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



◀ An upper grindstone of basalt from Unit IIIb of Mumba Rockshelter in Tanzania showing clear traces of ochre processing. Photo: H. Jensen.

View of Mumba Rockshelter showing the location of Margit Kohl-Larsen's 1934 & 1938 excavations. Photo: N.J. Conard.



**HEIDELBERGER AKADEMIE  
DER WISSENSCHAFTEN**

Akademie der Wissenschaften  
des Landes Baden-Württemberg



## THE ROLE OF CULTURE IN EARLY EXPANSIONS OF HUMANS

### Editorial

In this 14th issue of ROCEEH's newsletter, we begin by examining the origin of ochre use in Africa. From there, we establish a definition of what cumulative culture means and explore when it began. These articles are followed by reports about three conferences co-organized by ROCEEH: 1) "KULT-UR-MENSCH"; 2) "Computer Applications in Archaeology"; and 3) "Images, gestures, voices, lives. What can we learn from Paleolithic art?" an International Senckenberg Conference.

#### The beginning of ochre use during the Stone Age of Africa

Ochre is an important archaeological material found at many African sites, yet there is limited quantifiable information available about when and where the use of this colorant became a habitual part of human behavior. To pursue this research question, the ROCEEH team collaborated with a doctoral student at the University of Heidelberg to create a database of sites in Africa documenting the use of ochre through human history. We assigned ages to each assemblage of ochre based on its stratigraphical position within an excavation and detailed the number of ochre pieces, their weight and whether the finds showed evidence of being used by humans, such as traces of grinding, rubbing, smoothing or engraving (see title).

#### What is ochre?

Ochre is a term used by archaeologists to describe earth pigments, usually of reddish color, which contain iron oxides. The most common varieties found at archaeological sites include hematite and goethite. These minerals are typically found as lumps or nodules, or as residue or powder adhering to rocks, sediment or artifacts. The use of pigments by hominins can be traced back at least half a million years as evinced by the red ochre found in the archaeological record of Africa.

#### When did the ability to see red evolve?

Modern humans have three types of cone cells in the retina of the eye. These cells are a prerequisite for trichromatic vision and hence, a requirement for the perception of the color red. In fact, the capacity for trichromatic vision likely dates

back 35 million years, as documented in the higher primates known as catarrhines which include Old World monkeys and apes. Trichromatic vision may have evolved to help primates recognize ripe yellow, orange, and red fruits in front of a background of green foliage. Another advantage is the ability to observe the subtle changes in blood flow beneath hairless parts of the skin, which carry relevant information about the emotional state of other individuals.

#### When did ochre use begin?

The oldest reliable evidence for ochre use comes from a handful of sites in Sub-Saharan Africa starting about 500,000 years ago (Fig. 1a). It is interesting to note that the initial phase of ochre use is associated with changes in the ways early humans manufactured stone tools. For about a million years, handaxes had been one of the most common types of stone tools. Around this time their frequency decreased as new knapping techniques helped early humans create different types of tools. During this phase, ochre use is sparse and there are no apparent centers of innovation. A few of these early ochre artifacts exhibit traces of anthropogenic use such as scraping and grinding. It is likely that the ochre was used by *Homo heidelbergensis* or its contemporaries.

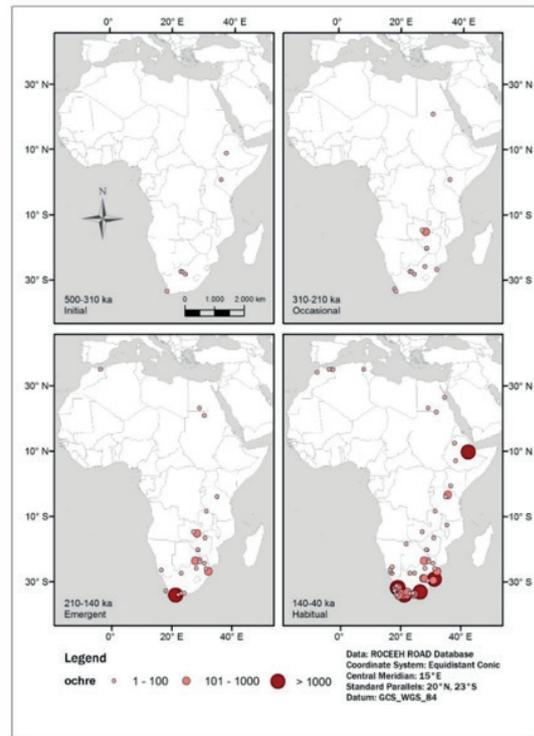
About 300,000 years ago, a phase of occasional ochre use is evident, with a slight increase in the number of sites yielding ochre (Fig. 1b). There is still no obvious center of innovation, but ochre use becomes more geographically widespread. It was during this time that *Homo sapiens* first emerged in northwestern Africa. Starting about 200,000 years ago, the use

of ochre began to increase noticeably. We call this the emergent phase of ochre use and note that *Homo sapiens* were present in eastern and southern Africa as well (Fig. 1c). By about 140,000 years ago, the habitual use of ochre is evident throughout Africa and is clearly associated with modern humans and their cognitively complex behavior (Fig. 1d).

