

Sickness, Hunger, War, and Religion from the Perspective of Archaeology, History, and Anthropology

Rachel
Carson
Center

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Sponsors: Rachel Carson Center, Staatssammlung für Anthropologie und Paläoanatomie München, Museum Mensch und Natur München

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A peste, fame et bello, libera nos Domine! (Save us from plague, hunger, and war, o Lord!)

For long periods in history, human life was dictated by sickness, hunger, war, and religion. These four aspects represent four significant determinants of human population development and formed the basis of this workshop.

This workshop was a joint initiative of the Prähistorische Anthropologie und Paläoanatomie (APPA), Arbeitsgemeinschaft der Gesellschaft für Anthropologie e.V., and the Rachel Carson Center for Environment and Society. While the APPA analyzed past populations with scientific methods, the Rachel Carson Center dealt with the interactions between humans and the environment from a humanities-based perspective. The workshop's participants thus aimed to establish an interdisciplinary perspective and explore new insights.

In order to realize this goal, two to four representatives from different scientific disciplines were asked to create panels prior to the workshop. From the exceptional numerous suggestions submitted, the scientific committee chose six topics to discuss and present. In addition to the panel pres-

entation, the program included sixteen ten-minute presentations in which recent studies in sickness, hunger, war, and religion were presented. The workshop's thirty-eight speakers hailed from eight different countries and represented diverse disciplines, including anthropology, archeology, history, microbiology, medicine, and genetics.

The workshop was attended by a remarkably large audience, not only from Munich universities, but also from diverse scientific institutes in Switzerland, Austria, and Germany. Overall, more than one hundred people attended the workshop.

At the beginning of the meeting, **Micheala Harbeck**, the second chair of APPA, **Christof Mauch**, the director the Rachel Carson Center, and **Michael Apel**, the conference's host and the director of the Museum Mensch und Natur greeted the attendees.

This first panel explored on the life and death of the pharaoh Tutankhamen (approx. 1332 - 1323 BC) and addressed related topics about the eighteenth dynasty and morbidity in ancient Egypt in the New Kingdom from the eighteenth to the twentieth dynasty. Representatives from egyptology and other scientific disciplines were scheduled to speak, but due to the current political situation in Egypt, three of the four speakers could not attend the workshop. The remaining speaker, **Albert Zink** (director of the Institute for Mummies and the Iceman in Bozen, Italy) delivered an exciting forty-minute presentation in which he discussed the latest interdisciplinary findings in the subject. With the help of genetics, for example, eleven royal mummies were examined to identify and analyze their familial relationship to Tutankhamen. Furthermore, different pathologies such as Köhler II and malaria could be diagnosed. Köhler II provides an explanation for contemporary depictions of the pharaoh that show him with canes. It also explains the presence of medication and walkers in his grave. Furthermore, a series of malformations discovered in other members of the family confirms the genetic findings that they had practiced incest. Another interesting aspect presented by Zink was the examination of Pharaoh Akhenaten (1351-1335 BC) for diseases that might explain his androgynous depiction in contemporary reliefs, statues, and sculptures. While Marfan syndrome or Wilson-Turner syndrome was long believed to have been responsible for his morphological appearance, scientists were able to determine that the pharaoh had not suffered from either of these diseases. It could therefore be concluded that Akhenaten's depiction in contemporary images were artistic rather than realistic. The subsequent discussion concentrated primarily on the latter topic and provided insights into art in ancient Egypt. Discussions also centered on the pharaoh's cause of death. It was concluded that the concurrence of infections like malaria and bone necrosis caused by Köhler II could well have led to the pharaoh's premature death.

