Os frontale	100 %	80 %	X	X	O	O	X
Os parietale (sin. + dex.)	100 %	0 %	X	O	–	O	O
Os temporale (sin. + dex.)	80 %	100 %*	–	–	–	X	–
Os interparietale	66,67 %	33,33 %	X	X	–	–	–
Os sphenoidale	–	0 %	–	–	–	O	–
Inner layer of cranial bone	100 %	20 %	X	O	O	X	O
Antler	66,67 %	55,56 %	X	X	X	–	X
Other modifications							
Os nasale	0 %*	–	–	–	–	–	–
Os frontale	50 %	30 %	X	X	X	X	X
Os parietale (sin. + dex.)	66,67 %	0 %	X	O	–	O	O
Os temporale (sin. + dex.)	40 %	0 %*	–	–	–	O	–
Os interparietale	50 %	0 %	X	O	–	–	–
Os sphenoidale	–	0 %	–	–	–	O	–
Inner layer of cranial bone	66,67 %	11,11 %	X	–	–	O	O
Antler	66,67 %	22,22 %	X	X	X	–	X

chrono-zonation. On the one hand, he used his own system of zonation (cf. Schmitz 1953; 1955) within the text; on the other hand, he used the Firbas- and a not precisely determined Overbeck-zonation in his diagrams.

However, as Schuldt assigned HV1 to the main occurrence of notched points the headdress should also date to the transition from the Preboreal to the Boreal. As several anthropogenic layers intersect at

the former shoreline where HV1 was found (Gross et al. this volume; cf. Schuldt 1961, 89), a correlation with a single layer or other object groups (e.g. notched points) should be treated cautiously. In the course of dealing with the object group of headdresses as well as with the site itself, a direct dating of the artefact seemed to be appropriate.

The pretreatment and result of dating the sample are discussed in several papers (Meadows et al., this volume; Wild et al. in prep.): The object convincingly dates to the Late Preboreal chronozone with a calibration result of 9134–8973 cal. BC (40.5 % probability), or 8935–8710 cal. BC (54.6 % probability). Thus, it falls within the suggested time span of a major expansion of Mesolithic traditions into the Northern European Lowlands (cf. Conneller/Higham 2015; Gross 2017). This expansion seems to be accompanied by the phenomenon of antler headdresses that so far had only been detected on Preboreal sites (Table 4; Wild et al. in prep.).

The huge amount of radiocarbon dates obtained from Hohen Viecheln so far (Sommer et al. 2007; 2011; see Gross et al. this volume) makes it possible to discuss the result of HV1 in terms of intra-site chronology and typology. Thus, HV1 was initially considered contemporary with the majority of notched points. However, four specimens of this projectile type have been dated so far, and all of them are associated with the Boreal chronozone with a calibrated date range of 8626–7611 cal. BC (HoVi-3743/3744/4926/5611), while only one other artefact from the site dates to the Late Preboreal and thus matches HV1: a long bone epiphysis – a possible waste product from tool production – with a calibrated age of 9207–8821 cal. BC (HoVI-5314). These two finds indicate a small deposition of artefacts in the pioneering phase of occupation at Hohen Viecheln, which is followed by the larger number of artefacts from the Boreal. Supported by the results of the Hohen Viecheln project (see Gross et al. this volume), this picture seems to be representative. The early position of HV1 within the intra-site chronology is thus ensured – and yet striking.

6 The Hohen Viecheln-headdresses in context

If we accept the determination of HV5 as a second antler headdress at Hohen Viecheln, still only two antler headdresses have survived on the site. Only the exact find spot of HV1 has been published (Schuldt 1961, 90 fig. 12). It was found close to the assumed ancient shoreline. Perhaps it had been formerly deposited within the actual area of habitation before a transport into the lake or lacustrine sediments by water or sediment movement took place. Likewise, it may have been put into the water intentionally in order to preserve it from damage or destruction by prowling dogs or other agents. As no decisive arguments for one or the other hypothesis can be put forward, both seem to be equally acceptable. However, in both cases the discovery of the artefacts would only have been by chance, since the excavated off-bank discard zone will not exactly mirror what was going on within the dry land habitation area. A comparable situation was observed at Bedburg-Königshoven (Street 1989), where two antler headdresses (BK1 & BK2) might have been water-soaked amongst discarded remains in open water before further processing (Wild in press).

The largest number of headdresses on one site comes from Star Carr, where 24 possible headdresses have been found (Clark 1954; Little et al. 2016). It is tempting to stress a possible connection of the high quantity of these headdresses and the presence of a wooden platform that extended the habitation area onto the water (see Taylor et al. this volume). Perhaps Star Carr was not the only site with such a high quantity of headdresses. But due to its unique wooden constructions, parts of the habitation area were also located in a place that finally became overgrown by peat, thus preserving the many headdresses.

The high resemblance of the location of Hohen Viecheln with those of other sites with headdresses is striking. This includes the use of dry areas in marshy environments for camps which were visited

Table 4. Relevant ^{14}C-dates for the sites with antler headdresses. Grey background: directly dated antler headdresses. Calibrated with Chrono-model 1.1 and the calibration curve IntCal13 (Reimer et al. 2013).