During the habitual phase, many pieces of ochre show evidence of anthropogenic modification, including faceted surfaces with striations indicating the production of ochre powder, as well as scoring and engraving marks (Fig. 2). These artifacts provide insight into the emergence of symbolically mediated behavior. Some pieces are intensively ground, while others exhibit geometrical or quasi-geometrical marks. Recent findings from South Africa provide a glimpse into the production and storage of liquefied ochre-rich mixtures. Ochre is also found adhering to personal ornaments such as perforated marine shell beads in South Africa, Morocco and Israel between 130,000 and 70,000 years ago (Fig. 3). Another exciting possibility is shown by a 74,000 years cone shell with red residue associated with the burial of an infant in South Africa.

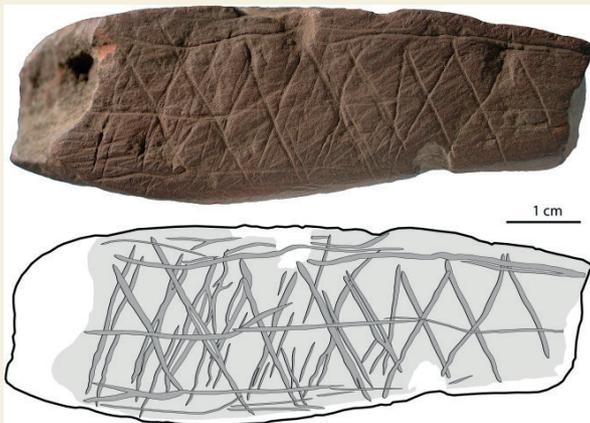
#### Did Neanderthals use ochre?

While there are several frequently cited, alleged ochre findings dating to the Late Acheulean of Europe, India and Armenia, in all of these instances, their status as anthropogenic artifacts is questionable. There is very sparse evidence for Neanderthal ochre use in the early Mousterian from France and the Czech Republic. The oldest reliable evidence for the use of red ochre by early Neanderthals comes from the Netherlands and dates between 250,000 and 200,000 years ago. Following these sporadic events, a gap of more than 100,000 years is noted in the European archaeological record. While the occasional use of red ochre reappears about 100,000 years ago, the best evidence occurs in France starting about 60,000 years ago. In contrast to their African cousins, Neanderthals also utilized a



▲ Figure 1. Distribution of localities in Africa with ochre dating between 500,000 and 40,000 years, showing the four phases of ochre use. Each of the maps depicts the relative number of finds of ochre found at a given locality. a) Initial ochre use from 500-300,000; b) Occasional ochre use from 300-200,000; c) Emergent ochre use from 200-140,000; d) Habitual ochre use from 140-40,000. Graphic: C. Sommer.

considerable amount of black manganese, a mineral which also functioned as a combustive agent to produce fire on demand.



▲ Figure 2. Perhaps the most famous piece of engraved ochre from layer CD of Blombos Cave in South Africa. After Henshilwood et al., 2009: Fig. 9.



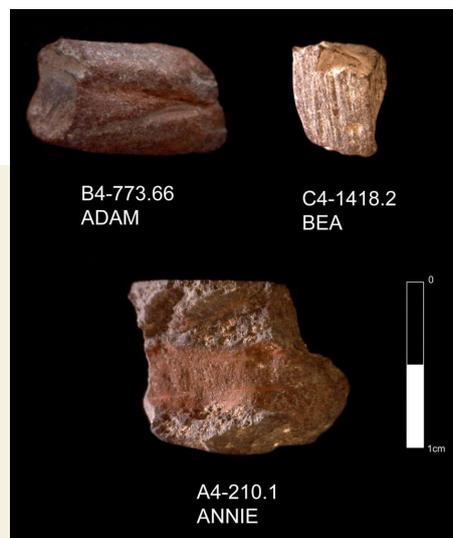
▲ Figure 3. Perforated seashells with ochre residues from group E of Taforalt (Grotte des Pigeons) in Morocco. Scale left (1 cm); scale right (0.5 mm). After Bouzouggar et al., 2007: SI Fig. 9.

### Why is ochre so important?

Ochre plays a major role in debates about the emergence of modern cognitive abilities in the human lineage. Interpretations of ochre use range from symbolically mediated behavior and ritual display to a variety of purely functional applications. Evidence exists for the intentional selection of saturated blood red and bright red hues in some rigorously analyzed ochre assemblages and for the procurement of ochre from distant sources, which were preferred over readily accessible, nearby outcrops. Considering the intentional selection, distant procurement and indication of symbolically mediated behavior, we conclude that these features point to the increased use of this attention grabbing pigment in collective rituals during the Middle Stone Age (Fig. 4).

Another hypothesis is illustrated through insightful experiments which assess the perceptual and behavioral impact of red stimuli in different psychological contexts, for example, the “romantic red effect,” which may influence how women choose their mates. Relative to other colors, red leads men across cultures to unconsciously view young and fertile women as more attractive and more sexually desirable. Such studies have a variety of evolutionary implications for the early use of red ochre. Experiments exploring functional uses of ochre suggest that it could have been used as an ingredient in compound adhesives, for tanning hides, to repel mosquitos and as sunscreen. Other functional uses of ochre are reported from the ethnographical record, for example, medicinal applications, nutritional supplements and neutralization of smells. Some ochre nodules may have been used as soft hammers for shaping stone tools. In sum, the current state research into red ochre recognizes it as a valuable archaeological material with a long evolutionary history. Therefore, ochre is attracting increasing attention in theoretical discussions about the emergence of modern cognitive abilities and its distinction as a find category with a unique significance.