In the next panel, **Heiko Prümers** (Commission for Archaeology of Non-European Cultures, Bonn), **Martin Trautmann** (A und O—Anthropologie und Osteoarchäologie, Praxis für Bioarchäologie Tübingen), and **Markus Ball** (Eberhard Karls Universität Tübingen, Institut für Humangenetik) discussed early Spanish settlements in Llanos de Moxos in Bolivia, concentrating particularly on the morbidity of the population. Heiko Prümers presented findings from Bolivia in an archeological and especially ecological context. The research region is situated in a savanna region where the soil is low in nutrients and unsuitable for agriculture, and made even more difficult by recurring floods. Traces of fauna, for example, suggest a wide spectrum of huntable animal species. Archeological artifacts, on the other hand, indicate corn cultivation in the historic settlement. A total of two hundred settlements of about five to ten hectares could be identified, in which the most remarkable features were twenty-three meter tall platform buildings in the settlements' center. Two settlements from the fifth to fourteenth century AD, Loma Mendoza and Loma Salvatierra, were discussed in detail. Martin Trautmann provided an overview of the population structure, focusing primarily on health. Research revealed little evidence of violence, no evidence of malnutrition, and a surprisingly high percentage of skeletal malformations indicating the presence of yaws, a tropical bacterial infection, or syphilis (or an earlier form of it). This is especially interesting because the geographical origin of these diseases is still unclear and there are different existing theories about their historical epistemology. Markus Ball examined the human remains with molecular and genetic methods in order to substantiate the morphologically derived diagnosis. In six out of forty-five cases, he was able to find evidence of a pathogen. Here, it is interesting to note that the pathogen was largely identified among those skeletons that showed no specific morphological malformations. The pathogen that Ball found could be identified as *treponema palladium*, which confirmed the hypothesis that syphilis had been present. The discussion that followed concentrated primarily on Ball's examination and the general possibility of finding evidence of pathogens in ancient DNA.

Another panel dealt with how hypothyroidism, or an underactive thyroid, can be seen from an archeological, anthropological, historical, and clinical perspective. **Frank Rühli** (Institute of Anatomy, University of Zurich) provided a survey of how an underactive thyroid is understood from a medical point of view. One common cause of hypothyroidism is iodine deficiency, which is especially common in Alpine regions. Iodine deficiency manifests as cretinism. Aside from the formation of a goiter, the bone structure experiences various developmental problems such as impairment of physical development or retarded growth. In her presentation, **Christina Papageorgopoulou** (Johannes Gutenberg University Mainz) discussed an exemplary case in medieval Switzerland where it was possible to detect this disease in the skeletal remains found in historic settlements. Papageorgopoulou's study is the first to deal with hypothyroidism in a historical context. Her approach allows for the detection of this disease in a population that left behind no written historical sources.

Environmental historian **Kaspar Staub** (Institute of Anatomy, University of Zurich) explored the history of the fight against iodine deficiency with the production of iodized table salt in the twentieth century. Based on historical sources, Staub drew a connection between height and the manifestation of a goiter as a consequence of iodine deficiency. The discussion that followed explored the possibility of detecting diseases in skeletal remains, and the effect of a disease on a population.

In epidemiology, the origin and spread of the plague is a new research area that benefits from the study of both historical and archeological sources. Recently, the spectrum of methods through which to study the topic has expanded considerably with the molecular genetic analysis of both current and historic plague pathogens. Nevertheless, the scientific community continues to dispute whether or not the *Yersinia pestis* bacterium was actually the cause of all great plague epidemics. How the plague's spread and epidemiologic path affected the course of history is also unclear. Because this subject is topical and can be approached from many different perspectives, six researchers from diverse disciplines found themselves on this panel. First, **Barbara Bramanti** (Johannes Gutenberg University Mainz) introduced the topic. She explained that there were three great pandemics in human history: the Plague of Justinian in the sixth century BC, the Black Death in the Middle Ages, and the Plague in the nineteenth century. Barbara Bramanti's working group is attempting to test the hypothesis that the great plague pandemics were responsible for the uneven prevalence of certain protective genetic variants in Europe. In order to test this hypothesis, plague victims must be carefully identified. This is especially difficult since historical accounts do not specify the reason for mass graves during the plague, and the fact that the disease does not leave visible traces in skeletal remains. **Raffaella Bianucci** (University of Turin, Italy) discussed the form of burials for plague victims. She concentrated specifically on the different types of burials in the country and in urban centers: While cities preferred mass graves in the event of a plague epidemic, the number of deaths in the country was significantly lower, so that the burial of plague victims often followed a normal pattern and is therefore undistinguishable from "normal" graves. **Stefanie Hänsch** (Johannes Gutenberg University Mainz) was able to find traces of *Yersinia pestis*-specific DNA in possible plague victims and classify them with molecular genetics. With this data, it could be confirmed that *Yersinia pestis* was, in fact, the pathogen that had caused the Black Death in the Middle Ages. **Mark Achtman** (University College Cork, Ireland) focused primarily on the evolutionary development of *Yersinia pestis*. With the help of molecular-genetic research on modern *Yersinia pestis* strains, he had been able to trace the origins of the bacterium to China. Achtman found that the bacterium had spread from east to west. Furthermore, it was found that modern strains of the bacteria could not be more than 2,600 years old. Historic sources presented by **Ole Benedictow** (University of Oslo, Norway) contradicted these findings. Benedictow pointed out that there are descriptions of plague epidemics as early as 3,200 years ago. He also doubted that the plague had originated in

China, as there is no mention of the disease in historic sources. The contradictions between the historical and genetic knowledge base led to a heated debate, and suggested the need for an interdisciplinary approach to the issue. **Elisabeth Carniel** (Institut Pasteur, Paris, France) provided an overview of the current status of plague illnesses around the world, presented the most common recent paths towards infections (for example in the United States the most common carriers are cats), and gave a visual demonstration of the possible nature of the disease.

