



newsletter 13 | 2017

The Role of Culture in Early Expansions of Humans (ROCEEH)



Hohle Fels Cave: Research at a World Heritage Site. Photos: University of Tübingen



**HEIDELBERGER AKADEMIE
DER WISSENSCHAFTEN**

Akademie der Wissenschaften
des Landes Baden-Württemberg



THE ROLE OF CULTURE IN EARLY EXPANSIONS OF HUMANS

Editorial

In the thirteenth issue of ROCEEH's newsletter we announce the inscription of six Swabian caves onto UNESCO's World Heritage List, where several ROCEEH members have conducted research for many years. Humboldt Foundation Senior Research Fellow Martin Porr talks about the difficulties that irrational and non-utilitarian objects present for the study of human cognition and evolution. Christine Hertler and Andrew Kandel report on an expedition to the Narmada Valley of Central India.

Swabian Ice Age caves declared as World Heritage sites

The United Nations Educational, Scientific and Cultural Organization (UNESCO) has declared six caves of the Ach and Lone Valleys near Ulm to be World Cultural Heritage sites. On July 9, 2017 in Krakow, Poland, the UNESCO committee announced that the sites of Vogelherd, Bockstein, Hohlenstein-Stadel, Sirgenstein, Geißenklösterle and Hohle Fels were officially inscribed on its World Heritage List as "Caves and Ice Age Art in the Swabian Jura". Archaeologists from the University of Tübingen have been working in these caves from the start of the twentieth century, unearthing the earliest evidence for figurative art, music and religious belief. The caves are famous for their abundant and varied stone tools and organic artifacts, including numerous personal ornaments, ivory carvings depicting animals and therianthropes (mixed human and animal forms), the "Venus" figurines of Hohle Fels, and flutes made of bone and ivory. These objects were made by modern humans during the last Ice Age in a period known as the Aurignacian, about 40,000 years ago. They are unique artifacts and invaluable to the study of human history and technology.

Since the project began in 2008, ROCEEH has played a key role in investigating these sites, with three members conducting research there. Nicholas Conard directs the ongoing excavations at Hohle Fels (see Newsletter 1/2009), the re-excavation of the backfill from the 1930s excavation at Vogelherd, and the prospection for new sites in the Lone valley. Maria Malina

is responsible for technical aspects and documentation of the excavations (see Newsletter 9/2013). Michael Bolus is analyzing the lithic finds from Geißenklösterle.

Old and new artifacts alike continue to yield surprising results and important insights into the transition from the Middle to Upper Paleolithic, the unfolding of cultural characteristics through the early Upper Paleolithic, and the re-settlement of the region after the Last Glacial Maximum. Compared to other Aurignacian sites in Europe, the layers in the Swabian caves are older and they thus represent key places to study the earliest migrations of modern humans into Europe. Selected highlights from the last three years of research include:

1) Mitochondrial DNA sequencing of a Middle Paleolithic femoral fragment from Hohlenstein-Stadel. The results suggest that Neanderthal mitochondrial DNA diversity was significantly higher than previously assumed, and that Neanderthals might have mated with early *Homo sapiens* earlier than previously thought;

2) A tool with four holes recently found in Hohle Fels (Fig. 1) sheds light on a technical application as yet unknown from the early Upper Paleolithic. Each of the holes is lined with deep and precisely cut spiral incisions. Research shows that the tool carved from mammoth ivory could have been used to make rope. Fragments of similar finds in Geißenklösterle and Hohle Fels were previously known, but it was not clear how they were used;

3) Recently found pieces of a second “Venus” figurine at Hohle Fels (Fig. 2) and additional fragments of bone and ivory flutes show that these artifacts are not isolated developments, but formed an integral part of Aurignacian culture. As tools for communication they surely enabled early *Homo sapiens* to inhabit these valleys during the early Upper Paleolithic. The ROCEEH team is using the unique set of lithic and organic technologies found at these World Heritage Sites to test models of cultural innovation during the early Upper Paleolithic of Swabia.