Lab.-code	Site	Find	Mat./Spec.	^{14}C-BP	Reference	cal. BC (95.0 %)
KIA-51074	Hohen Viecheln	HV1 headdress	*C. elaphus*	9518 ± 46	Wild et al. in prep.	9140–8970 8940–8710
RICH-22176	Hohen Viecheln	HoVi-5314 waste product	*C. elaphus*	9608 ± 44	Gross et al. this volume	9207–8821
RICH-22650	Hohen Viecheln	HoVi-4926 notched point	Large cervid	9278 ± 44	Gross et al. this volume	8626–8416 (83.3 %) 8414–8346 (11.8 %)
RICH-22640	Hohen Viecheln	HoVi-3743 notched point	Large cervid	9109 ± 49	Gross et al. this volume	8451–8247
RICH-22649	Hohen Viecheln	HoVI-5611 notched point	Large cervid	8829 ± 44	Gross et al. this volume	8202–8101 (21.6 %) 8094–8035 (9.3 %) 8013–7752 (64.2 %)
RICH-22637	Hohen Viecheln	HoVi-3744 notched point	Large cervid	8740 ± 44	Gross et al. this volume	7938-7611
KIA-51073 RICH-22179	Berlin-Biesdorf	BB1 headdress	*C. elaphus*	9397 ± 34	Wild et al. in prep.	8770–8570
KN-3999	Bedburg-K.	Stratigraphy	Plant remains	9780 ± 100	Street 1991	9454–9099 (74.6 %) 9088–8826 (20.4 %)
KN-3998	Bedburg-K.	Stratigraphy	Plant remains	9600 ± 100	Street 1991	9255–8725
KN-4138	Bedburg-K.	Butchered fauna	*B. primigenius*	10670 ± 100	Street et al. 1994	9600–9517 (70.0 %) 9506–9456 (25.0 %)
KN-4136	Bedburg-K.	Butchered fauna	*B. primigenius*	10020 ± 100	Street et al. 1994	9600–9313
KN-4135	Bedburg-K.	Butchered fauna	*B. primigenius*	9740 ± 100	Street et al. 1994	9374–8808
OxA-4578	Star Carr (1950)	Worked tine	*C. elaphus*	9590 ± 90	Dark et al. 2006	9245–8742
OxA-4577	Star Carr (1950)	Worked crown	*C. elaphus*	9670 ± 100	Dark et al. 2006	9288–8785

regularly over a longer period as well as an opportunistic subsistence mode (see Wild in press for Bedburg-Königshoven). Furthermore, the possible connection of antler headdresses and osseous points at Hohen Viecheln and Star Carr must be discussed. At both sites hundreds of bone and antler points were discovered as well as some headdresses, while both artefact groups are usually rarely found elsewhere (perhaps with the exception of the Friesack sites). At Star Carr these circumstances led to discussions about possible rites concerning the two object groups (Chatterton 2003; Conneller 2004). Although the explanation for this phenomenon might be a preservation bias, it is possible to find more arguments against the hypothesis of rites inherently connecting these object groups. In the course of the recent investigations at Hohen Viecheln it was possible to gain a more precise knowledge about the stratigraphy and chrono-typology of the site. It must be stressed again that the directly dated headdress HV1 predates all the dated osseous projectiles from the site. Thus, it is most probable that it also predates the majority of all osseous projectiles from the site. A frequent common occurrence of antler headdresses and osseous points – as postulated for Star Carr – can thus be rejected for Hohen Viecheln.

At this point, HV5 has to be taken into account. It is so far the only evidence of a block of raw material exploited by 'groove and splinter technique' at the site. In the Mesolithic this procedure is mainly known from Star Carr (Clark/Thompson 1954). It was generally used to produce blanks for projectiles.

Schuldt first reported that this procedure was not used at Hohen Viecheln (Schuldt 1955, 31). Later he corrected his view and presented a not very regularly shaped rod made of a beam that shows signs of a grooved furrow on one lateral edge (Schuldt 1961, 150). Pratsch furthermore reports an antler tine with two grooved furrows (Pratsch 2006, 49; 145). This, however, rather points towards the method of 'blank production by bipartition' (Averbouh 2000, 153) than to the classical concept of the 'groove and splinter technique', which is a 'blank production by extraction' (Averbouh 2000, 154). Hence, HV5 might be the only unambiguous evidence of the 'groove and splinter technique' at Hohen Viecheln. Although neither directly nor relatively dated, it is remarkable that HV5 combines two features (the possible antler headdress-character and the utilisation of the 'groove and splinter technique') that both point towards an early chronological position at the site. Furthermore, it emphasises the connection between the 'groove and splinter technique' and the production of headdresses similar to what is seen at Star Carr.

To conclude, it is worth mentioning that the famous hypothesis that the headdresses were part of shamanic costumes (e.g. Little et al. 2016) cannot be supported by the results from Hohen Viecheln. The possible presence of at least two headdresses in the initial short-term occupation at Hohen Viecheln, combined with the assumption that further such artefacts might have been present on site originally (see above), speaks against their use as part of a costume of a shaman – who is supposed to be an individual specialist (e.g. Grøn 2010). It rather speaks for the use of the headdresses in a more socially common activity. Perhaps such an activity can be seen in a ritual dance (Sonner 1933) of a certain part of the group (e.g. Vormann 1911). This phenomenon commonly described in ethnology is elusive in archaeology. Perhaps, the Mesolithic antler headdresses offer a rare look 'behind the curtain' on such a ritual in the Preboreal.

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