Dušan Borić (Cardiff University, Great Britain) and **Marija Radović** (Belgrade University, Serbia) presented an example that demonstrated morbidity, nutrition, and lifestyles of a prehistoric population. Their analysis focused on archeological findings on Mesolithic and Neolithic populations (especially Lepenski Vir and Vlasac) along the Danube near the so-called “Danube Gorges.” Central to the discussion was how the populations’ health and habits transformed their economies from those of appropriative societies into those of a producing society during neolithization. In order to analyze this transformation, individuals from three different eras—the Early Mesolithic Period, the Late Mesolithic Period, and time of transition towards the Neolithic period—were examined. Marija Radović investigated the oral health of the human remains. By identifying the frequency of caries and enamel hypoplasia, the team was able to draw conclusions regarding the health of the population, which varied among the population. It was found that Neolithic people’s teeth had fewer stress-related characteristics in them than today’s population. Archeologist Dušan Borić presented findings from research on the populations’ diet obtained with isotope analyses. Here, it is important to note that a significant change in sustenance took place: While Mesolithic populations’ diet was based on aquatic animals like fish; the amount of seafood consumed by people in the Neolithic period was decidedly lower. These findings are particularly important because they represent one of the only insights into people’s lives during this period. Borić also introduced **Sofija Stefanovic**, who due to health reasons could not travel to Munich. Her research, which explored pathological changes in thirty skulls from the aforementioned archeological sites near the “Danube Gorges,” showed evidence of infection, most likely cases of trepanoma-related diseases.

The topic of “war” was addressed by a panel that explored the remains of an ancient battlefield on Kalkrieser Mountain near Osnabrück, from an archeological, anthropological, and historical perspective. The panel was composed of three speakers: **Birgit Großkopf** (Göttingen University), **Susanne Wilbers-Rost** (Museum und Park Kalkriese), and **Achim Rost** (Osnabrück University). The speakers convincingly explained how the discovery of this site linked the Kalkrieser Battle to the historical Battle of the Teutoburg Forest in nine BC, during which the twelfth, thirteenth, and fifteen legions as well as three alae and six cohorts of the twelve to twenty thousand man troop were annihilated by the Teutons in a narrow pass of about thirty square kilometers between a foot-

hill and a moor. Further scientific research concentrated above all on the consequences of the battle. Human skeletal remains were exclusively found in this site, a topic which was addressed by Birgit Großkopf. Despite the fact that the remains were poorly preserved, it was clear by their condition that they had not been burned, as was Roman tradition. Instead the dead were deposited into mass graves, which confirms Tacitus's report concerning a later burial of the victims during Germanicus's visit to the battlefield in fifteen BC. Susanne Wilbers-Rose presented the archeological findings at the Kalkriese site, concentrating particularly on a wall complex that had partially collapsed during the battle, and that was most-certainly a result of the Teutons' ambush. Details of the battle could be ascertained through the discovery of well-preserved donkey skeletons and harnesses where the wall had collapsed. Using the example of Kalkriese, Achim Rost concluded that one cannot determine the intensity of a battle based solely on the number of military personnel, and that other factors, such as looting, body-stripping, the decay of metals, the recovery of fallen soldiers and their armor, also affect the overall picture of an archeological battle site. With this observation, Rost gave new impetus to battlefield archeology. The Kalkriese site also indicated the tendency to collect and recover re-usable objects. Furthermore, Rost drew connections to archeological excavations of antique, medieval, early modern battle sites in Europe and the United States.

