

In summary, the session focussed on medieval and post-medieval processes of colonisation and colonialism, with papers seeking to compare the indigenous population with the incomers through the varied lenses of a suite of archaeological and environmental data. The indigenous communities of these colonised landscapes were visible to different degrees – and of course in virtually all cases the historical sources relating to these events were produced by the conquering societies – underlining the relevance of all forms of archaeological material in providing the conquered with a voice, whether in the form of their physical remains, artefacts, buildings or their essential relationships with the surrounding landscape, its animals and vegetation.

## **Integrated novel applications for dietary reconstructions in prehistory**

Domingo C. Salazar-García ([domingo\\_carlos@eva.mpg.de](mailto:domingo_carlos@eva.mpg.de)), Cynthianne Debono Spiteri ([cynthianne\\_spiteri@eva.mpg.de](mailto:cynthianne_spiteri@eva.mpg.de)), both Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany, and Beatrice Demarchi ([beatrice@palaeo.eu](mailto:beatrice@palaeo.eu)), Departments of Archaeology & Chemistry, University of York, York, UK

A broad range of biogeochemical techniques encompassing a wide array of disciplines is successfully being used to address key questions in archaeological research, including chronology, migration, trade, palaeopathology and palaeoenvironmental reconstructions. The aim of the session was to focus particularly on the developments in palaeodietary studies, which inform about population dynamics and socio-cultural characteristics of different communities over space and time. Biogeochemical techniques in particular have shown a remarkable adeptness at acquiring data from a variety of archaeological substrates, such as ceramics, lithics, textiles, sediments, plant remains, and human and animal tissues, including dental calculus. These techniques allow an intensive exploitation of archaeological material, especially organics, which are often preserved in small quantities and would otherwise not have been considered viable for analysis. The success of this approach is attested by the wide range of publications detailing the development and application of novel techniques, targeted towards answering fundamental archaeological questions. This was also reflected in the broad range of analytical methodologies presented during the session, which comprised bulk light and heavy stable isotope analysis that allows a better understanding of the composition of ancient diets, characterization of foodstuffs absorbed within ceramic vessels using lipid residue analysis, identification of protein sequences informing on dietary deficiencies, studies on microbial communities associated with the production of specific food types, and microscopic techniques used on teeth and dental calculus to recover palaeodietary information.

Isotopic analyses are nowadays at the forefront of archaeological dietary research, and indeed, we had a considerable number of contributions showcasing both traditional and novel isotopic methodologies applied to archaeology. Palaeodietary data obtained using well-established stable isotope analysis on bone collagen was presented from different time periods and regions of Eurasia. At the Late Neolithic site of Gougenheim in northeastern France, carbon and nitrogen isotope ratios showed a higher diversity of food sources being consumed by women as opposed to men, and an unexpected overall similar diet between two distinct burial subgroups. Bulk carbon and nitrogen stable isotope analysis carried out on bone collagen from individuals buried at four different Italian sites located in three different regions, but all dating to the Bronze Age, showed that food choices varied according to the local environment. A small contribution from marine protein was evident at coastal sites, and it was possible to identify the gradual expansion of C<sub>4</sub> plants<sup>1</sup> from northern to southern Italy. In medieval Central Russia, the diet of pre-Mongolian urban and rural populations was compared using carbon and nitrogen stable isotope analysis, and results showed a greater meat consumption in urban locations than in villages, where vegetables were the main dietary staples. A higher diversity in diet between males and females in rural locations was also observed. Using the same technique, a diet based on fish, reindeer and seal was identified at the medieval site of Ii Hamina in northern Finland; however, the input from the different food resources was found to vary between the different individuals studied, and also over their lifetime. One

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<sup>1</sup> Plants in which the CO<sub>2</sub> is first fixed into a compound containing four carbon atoms before entering the Calvin cycle of photosynthesis; these are mainly plants adapted to more arid conditions, like maize or millet.