*Andrew W. Kandel, Rimtautas Dapschauskas*



▲ Figure 4. Sibudu Cave. Modified ochre from the Middle Stone Age layers of the Deep Sounding. Figure: E. Velliky.

### References

Bouzouggar, A. et al. (2007). 82,000-year-old shell beads from North Africa and implications for the origins of modern human behavior. *Proceedings of the National Academy of Sciences of the USA* 104: 9964-9969.

Henshilwood, C.S. et al. (2009). Engraved ochres from the Middle Stone Age levels at Blombos Cave, South Africa. *Journal of Human Evolution* 57: 27-47.

### Multiple facets of cumulative culture

Cumulative culture (CC), the accumulation of cultural traits with modifications built upon earlier ones, is widely seen as a uniquely human characteristic that involves distinct cognitive and behavioral performances. In our search for its origin, we note several periods as possible candidates for when cumulative culture may have emerged in human evolution: around 3.3 million years ago (Ma) with the introduction of stone tool technology; around 2.5 Ma with more habitual and diverse flake technologies; around 1.7 Ma with early Acheulean or at 0.8 Ma with advanced Acheulean bifacial technology (Fig. 5); between 0.5 and 0.3 Ma with composite technology; or between 100,000 and 40,000 years ago with symbolically mediated artifacts. Basic to any identification of an onset of CC in or beyond the course of human evolution is the identification of behavioral and/or cognitive factors necessary for the development of CC and inferences about how these factors are reflected in the archaeological record. In a recent study, the author, a member of the ROCEEH team, looked further into these questions.

Based on comparative studies with animals and children, different factors such as imitation or high-fidelity copying, teaching, communication and language, prosociality, innovation and demographic aspects have been suggested as crucial for CC. But which factor is necessary, which is sufficient? Several of the abovementioned aspects are themselves multifactorial (and cultural) performances that are not independent from each other. To depict the evolution of cumulative culture, the evolution of the associated performances must be tracked (Fig. 6), along with their interdependencies. Yet, many of the different associated performances are barely detectable in the archaeological record. Another perspective may help trace the relevant factors. CC can be assumed to be a process involving individuals, groups and their specific environment. A group of individuals displays a certain performance; this is part of the environmental sphere of the individuals and does not involve any social interaction. Individuals learn this performance in social context. Other individuals learn from them and so on, until one individual modifies the behavior. Beside the invention of something new from existing cultural patterns, a crucial phase in the cumulative process is the transition from an individual invention to an innovation on the level of the social group: An old behavioral practice must be abandoned, against individual habits and social conformity, and replaced by a new

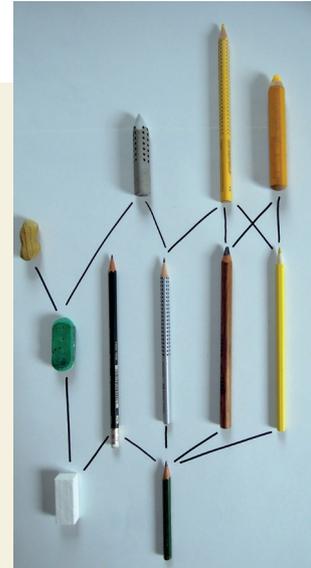


▲ Figure 5. Did cumulative culture start with advanced bifacial technologies? Photo: H. Jensen.

one. Finally, if the new performance is widely accepted in the group, it becomes part of the general learning environment.

Various performances in the social sphere support or hamper the transmission of well-established performances, as well as new or modified ones. In developing CC, the accession and intensification of interpersonal relationships (e.g., joint intentionality) as well as supportive, directed transmission (e.g., different forms of teaching) have become increasingly important to passing down complex information and new elements of performances against group conformity. While the social transmission of performances is a necessary prerequisite of CC, it is not sufficient. The cumulative aspect of culture is also based on individual performances transferring known elements into new contexts or combining them with new elements. Individual performances of curiosity and extended play, along with the abilities to decouple problems and solutions and to chunk and chain together parts of performances, support innovation via transfer and combination. However, also chunking and chaining are not sufficient to generate cumulative culture, but rather, act as a catalyst which boosts the range of individual and social performances. The environmental sphere of development of cumulative culture grows with each new performance or modification. With the extension of resources and models, the potential scaffolds for new performances expand. The opportunities for inventions and innovations in technology also increase by the frequency of material engagement. Accumulation of cultural performances can foster cumulative culture in aspects of modification and transmission.

The development of CC is based on ongoing processes in the ontogenetic-individual, historical-social, and evolutionary-biological dimensions in interaction with the specific environment, in both phylogeny and ontogeny. The performance of cumulative culture is not fixed in a specific genetic code; instead, genetic basics formed through evolutionary processes are individually developed in historical-



► Figure 6. Cumulative development of pencils and erasers. Photo: M. Haidle.

social contexts, and they change throughout the phases of life history. On the other hand, increased individual material and social engagement is not sufficient to explain the course of development in human evolution, but must instead be combined with mutational enhancements of the cognitive and nervous system within social and material environments that have been altered by human engagement.