Miriam Haidle, Michael Bolus

The archaeology of irrationality: Interrogating Paleolithic art and modern human origins

The archaeology of irrationality critically engages with fundamental problems in the study of the origins of modern humans and cognition. Reflections of symbolic thinking, as well as abstract and figurative representations (Fig. 3), are hypothesized to have been of crucial importance to the success of *Homo sapiens*. However, human evolutionary studies and Paleolithic archaeology have notoriously struggled to integrate seemingly irrational and non-utilitarian objects into their explanatory frameworks, which are largely dominated by adaptationist or functionalist approaches. The aim of this project is to explore the consequences of moving beyond the traditional orientation within Paleolithic archaeology to establish an interpretative framework that engages with the dynamic and unstable, relational constitution of things, materials, animals, places and humans. To illustrate the relevance of these questions for archaeological research, I want to briefly discuss a recent study by the ROCEEH team and its wider implications. In recent years, the origin of modern humans has been increasingly framed in terms of the origins of the uniquely human cognitive capacity for symbolic behavior. This behavior is seen as the basis for the creation of cultural meanings that are shared and negotiated through a range of verbal and non-verbal forms of communication. This forms the basis for the incredible variability and flexibility of modern human cultural practices and artifacts in a wide sense of the term. Some of the most significant current questions in archaeology are related to these issues. What are the mechanisms that influence these cultural forms? What is their cognitive basis? How do they originate? Why do some persist and some disappear?

The most widely accepted framework to address these questions is behavioral ecology or evolutionary ecology (or variants thereof). Within this framework, explanations are regarded as successful if they demonstrate correlations between practices or artifacts and environmental conditions, which point to a more efficient use of resources. Change over time is the result of successful adaptive processes in which individual organisms compete against each other for access to different kinds of resources. It is assumed that individual actors will try to achieve the best possible outcome in terms of material gains and ener-



▲ Figure 1: Ivory tool from Hohle Fels cave with four holes showing precise spiral incisions. Photo: University of Tübingen

▲ Figure 2: Possible fragment of a second “Venus” from Hohle Fels with reconstruction of suggested location. Photo: J. Lipták; reconstruction: M. Malina

getic cost-benefit relationships. This framework constructs a particular understanding of human culture in relation to nature or the natural environment. Culture is ultimately understood as the product of choices of individuals to maximize cost-benefit relationships. It is ultimately understood as a collection of adaptive devices to enhance behavioral efficiency. In this sense, culture reflects the material properties of nature. The variability of cultural forms is consequently only a false flexibility, because it always depends on those fundamental assumptions of the behavioral ecological framework or the assumption of ultimately rational decision making by individual organisms. Human agency, creativity and interpretation are absent. But how are environmental and cultural variables related to each other during human evolution or close to the so-called origins of modern humans?

Recently, the ROCEEH team published a paper, which argued for an ‘increase in behavioral flexibility’ in the context of modern human origins (Kandel et al. 2016) The findings might indeed point towards a significant shift in the way we look at humanity’s deep past with important implications for our understanding of the variability of past and present human behavior. The authors examined contexts from the Southern African Middle Stone Age (MSA), which are roughly dated between 190,000 to 30,000 years ago. According to most researchers today, it was during this time in southern Africa that the characteristics of modern human behavior evolved.

The authors conducted a comparative analysis of a range of sites and concentrated on assessing cultural complexity. They also related their findings to a sophisticated analysis of the respective environmental conditions through time. The main conclusion of the paper is that humans during this time “were not specific in their habitat choice, and that cultural adaptation functions independent of environmental change” (p. 659). Because they failed to establish correlations between environmental

conditions and cultural practices, the authors concluded that ‘cultural performance steers the expansions and contractions of populations’.

This result is very significant in that it questions the dominant explanatory framework that views culture and cultural practices primarily as adaptations to the natural environment. Of course, these insights would not be at all unusual in social anthropology, sociology, in the broader field of the social sciences, or within the humanities. In the study of the deep human past, however, such a reorientation has dramatic consequences, because virtually the entire field operates within this paradigm. Research projects and strategies are overwhelmingly set up to detect correlations between cultural practices and environmental conditions to make a case for adaptive processes. I would argue that we should question the use of these explanations as our main frame of reference in the deep past.

The results of this ROCEEH study further support a call for a new engagement with the characteristics of ‘culture’, and how it relates to human cognition and the natural environment. If we cannot refer to rationality, efficiency and adaptive mechanisms, what are the processes that cause cultural traditions and practices to emerge, persist and disappear? These are significant and important questions. It is about taking cultural variability seriously. It argues against universal explanations and the imposition of totalizing schemes. No amount of cost-benefit rationalizing can explain those many voices and perspectives



▲ Figure 3: Red ochre hand stencil, Kimberley, Northwest Australia.
Photo: M. Porr

that have been there from the very beginning. We need a new engagement with the notion of culture and cultural variability in relation to human behavior and cognition. It is independent cultural variability all the way down.