paper looked at the potential of using nitrogen isotopes from bone and dentine samples to detect breastfeeding and weaning in a Great Moravian population, while another study utilized the same approach on both human and animal bones to track millet consumption across the Eurasian steppe. The limitations of using nitrogen stable isotope analysis on bulk collagen to predict the relative contribution of animal and plant protein to the diet was questioned and experimentally assessed in another study. Results showed that using nitrogen isotope values obtained from specific amino acids provides a higher resolution dataset than bulk collagen, which can be influenced by offsets in the nitrogen values of the plants consumed. New software was presented (FRUITS), which applies Bayesian statistics on isotopic data to construct mixing models that quantify the proportion of different components in the diet. A novel approach introduced the potential of carrying out isotope analysis on heavy metals, namely copper, iron and zinc, and provided promising experimental proxies that were tested on plants, herbivores and carnivores from South Africa to use these elements as new palaeodietary indicators.

Dairying was also a key theme in the session, in which four papers and one poster presented were directly targeted at identifying pastoral activities and the consumption of dairy products in prehistory. The onset of pastoralism has more recently been shown to coincide with the start of the Neolithic, rather than being a later development. This, combined with ongoing research into the occurrence of lactose persistence and the spread of agriculture, has pushed studies on dairying to the forefront of current research. Consequently, it is necessary to continue to improve the analytical techniques available and develop new approaches, to securely and unequivocally identify the consumption of dairy products, and potentially increase our accuracy in determining identification down to species level. Five analytical methods were showcased, each focused on identifying prehistoric evidence for dairying. A novel approach, based on the use of stable calcium isotope ratios obtained from tooth enamel in sheep molars, shows that  $^{44/42}\text{Ca}$  isotope measurements could securely identify different phases of tooth development (*in utero*, birth and weaning), and can therefore be used in the identification of pastoral husbandry practices. The potential of studying the co-evolution of human milk use and microbes involved in fermentation processes was also explored as a viable approach to identifying the consumption of milk products. Multidisciplinary approaches using pottery use-wear analysis, ethnographic analogies and lipid residues were used to identify milk residues from Late Vinca settlements in Central Siberia and the Early Neolithic site of La Draga in Catalonia. Evidence for cheese production was also shown through the application of lipid residue analysis on ceramic sieves dated to Early Neolithic settlements in Central Europe, confirming their original interpretation as ‘cheese strainers’. Analysis of food crusts from Neolithic ceramic vessels in northwestern Russia using lipid residue analysis further highlighted the versatility of this technique in identifying evidence for processing animal and plant products. Results obtained by carrying out immunological tests (ELISA) on protein residues were also reported from a wide range of food products present in ceramic vessels from the Czech Republic.

Teeth and dental calculus also provide an excellent dietary archive. A presentation combining both mesowear and microwear analysis on ungulate teeth from the Middle Palaeolithic levels of Teixoneres cave (Spain) provided valuable information on ungulate behaviour, which was useful in detecting seasonal procurement of such game by hominins. Analysis of dental calculus obtained from individuals in Neolithic Iraq, and Medieval and post-Medieval Lithuania, highlighted the potential of using trapped phytoliths, starches and pollen for understanding patterns of oral hygiene, diet, food processing and craft activities. The integration of microfossil and biomolecular analyses on calculus and food residues on pottery, combined with data from a range of elemental stable isotopes from skeletal remains, is beginning to paint a clearer picture of peoples’ diet in different parts of the world – however, what about dietary deficiencies, often with pathological consequences? This issue was addressed by one of the final talks of the session, where new research presented showed that the building blocks of bone collagen can act as an archive of diet-related diseases, such as scurvy, even in the absence of visible pathological lesions on the bones themselves.