Taking the diversity of individual, social and environmental factors involved into account, which in itself developed in three dimensions, it is unrealistic to look for the onset of cumulative culture at a specific moment in human evolution. A gradual scenario is more appropriate that shows an expansion of cumulative cultural potential in several grades merging into one another. The accumulation of traditions represent an initial branch of CC which is mainly situated in the social sphere. Even if every single practice could have been invented by one individual alone, the whole set of practices is unlikely to have been invented by a single individual. Cultural modifications mark a second branch in the development of cumulative culture. Socially transmitted practices are modified by individual inventions; in a social innovation process, these modifications replace older, customary practices. With the accumulation of traditions and the cultural modifications, the main factors of cumulative culture are in place. With simple donated culture, however, the cumulative effect becomes extended, and the developmental speed increases. Cumulative cultural development based on emulation, imitation, and simple, possibly unintentional assistance is limited not only by rising complexity but also by the sheer number of accumulating practices that must be acquired by naïve individuals without the purposeful help of an expert. Simple donation of cultural practices from experts to naïve individuals via motivation, intentional evaluative feedback, drawing attention, assistance, or demonstrating expands the possibilities of social learning. Thus, the initiative for transmitting a practice is no longer limited to the naïve individual, but can also be taken by the

expert. Active support from experts extends the amount and complexity of performances that can be learned. It fosters a deeper understanding of the practices, allowing transfer and recombination to become increasingly complex. The learning environment is significantly enriched. Finally, in advanced donated culture formal teaching enables the learning and comprehension of opaque learning situations by transmitting knowledge beyond specific examples.

The interplay of basic factors and developmental dimensions shows a slow and gradual development of cumulative culture from its basis (the accumulation of traditions and cultural modifications demonstrated by other species) to simple and advanced donated culture. In conclusion, the onset of cumulative culture cannot be observed as a single-trait event that occurred in a relatively short time, but rather, results from multifactorial and gradual processes that unfolded over millions of years.

Miriam Haidle

### Conference Report “KULT-UR-MENSCH”

Heidelberg, Germany, 23–25 November 2017

Organizers: Miriam N. Haidle, Christine Hertler, and ROCEEH

Concepts of culture are diverse and debated in the various fields of their application (Fig. 7). Broadly speaking, culture can be defined as the behavioral patterns exhibited by a group. Culture is transmitted across generations through social interaction and learning. Some scholars classify culture more narrowly as text, symbolic systems, artistic performances, rituals, practices, standardized ways of thinking and acting, values and norms. Many approaches refer to culture as a trait specific to modern humans in contrast to animals. However, the scope of the ROCEEH research center encompasses a broad span of time. ROCEEH'S focus begins around 3 million years ago with hominins who probably showed group-specific behavioral traditions comparable to chimpanzees today. The focus ends about 20,000 years ago with *Homo sapiens* who demonstrated aesthetic and technical performances that let us assume cultural capacities similar to those of humanity today. Basic data are limited to fossils, artifacts mainly made from stone, and their contexts. We are dealing with the deep history of cultural developments without direct observations of behavior and explanatory statements by the groups under study. Furthermore, we have no written sources and only sparse pictorial representations coming from the end of that time frame. Therefore, we need to clarify the cultural concepts underlying our study of the role of culture in early expansions of humans.

To discuss perspectives of cultural concepts for the study of “becoming human”, ROCEEH organized an interdisciplinary conference held at the Heidelberg Academy of Sciences and Humanities (Fig. 8). The aim of the meeting was to present, discuss, and enhance the approaches and concepts developed by ROCEEH during the last ten years. Invited speakers and debaters from the fields of philosophy, rhetoric, anthropology,



▲ Figure 7. The word cloud resulting from the question “What does culture mean to you?” yields interesting insights into the diverse associations of the participants. The more often participants selected a term, the larger it is depicted. Graphic: C. Hertler.

cognitive science, social science, social ecology, prehistory and history presented their views in 16 talks and defended them in lively rounds of discussion.

Before the conference, the ROCEEH team prepared a position paper outlining its humanistic perspectives to provide a basis for discussion. One aim of our research is to examine the development of cultural faculties and performances over the course of human evolution. However, we recognize that neither the cultural performances, nor their agents, nor the developmental processes are directly comparable to what can be observed today. With this in mind, we developed specific cultural concepts and condensed them into these:

- Thesis 1: Considering the deep history of human evolution, we view culture predominantly as a culture of activities and primarily as a culture of subsistence.
- Thesis 2: Artifacts and tools are significant expressions of cultural performances.
- Thesis 3: The environment of a group is determined by its culture. The cultures of resources are groupspecific and express cultural diversity.
- Thesis 4: The cultural capacities of humans and their expressions are dynamic. They developed in three dimensions interacting with each other and with the specific environment.
- Thesis 5: Geographical expansions are the visible expression of cultural-ecological processes and their dynamics.

The ROCEEH team introduced its five theses during the first session and illustrated them with examples from prehistory, paleoanthropology, and geography (Miriam Haidle, Nicholas Conard, Friedemann Schrenk, Volker Hochschild). In the second session contributions from philosophy, anthropology, and prehistory, as well as social and cognitive sciences continued. Volker Gerhardt (Berlin) examined the tight relationship of culture and technique; Niels Weidmann (Tübingen) explored

the stress field between culture as a general feature of humans and the diverse worlds of experience, which we are confronted with as cultures. Looking at the developmental perspective Christoph Antweiler (Bonn) pointed out that developmental theories are in themselves cultural-historical artifacts. Stefanie Höhl (Vienna) discussed the transmission of cultural practices on the basis of a learning example. While Anke Scholz (Tübingen) emphasized resources as products of cultural constructions, Engelbert Schramm (Frankfurt/Main) addressed their communal organization in supply systems.