Reference

Kandel, A. W., Bolus, M., Bretzke, K., Bruch, A. A., Haidle, M. N., Hertler, C., & Märker, M., 2016. Increasing Behavioral Flexibility? An Integrative Macro-Scale Approach to Understanding the Middle Stone Age of Southern Africa. *Journal of Archaeological Method and Theory*, 23, 623-668.

*Assistant Prof. Martin Porr
The University of Western Australia
Alexander von Humboldt Foundation
Senior Research Fellow*

ROCEEH expedition to the Narmada Valley, Central India

Thanks to its favorable position at the center of South Asia, the Indian subcontinent plays an important role in theories about the geographic expansions of humans across Asia. The archaeological record of India documents a human presence starting in the Early Pleistocene, with three distinct technological phases recognized through their respective stone tool industries: 1) an early bifacial culture, similar to the Acheulean, which is known for its handaxe-bearing sites in Africa and much of Eurasia; 2) a Middle Paleolithic entity characterized by the frequent use of the Levallois and discoid techniques, which is similar in concept to the Mousterian of Europe and the Levant; and 3) a microlithic culture with small bladelets and tools, which are ascribed to the Late Pleistocene. However, details about the chronological and spatiotemporal relationships of these cultural entities are not well understood, mainly because of an insufficient control of the chronology. Furthermore, the lack of a coherent chronological framework makes it difficult to determine the relationship between these cultural units and the diverse hominin candidates known from Sub-Saharan Africa and Southwest Asia who could have made use of these specific technologies. While the appearance of new technologies is often considered as an indicator of human dispersal events, the record of human fossils on the Indian subcontinent remains poor. Thus, assigning the makers of these toolkits to a specific human lineage is not a straightforward task in South Asia. In fact, a single skull of a fossil human is available for scientific studies, and this specimen was discovered on the northern banks of the Narmada River near the village of Hathnora.

The source of the Narmada River lies on the Amarkantak Plateau in the eastern part of the state of Madhya Pradesh. It flows on a westward course until it reaches the Arabian Sea in the Gulf of Khambat. Along its way the river cuts through a wide array of geological deposits, from the Precambrian basement to the Cretaceous-Paleogene Deccan Traps in the west,

and Paleogene and Neogene deposits in the east. Traditionally, the Narmada River is considered as the boundary between peninsular India to the south and the foothills of the Himalaya to the north, and these are dissected by major river systems such as the Indus, Ganges and Brahmaputra.

In its first exploratory mission, members of the ROCEEH team visited sites along the valley of the Narmada River, focusing on the Central Narmada, where extensive Quaternary deposits are exposed along the river banks (Fig. 4). The alluvial infill of the basin is subdivided into a sequence of formations starting with the as yet undated Pilikar and Dhansi Formations. The hominid finds from Hathnora were collected from the overlying Surajkund Formation. The geologist Arun Sonakia discovered the almost complete neurocranium in 1982 as part of a systematic search for vertebrate bearing horizons in the Narmada Valley. The taxonomic assignment of the human fossil itself is problematic. During a comparative study of morphological features the skull was originally assigned to the species *Homo erectus*. However, the specimen does not preserve dentition and deviates in a number of features from the characteristic representatives of Southeast Asia. A more recent study concludes that several taxonomic determinations are in fact possible. In addition to *Homo erectus*, the skull could be associated with *Homo heidelbergensis* or other early human taxa. Such taxonomic designations depend rather on which model researchers prefer for understanding early human dispersal across Asia.

It will therefore be of crucial importance to determine the age of the specimen, a task that brings its own challenges. The skull was retrieved from a cemented gravel horizon representing the Surajkund Formation, which is exposed in patches along the course of the river (Fig. 5). The gravel deposits are overlain by the sand and clay deposits of the Baneta Formation which encompasses at least one vertebrate bearing layer. The sediments of the Baneta Formation were eroded near the river bed and are only exposed at a distance away from the river. Radiometric dating of the gravel layer resulted in a broad spread of ages ranging from 48,000 to greater than 236,000 years old. These results suggest that some of the vertebrate fossils have been redeposited. As a result, the age of the hominin specimen could be associated with any of these dates. These studies also cast doubt on the initial and quite simple concept for an orderly and sequential layering of the formations. Apparently, several vertebrate faunas are mixed in the gravel section of the Surajkund Formation. Taxonomic studies of the hippos, bovinds, cervids, proboscideans, and ostriches collected from this horizon are required.