These major case studies were complemented by a series of short presentations that provided an overview of current projects and results in different locations in the German-speaking world. The topic of "sickness" was addressed by a series of presentations. Where **Ingrid Wiechmann** (LMU Munich) examined the successful search for proof of plague pathogens in individuals found in a medieval mass grave in Bavaria, **Lisa Seifert** (LMU Munich) discussed the possibility of detecting tuberculosis pathogens. **Anna Zipp** and **Phillip von Grumbkow** (Göttingen University) examined a mass grave in Kassel from the early nineteenth century from which they could identify individuals as Napoleonic soldiers. Especially interesting was the discovery of molecular-genetic evidence of typhus pathogens (*Bartonella quintana*) that led to epidemics during Napoleon's Russian campaign in 1812. **Gerhard Hotz** (Naturhistorisches Museum Basel; Institut für Prähistorische und Naturwissenschaftliche Archäologie, University of Basel) and **Jürgen Mischke** (Deutsches Seminar, University of Basel) presented the very rare discovery of a dog's tapeworm cystercercosis in the remains found in the medieval graveyard in the Barfüßerkloster in Basel. This discovery was placed within a larger interdisciplinary attempt to determine the general health and hygiene conditions in Basel during this time. **Loukas Konstantinou** presented the discovery of a poros-sarcophagus from Eleusis, Greece, analyzed the human remains found therein, and speculated upon the cause of death. The topic of "hunger," which included nutrition and ecological issues, was taken on by a series of different speakers. **Ferdinand Neuberger** (LMU Munich) was successful in finding evidence of incidents of famine based on the analysis of hair in historic and contemporary individuals. **Olaf**

Nehlich (Max-Planck-Institute Leipzig), **Gisela Grupe** (LMU Munich), and **Andreas Rott** (LMU Munich) addressed the benefits and inherent difficulties of isotope analysis (especially of sulfur) in reconstructing a population's nutritional patterns based on the examination of individuals from historic cemeteries. A series of presentations explored examples of prehistoric and historic battles. Through anthropological analysis, **Steve Zäuner** (Eberhard-Karls-Universität Tübingen) confirmed that a battle had led to the destruction of the Chalcolithic settlement of Junacite in Bulgaria at the end of the fifth century BC. **Christine Cooper** (Referat Denkmalpflege und Archäologie, Fürstentum Liechtenstein), on the other hand, showed how by studying the traumatologic characteristics of human skeletons from the late medieval Battle of Dornach in 1499, scientists have been able to determine which weapons caused the trauma found among individuals. **Alexander Lutz** (LMU Munich) presented his research on two mass graves from the Thirty Years' War, and **Bettina Jungklaus** (FU Berlin) showed how she was able to identify medieval graves on the castle fortress in Lebus near Frankfurt/Oder as victims of the historically recorded local bishop's feud in the thirteenth century. **Nadine Carlichi** (LMU Munich) introduced a new methodological approach to examining trauma-related fracture lines in skeletal material. In their presentation of their research on early and Middle Bronze Age graves from the Munich gravel planes, **Ken Massy** (LMU Munich) and **Nadja Hoke** (LMU Munich) addressed religious aspects that can be observed in different forms of grave construction and treatment of the dead. **Barbara Teßmann** (Freie Universität, Berlin) presented her findings derived from the anthropological analysis of skeletal remains from Monkodonka and the burial mounds of Mušego in the Middle Bronze Age. The speaker concentrated specifically on whether the remains they found were from an elite class, and from which religious dimension they came. **Harald Stadler** (University of Innsbruck) discussed an interesting single grave occupied by a woman in Tarrenz, Tirol. He showed how based on various characteristics, he was able to identify her as a healer from the early seventeenth century who had been hastily buried facing downwards, and who was possibly the victim of a ritual or superstition-based killing.

During the course of the workshop, the participants discussed the problems that surround cooperation across different disciplines. Individual interpretations and evaluations of research in a foreign discipline without intense cooperation often leads to miscalculations due to the substantial difference in methods across different disciplines. Based on several case studies, the workshop emphasized the extremely promising potential of interdisciplinary analysis of historical questions. Case studies like those in ancient Egypt and the Battle of the Teutoburg Forest show that a synthesis of historical, archeological, and anthropological research can lead to exciting new insights. And the possibilities of this synthesis are far from exhausted! Particularly the natural sciences and new molecular genetic methods will facilitate great improvements in historical epidemiology research. In this workshop, a first step towards these improvements was demonstrated in research on the plague,

syphilis, typhus, and tuberculosis. New questions inspired multidisciplinary research in which historical tradition and scientific findings contradict one another, such as in the case of the analysis of the epidemiology of the plague. Cases like these elicit more in-depth research in the respective field in order to encompass the complexity of the research and achieve a synthesis in line with different disciplines.

-- *Michaela Harbeck, Kristin von Heyking, and Heiner Schwarzberg*