In the third session, the ROCEEH theses were critically discussed from cultural-theoretical perspectives. Mathias Gutmann (Karlsruhe) stressed that humans should not only be regarded as historically evolving beings, but also as experiencing themselves through the lens of their own history. This raised the question of when and how human ancestors became historically conscious. Martin Langanke (Greifswald) mentioned conceptual as well as methodological problems in stories of continuity from pre-cultural natural beings to fully cultural humans. Maria Kronfeldner (Budapest) emphasized the descriptive and explanatory power of a distinction between nature and culture on the basis of causal patterns. Presenting an integrative approach from philosophical anthropology/pragmatism, Matthias Jung (Koblenz) referred to the entanglement of the cultural dimension of activity with the development of the symbolic dimension. Coming from a rhetorical perspective, Frank Duerr (Tübingen) linked cultural development with persuasion as manipulation of decisions of others. Davor Löffler (Berlin) characterized cultural evolution as a change in social realities.

The final half day was dedicated to a lively, and sometimes controversial, discussion in which the participants debated their varying perspectives. Different approaches addressed the notion of cultural development by attributing meaning to activities. Only through active engagement with different themes can we expect to find an explanation; but as our understanding improves, more options and their limitations are revealed. At least in an analytical setting, nature and culture, as well as biology and the humanities, can be clearly separated. However, from a pragmatic point of view, ROCEEH's broad research scope forces us to view these developmental transitions as gradual. As we observe aspects of activity and subsistence, as well as the formation of cultural meaning through material and social engagement, we see the strict separations dissolve. These approaches coupled with the examination of material and resource cultures provide an opportunity to make intercultural comparisons with groups without written or other language-based records. It became evident at the conference that interdisciplinary discussion on the development and role of culture in early expansions of humans is indispensable, not just to focus on the human essence, but also to emphasize the wide (pre-)historical dimension and the diversity of human lifeways within. Creative capabilities and the attribution of meaning are not restricted to the advent of visual art and music, but are also evident in the earliest tools produced for

a certain purpose. Neither creative capabilities nor any other criteria suffice to separate humans from animals. There are no general characteristics beyond time, but all have been developed, acquired, practiced, explored, adapted, and learned. ROCEEH's research question represents an extreme approach which takes the *longue durée*, and the answer is also relevant for the examination of current phenomena.

The five theses presented in ROCEEH's position paper show how the research center incorporates 'culture' in its multitudinous forms. As ROCEEH studies the cultural heritage of humans between 3 million to 20,000 years ago using its ROAD database, it incorporates empirical research about material remains and then reconstructs the contexts of activities. The project elaborates concepts for the study of 'becoming human,' especially with regard to range expansions. To accomplish these tasks, varied approaches and sources from different fields of research need to be integrated. Based on the feedback about the theses at the conference, we plan to revise the position paper, so it can serve as a foundation for developing the humanistic approach of the ROCEEH research center.

*Miriam Haidle, Michael Bolus, Christine Hertler*



▲ Figure 8. Participants of the "KULT-UR-MENSCH" Conference in front of the Heidelberg Academy of Sciences and Humanities.  
Photo: B. Schweigl-Braun.

## Conference Report

### 46th Computer Applications and Quantitative Methods in Archaeology "Human History and Digital Future"

Tübingen, Germany, 19–23 March 2018  
Organizers: Volker Hochschild, ROCEEH,  
Matthias Lang and the eScience Center

The annual Computer Applications in Archaeology (CAA) conference is one of the major events in the calendar of scholars, specialists and experts in the field of computing technologies applied to archaeology. This year's conference covered a wide range of applications in archaeology, with a focus on (geo-) databases, remote sensing, 3D modeling, agent based modeling (ABM), as well as simulation. The co-chairs, Volker Hochschild and Matthias Lang, announced that it was the largest CAA ever

held with more than 520 participants presenting 420 submissions in 40 sessions. This was the second time the conference took place in Germany, the first being in Berlin in 2007. Next year the conference will convene in Krakow, Poland.

Well-suited to one of the major subjects of the conference, “Remote Sensing in Archaeology,” Dr. Gunter Schreier from the German Aerospace Center (DLR) gave a keynote on “Earth Observation and the Copernicus Programme in Support to Archaeology and World Heritage Preservation.” Scientific highlights included the different 3D applications of photorealistic digital models of artifacts, buildings and monuments, for example, the virtual reconstruction of Palmyra, the recently destroyed cultural heritage site in Syria. Of relevance to the ROCEEH project, we noted that many presentations discussed lithic artifacts as cultural objects. The conference started with practical workshops in the computer pools. ROCEEH members Zara Kanaeva and Andrew Kandel introduced the ROAD database, while Christian Sommer and Adel Omran presented the use of Remote Sensing for Archaeology. Over the following three days, the ROCEEH team (Angela Bruch, Michael Bolus, Michael Märker, Christian Sommer and Nicholas Conard) organized four sessions. The session “Early human land use strategies during Middle and Late Pleistocene glacial and interglacial times in Europe“, chaired by Michael Bolus and Angela Bruch turned the spotlight on ROCEEH’s work. Michael Bolus spoke about Neanderthal tool diversity and mobility, Christine Hertler talked about expansions, and Ericson Hölzchen (see Who’s Who) presented about Neanderthals on the move. Christian Sommer and colleagues presented “Corridors or Barriers? A GIS model to classify biome distributions in the Late Pleistocene Europe,” within the Paleo-GIS session.