In addition to reviewing important sites along the Central Narmada Valley, ROCEEH visited several sites containing large

panels of cave paintings which are often associated with microlithic assemblages (Fig. 6). A visit to the open-air site of Patne in Maharashtra state may provide ROCEEH with a chance to study the origin of microlithic assemblages and determine their place in the chronology of India. After its first expedition, ROCEEH's involvement in India is expected to grow in the coming years, with the next expedition planned to the Siwaliks in the foothills of the Himalayas.

Christine Hertler, Andrew Kandel

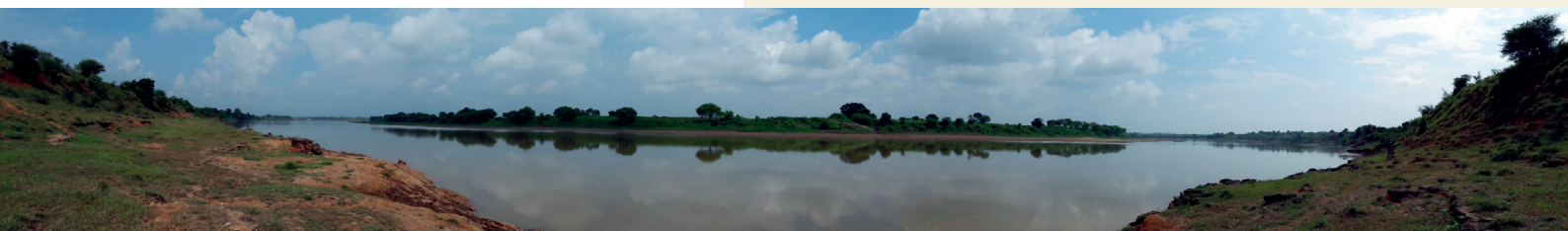


▲ Figure 5: The Central Narmada Valley near Surajkund. The human fossil from Hathnora was found in the conglomeratic banks at the center of the photo. The sandy part of the formation is still preserved between the conglomerates. The slope to the left exposes the overlying Baneta Formation. Photo: A. Kandel



▲ Figure 6: Part of the team at Bhimbetka, a World Heritage Site with rock art; from left: Martin Porr, a specialist on rock art from The University of Western Australia, Parth Chauhan, our host and archaeologist from the Indian Institute of Science, Education and Research at Mohali, and Christine Hertler. Photo: A. Kandel

▼ Figure 4: The Central Narmada Valley, India. Photo: A. Kandel



Conference Report

“Keep calm and boldly go – Which factors in the environment drive early human expansions and have an impact on their settlements?”

Workshop in Mauer, Germany, 24–27 April 2017

Organizers: Christine Hertler, Ericson Hölzchen (ROCEEH, Frankfurt) and Zara Kanaeva (ROCEEH, Tübingen)

The Mid-Pleistocene Revolution is a well-characterized period of climatic transition between 1.2 and 0.8 million years ago. Environmental, faunal and particularly hominin responses to the climatic transition lie at the core of the International Focus Group (IFG) “Modelling Environmental Dynamics and Hominin Dispersals Around the Mid-Pleistocene Revolution” (METHOD) funded by the International Union for Quaternary Science (INQUA). On the first day of the workshop, participants of the IFG met in Frankfurt for database training. Then they proceeded to the home of *Homo heidelbergensis* in Mauer (Fig. 7) to discuss and compare the effects of the Mid-Pleistocene Revolution in Sub-Saharan Africa, in the Mediterranean region from Spain to the Caucasus, in Central Europe, and in South and Southeast Asia. Selected studies were presented in a series of talks, as was an array of new methods. In several discussion groups, the participants considered various topics including the impact of climate and environment on hominin populations dynamics, dispersal and behavior; shifts in hominin environments as a response to the Mid-Pleistocene Revolution; and identifying and elaborating case studies for modeling. The next meeting of the IFG METHOD will be devoted to agent-based modeling and take place in March, 2018 in conjunction with the Computer Applications in Archaeology conference in Tübingen (see Forthcoming, below).