Several social events accompanied the conference, including an icebreaker at the Alte Aula, a reception at the castle’s Rittersaal (Fig. 9) with a guided tour through the exhibition of the oldest Paleolithic art, and a Swabian Bierfest at the University’s Mensa. The conference was followed by several excursions through southern Germany, one led by Nicholas Conard and his team to the UNESCO World Heritage Ice Age Caves of the Swabian Jura and the Museum of Prehistory in Blaubeuren. Parallel to

the conference, the annual meeting of ROCEEH’s scientific commission took place in the Castle Hohentübingen.

*Christian Sommer, Volker Hochschild*

## Conference Report

### “Images, gestures, voices, lives.

### What can we learn from Palaeolithic art?”

International Senckenberg Conference in Tübingen, Germany, 30 May–2 June 2018

Organizers: ROCEEH and Senckenberg Centre for Human Evolution and Palaeoenvironment

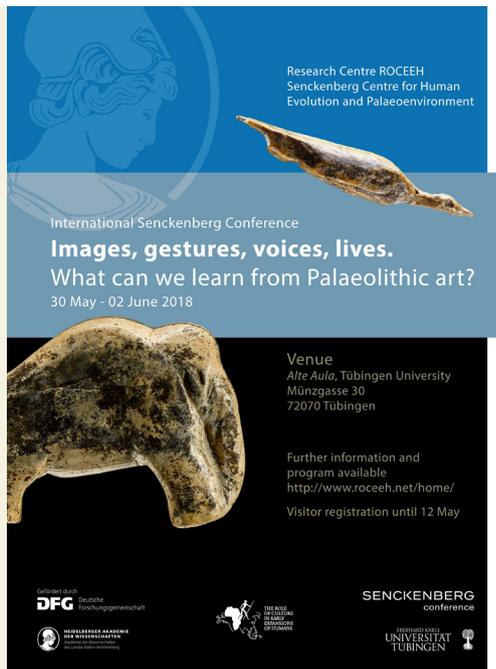
There can be little doubt that one of the most profound discoveries of European archaeology has been the discovery of the first painted Paleolithic cave at Altamira, Spain. In 1879 and inspired by Paleolithic decorated artifacts he had seen at the Universal Exhibition in Paris, Marcelino Sanz de Sautuola started excavations in a cave on his property in Cantabria. While he was busy excavating, his daughter Maria examined the roof of the cave and discovered those paintings which have similarly intrigued academic and general audiences. This discovery has fundamentally changed the understanding of the Paleolithic period and the perception of humanity’s deep past. Not surprisingly, the discovery also created a significant amount of controversy. This first encounter with Paleolithic cave art also has a tragic dimension, because its substantial antiquity was only accepted by the contemporary scientific community around 1900 and long after Sanz de Sautuola’s death. Since then, the existence of European Paleolithic cave paintings and figurative objects has been confirmed by thousands of well-dated and well-contextualized pieces of evidence. Some of the most recent discoveries in this respect have been made in cave sites of the Swabian Jura. These are not only among the earliest examples of figurative objects anywhere in the world; in 2017 they were also recognized as UNESCO World Cultural Heritage, which is both an acknowledgement of the importance of the finds themselves, as well as the long and intense research that has been conducted in the region.

The discovery and interpretation of European Paleolithic art continues to influence our perception of the human past and present in manifold ways. Since the acceptance of its antiquity, the phenomenon of Paleolithic art has impacted on a wide range of disciplines and fields with very different theoretical perspectives, orientations and views. It has been argued to reflect a uniquely human aesthetic sense of beauty and exclusively human capacities for cultural behaviors and cognition, often discussed in the context of human origins. Within the wider field of the humanities and social sciences as well as the public sphere, it has also shaped the notion of ‘art’ itself and has affected in complex ways the understanding of humanity’s past and present, notions of time and progress, and the definition of humanity itself. Paleolithic art has also intrigued many artists in their engagement with the breadth and depth of creative aspects of the human experience. To discuss the most recent perspectives within this research field, ROCEEH organized an international, interdisciplinary conference (Fig. 10) in



► Figure 9. Opening of the reception at the Rittersaal by Prof. Dr. Volker Hochschild. Photo: L.-S. Kurz.





▲ Figure 10. Aurignacian sculptures from Hohle Fels and Vogelherd promote the conference. Graphic: C. Groth.

cooperation with the Senckenberg Centre for Human Evolution and Palaeoenvironment (HEP). Supported by the Deutsche Forschungsgemeinschaft (DFG) and the Senckenberg Gesellschaft für Naturforschung, the conference took place at the Alte Aula of the University of Tübingen. The invited researchers (Fig. 11) presented their results in a total of 30 talks.

In his keynote lecture Nicholas Conard (Tübingen) elaborated on “Females, fish, fowl, flutes and the variety of artistic expressions in the Swabian Aurignacian”. He stressed the long and continuous research tradition in Southwest Germany that allowed the generation of a multilayered approach towards the art objects and many levels of contextualization. As such, the research so far allows unique insights into the lifeworld of the creators of the earliest figurative objects. Finally, it has confirmed the presence of the earliest known musical instruments in the form of complete ivory and bone flutes and many further fragments.

Together with the question “What can we learn from Palaeolithic art?” the conference title referred to “images, gestures, voices, lives”. These notions relate to the elements that are the foci of our scientific explorations. In the end, archaeology is not only about objects and material evidence. It is about the lives and their expressions, both in the past and the present, that have been lived around and with the material evidence that we now call art. How can we approach this evidence? How can we construct and reconstruct the relationships between images, gestures, voices and lives—both in the past and the present? The conference was structured to approach these questions in five sessions.

Session 1 – “The origins of the eternal quest for beauty.” Speakers: Ingeborg Reichle (Vienna), Harald Floss (Tübingen), Thomas Heyd (Victoria), Ulrich Pfisterer (Munich), Rémi Labrusse (Paris).

The first section dealt with questions around the significance of Paleolithic art in the context of the history of art and the understanding of the development of aesthetics. Art historians have been intrigued and puzzled by the antiquity and complexity of Paleolithic art for a long time. Like non-European ethnographic art objects, Paleolithic art continues to challenge the traditional schemes of Western art history. The contributions at the conference demonstrated that Paleolithic paintings and sculptures have been used by art historians to support Darwinian, as well as anti-Darwinian, arguments since 1900. Aesthetics remains an important approach to understand the manufacture, use and the (ancient and modern) perception of those objects. However, it is equally recognized that the Paleolithic gaze had many further dimensions. While Paleolithic figurative objects and paintings are generally met with strong emotions, these reactions must be viewed as the result of long acculturation processes leading towards the current deep appreciation of Paleolithic “art”. In this context, it is important that the work of several modern artists has been influenced by Paleolithic objects, which has, in turn, further affected the perception of Paleolithic remains.

Session 2 – “The challenge of materiality.” Speakers: Hans-Peter Hahn (Frankfurt/Main), Chris Low (Oxford), Peter Vang Petersen (Copenhagen), Shumon Hussain (Leiden), Olivia Rivero (Salamanca), Randall White (New York).

The second session examined the interrelationships between the study of Paleolithic art and more recent approaches in social anthropology and material culture studies. How should we engage with the materiality of Paleolithic art? In recent years, a range of disciplines have developed an increasing interest into the material dimensions of human existence and its ontological variabilities. This has inspired a reassessment of established anthropological concepts and notions, and a renewed engagement with indigenous worldviews. At the conference, it also became apparent that processes of production and stabilization of meaning need further assessment. These re-evaluations will have to engage with the agency of materials, dynamic processes of production and use, as well as the biography of objects that are entwined with the life-histories of human beings.

Session 3 – “Beyond evolution and history.” Speakers: Margaret Conkey (Berkeley), Oscar Moro-Abadía (St. John’s), Niels Weidtmann (Tübingen), Thomas Junker (Tübingen), Ewa Dutkiewicz (Tübingen), Duilio Garofoli (Tübingen).

The third session was designed to address the relationship between Paleolithic art objects and the origins of modern cognition and humanity. A core theme in Paleolithic archaeology has always been the question of human origins. Entangled in this field are notions of the definition of humanity,

human nature, the distinctions between history and evolution, as well as nature and culture. These aspects have a long history within the Western intellectual tradition and form (often unacknowledged) core elements of modern science. The speakers discussed if art objects—as traditionally defined—have any specific role to play in these contexts. They also discussed how art objects could be productively integrated into biological frameworks of explanation and a respective understanding of human evolution. Issues of the constitution of meaning, including social memory, and the representational qualities of so-called art objects were critically discussed.

**Session 4 – “Perception, practice and performance.”**  
Speakers: Inés Domingo Sanz (Barcelona), Adeline Schebesch (Erlangen), Antonio Batarda (Vila Nova de Foz Côa), Beth Vellicky (Tübingen), Andreas Pastoors (Erlangen), Tommaso Mattioli and Margarita Díaz-Andreu (Barcelona).

The fourth session engaged more closely with the gestures and voices that are mentioned in the title of the conference. How can we reconstruct the practices and performances that once created those objects that now constitute our archaeological record? In archaeological research, the producers and creators are absent; but they once existed in those empty spaces between images and objects. Objects were once imagined, created and watched. From the evidence from the cave sites in Southwest Germany, at least, we can also infer the presence of music through the presence of several flutes. The role of bodily sensorial experience and perception, the role of voices and sounds, has so far received relatively little systematic attention in the context of the study of Paleolithic art. However, at the conference, it became clear that there are various ways in which these aspects can be approached, through the reconstruction of soundscapes and contexts of light and darkness, references to ethnographic case studies and the comparative analysis of body techniques that are used by professional actors.

**Session 5 – “From digital documentation to meaningful analysis.”** Speakers: Tilman Lenssen-Erz and Oliver Vogels (Cologne), Christoph Steffens and Markus Steffens (Esslingen), Ewa Dutkiewicz (Tübingen), Jo McDonald (Crawley), Andrew Kandel (Tübingen) and Rimtautas Dapšauskas (Heidelberg), Richard Buffat (Vallon Pont d’Arc).

The fifth and final session engaged with questions surrounding the role of digital technologies in moving from documentation to analysis and interpretation. The recording and storage of artworks in digital form is indispensable today to support the ways researchers and the public engage with artifacts and artistic expressions. Researchers can easily share information and work on art pieces without touching the existing objects when they are able to access the appropriate digital data. In this session, we discussed how digital technologies can assist in the epistemological and methodological challenges of the interpretation of Paleolithic art. Again, case studies ranged from the detailed recording and presentation of the delicate statuettes from the Swabian Jura, to the monumental replication of the

famous Grotte Chauvet, to the continental-wide analysis of the origins of ochre use in Africa.