*Christine Hertler, Ericson Hölzchen,
Susanne Haupt, Zara Kanaeva*

Sixth Biennial Conference of the Eastern African Association for Paleoanthropology and Paleontology (EAAPP)

Addis Ababa, Ethiopia, 30 July–2 August 2017

Organizers: Eastern African Association for Paleoanthropology and Paleontology (EAAPP) supported by ROCEEH

The conference of the EAAPP occurs every second year in one of its member countries and is a major meeting for every scientist who is involved in fieldwork in Eastern Africa. It serves as a contact point for meetings between Eastern African scientists at any stage in their career and researchers from abroad who support the paleosciences in Eastern Africa. The 2017 conference took place in Ethiopia. Studies focusing on the Afar Triangle, the Middle Awash Valley and the Omo Basin contributed a significant portion of more than 60 talks and nearly 30 poster presentations. Localities in Ethiopia cover a vast period in human evolution, starting more than six million years ago and ranging until historical times. They are therefore of utmost importance for research in human evolution. On behalf of ROCEEH, Nicholas Conard presented ongoing research from Mumba Cave in Tanzania. These studies started with renewed analyses of the collections, which paved the way for a new field project sponsored by the Volkswagen Foundation, in collaboration with Pastory Bushozi of the University of Dar es Salaam. Christine Hertler introduced the ROAD database as a useful tool for the study of human expansions, raising the interest of museums the interest of museums and other institutions in Eastern Africa. Both contributions yielded positive and encouraging comments. The next EAAPP conference will take place in Kenya in 2019.

Christine Hertler



◀ Figure 7: Participants of the METHOD Workshop in Mauer, Germany.

Photo: S. Knörr

Forthcoming

- ROCEEH Conference KULT-UR-MENSCH. Kulturkonzepte für die Erforschung der Menschwerdung”
23–25 November 2017 in Heidelberg. Conference organized by Miriam N. Haidle, Christine Hertler, and ROCEEH.
- METHOD-IFG Training Lab “Agent-based modeling”
14–16 March 2018 in Frankfurt/Main. Organized by Ericson Hölzchen and Christine Hertler within the framework of the IFG METHOD (see Conference Report, above).
- CAA International 2018 “Human History and Digital Future”
19–23 March 2018 in Tübingen. Local organizers include Volker Hochschild (ROCEEH, Tübingen), Matthias Lang (Tübingen), and ROCEEH. <http://2018.caaconference.org/>

The 46th International Symposium on Computer Applications and Quantitative Methods in Archeology (CAA 2018) will be held in Tübingen. Under the motto “Human History and Digital Future”, 450 participants will present their latest scientific findings in various sessions on Database Management, Spatial Modeling, Remote Sensing, and much more. The program is complemented by keynote lectures, practical software workshops, excursions, and evening social events.

- International Senckenberg Conference “Images, gestures, voices, lives – What can we learn from Palaeolithic art?”
30 May–2 June 2018 in Tübingen. Conference organized by ROCEEH and Senckenberg Centre for Human Evolution and Palaeoenvironment.

Who's who?

This issue: Julia Heß, administrative coordinator



Julia Heß studied biology at Johann Wolfgang Goethe University in Frankfurt and at Université de Provence in Marseille, France. She completed her diploma on “Recording from Single Auditory Nerve Fibres in the Pigeon” in 1996 and started her working career as an editorial journalist at a medical publisher. After the birth of her three children, she returned to work for several years at the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) before joining the ROCEEH team as administrative coordinator in August 2014. Julia is responsible for the planning and compliance of the budget, the internet presence of the Research Center, the newsletter, the implementation of the Virtual Atlas, and contact between the researcher team and the Academy.

CONTACT

The Role of Culture in Early Expansions of Humans
Heidelberg Academy of Sciences and Humanities

Senckenberg Research Institute Frankfurt/Main
Eberhard Karls University of Tübingen

COORDINATORS

Miriam Haidle (scientific)
Julia Heß (administrative)

Senckenberg Research Institute
Senckenberganlage 25
D-60325 Frankfurt/Main
miriam.haidle@uni-tuebingen.de
julia.hess@senckenberg.de
www.roceeh.net



THE ROLE
OF CULTURE
IN EARLY
EXPANSIONS
OF HUMANS

The Heidelberg Academy of Sciences and Humanities is a member of the Union of German Academies of Sciences and Humanities, which coordinates the Academies' Program. The research project, „The Role of Culture in Early Expansions of Humans“, was incorporated into the Academies' Program in 2008.