In summary, the conference moved between different scales of analysis and interpretation from microscopic studies of single objects to diachronic developments across whole continents. Generally, it was asserted that art as such is a problematic notion that has a complicated history and cannot be applied cross-culturally without problems. Objects that are usually regarded as “art” are participating in humans’ world-building and in processes of the creation and stabilization of meaning. In this context, it was generally acknowledged that so-called art objects need to be seen in contexts of dynamic performances of production, use and communication. Art cannot be reduced to material visual culture, but also has acoustic, haptic (kinesthetic) and other dynamic aspects. It can be linked to a wide range of performances and social purposes. The latter can include ritual-religious or more general aspects related to social cohesion, self-assurance, teaching and apprenticeship. These insights have demonstrated that “art” cannot be viewed as a unified phenomenon, but rather needs to be understood as a variety of processes that can equally embrace the mundane or extraordinary. Consequently, it remains difficult to pin this phenomenon down and even harder to assert that it is always connected to symbolic meaning. As mentioned above, the processes of the creation, communication and stabilization of meaning remain an area of debate and no unequivocal relationship between objects and cultural meanings can be assumed. These considerations clearly demonstrate that the idea of Paleolithic art has shifted considerably in the last decades. It is no longer connected to an idea of “fine art” that concentrates on objects of elaborate artistic qualities such as paintings and sculptures. The interest has now broadened considerably, and it equally embraces items such as personal ornaments and pigments in their own right.

The meeting closed on a high note. The participants agreed that many insights had been gained with regard to such a broad field of disciplines and new ideas surrounding Paleolithic art. They also agreed that if we want to continue in this spirit, it behooves us to get not only the archaeological and empirical basis right, but also the theoretical.

*Miriam N. Haidle, Martin Porr*



▲ Figure 11. Participants of the conference on Paleolithic art in front of the Alte Aula, Tübingen. Photo: B. Rey.

## Forthcoming

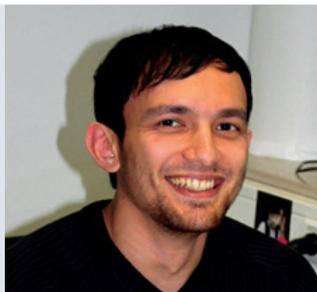
- **European Palaeobotany and Palynology Conference 13–17 August 2018** in Dublin, Ireland. Session “Cenozoic plant diversity gradients in time and space and their impact on early humans.” Organized by Angela A. Bruch, Alexandra-Jane Henrot, Louis François, Natalia Rudaya, and Torsten Utescher (ROCEEH/NECLIME). <http://eppc2018.ie/>
- **Interim colloquium of the Regional Committee on Mediterranean Neogene Stratigraphy and the European Union’s Pontocaspian Biodiversity Rise and Demise final conference: Ecosystem isolation and connection: rise and demise of biota in the Pontocaspian-Caucasian region 27–29 August 2018** in Tbilisi, Georgia. Session III “Neogene and Quaternary terrestrial ecosystems in the southern Caucasus.” Organized by Jordi Agustí, Angela A. Bruch, and Tom Hoyle. <http://pontocaspian.eu/content/pride-rcmns-conference-0>
- **METHOD IFG Training Lab 2018: Computational Models in Palaeolithic Archaeology and Palaeoecology and Workshop 2018: „We boldly went” - Advances and progress modelling the MPR 27–29 November 2018** in Burgos, Spain, organized by Ana Mateos and Jesús Rodríguez at the Centro Nacional de Investigación sobre la Evolución Humana (CENIEH) and co-organized by Christine Hertler and Maria Rita Palombo
- **METHOD Workshop 2018-6: „We boldly went” - Advances and progress modelling the MPR 28–29 November 2018** in Burgos, Spain, organized by Ana Mateos and Jesús Rodríguez at CENIEH and co-organized by Christine Hertler and Maria Rita Palombo

## Who’s who?

This issue: Viola Schmid and Ericson Hölzchen



Viola C. Schmid joined the ROCEEH Graduate Network in December, 2013. She is a PhD student in Early Prehistory at the University of Tübingen focusing on Middle Stone Age (MSA) lithic technology, in general, and the basal ‘serrates layers’ of Sibudu Cave, KwaZulu-Natal, South Africa, in particular. She worked for the ROCEEH team as a research assistant from 2014 to 2015, entering data into the ROCEEH Out-of-Africa Database (ROAD). Her academic career started at the University of Vienna, where she earned her undergraduate degree specializing in Paleolithic Archaeology. She continued as a graduate student at the University of Tübingen and completed her Master’s thesis on the Early MSA of Elands Bay Cave, Western Cape Province, South Africa. Furthermore, Viola gained much experience in the field at excavations in Austria, Germany, France, Italy, Czech Republic, Ukraine, United Arab Emirates, and of course, South Africa.



Ericson Hölzchen studied Bioinformatics at the Goethe University in Frankfurt and wrote his diploma about modeling the evolution of primate molars. Due to his

biological background and experience in computer science, he became interested in processing biological data with computers. Through his interest in human evolution and expansion he became involved with the ROCEEH Graduate Network in 2013, first as a research assistant and then as a PhD student. His research examines the mechanisms and main drivers of hominins as they move across landscapes. Moreover, Ericson is interested in the effect of different spatial and temporal scales on simulations. He uses agent-based modeling to simulate hypotheses about hominin expansion, where the agents represent hominins that interact with Pleistocene landscapes. Current modeling projects include the dispersal of hominins out of Africa, the occupation of Europe during the Mid-Pleistocene Transition, and Neanderthal mobility.

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