It is clear that technological and methodological advances in the last two decades have brought on a “revolution” in palaeodietary reconstructions. The field is flourishing, with applications now encompassing a wide range of periods and places. We have come a long way in integrating science in archaeological research, and both disciplines have been successfully combined in research agendas, but there is still a need to strive to improve on this communication, and not let our guard down. An awareness that different traditions of archaeological theory and discourse exist at both European and world-wide level is a crucial aspect for the future development of archaeological science. Different modes of practice, training and teaching, access to equipment and resources, and different topical archaeological questions will impact

the way scientific techniques will be used to advance knowledge of the past. This is bound to create a rich and vibrant exchange and to lead to exciting discoveries; to ensure that this happens in the shortest timescales and with maximum profit, open dialogue, engagement and *integration* will need to be pursued. Our session was exemplary in this respect, a showcase of novel techniques and approaches to address relevant archaeological questions, which also have great impact on present society. This impact was highlighted in the discussion that followed the presentations: a community of people, not engaged directly with archaeology, is nonetheless following the outcomes of our research very closely, because *they want to know what to eat today*.

An example of such an attentive audience is the Ancestral Health Society, who strive for health reform and whose purpose is “fostering interdisciplinary collaboration and translational efforts between scientists, healthcare professionals, and laypersons that study and communicate about the human ecological niche and modern health from an evolutionary perspective to develop solutions to our current health challenges. [...] Modern humans suffer from numerous diseases linked to the metabolic syndrome, such as diabetes, yet these health maladies were virtually nonexistent during most of our ancestry” (<http://www.ancestralhealth.org/about>). The Paleo Diet movement (<http://thepaleodiet.com>) also prescribes eating “everyday, modern foods that mimic the food groups of our pre-agricultural, hunter-gatherer ancestors”, in order to “optimize your health, minimize your risk of chronic disease, and lose weight”. Such a direct transposition of “prehistoric diet” to “everyday diet” may be fraught with misunderstandings and therefore it is our duty to ensure clear and honest communication of our findings, their meaning and the limitations of our interpretations, to the wider public.

## Children in prehistoric and historic societies

Paulina Romanowicz ([paulina.romanowicz@wp.pl](mailto:paulina.romanowicz@wp.pl)), University of Szczecin, Poland, and Aija Vilka, University of Latvia

There is no doubt that children were present in each past society even if their presence is so poorly visible in the archaeological record. While archaeologists increasingly seem to consider this phenomenon, still archaeological data are poor. Organizing a session on children in prehistoric and historic societies we wanted to give the youngest and quietest participants of the past their rightful place among the members of their cultures. The aim of this session was to bring together ideas and data to develop a European overview of childhood and the role of a child in past societies.

The session was held on 6 September, organized by Aija Vilka and Marta Chmiel, Katarzyna Orzyłowska and Paulina Romanowicz, all from University of Szczecin. All four are PhD students working on theses related to the archaeology of childhood and children. During the session 18 papers and seven posters were presented. Authors came from various places in Europe: the Russian Federation, Germany, Denmark, Greece, Latvia, Poland, France, Croatia, Lithuania, Czech Republic, United Kingdom, Hungary, Switzerland, Italy, Slovak Republic, Romania – as well as the Republic of Korea. The presentations covered a wide array of periods, cultures, and topics, based on up-to-date methods and theories in childhood research.

The session was opened by Paulina Romanowicz. Each part was moderated by her together with Marta Chmiel and Aija Vilka. The papers were scheduled in counterchronological order, from those on the early modern period back to 500 000 years ago. Not surprisingly, most authors based their speeches on the analysis of children burials, but we were happy that some of the papers referred to artefacts and their connection with children, showing that we can research childhood not only through burials, but also in a different household objects, such as toys or flint tools, that were used and made by them.

The first papers concerned children in early modern to early middle ages. We learned about the accumulation of newborn graves in medieval burial grounds (Martin Čechura), anthropological analyses of skeletal remains from children's graves in comparison with grave goods (Doris Gutschmidt-Schumann), the position of children in medieval and post medieval urban society (Lene Høst-Madsen), and short grave pits as a child burials' indicator (Aija Vilka). The afternoon papers concerned prehistoric children. Beginning from the invisibility of children in the Wielbark culture (Marta Chmiel), through defining the social status and communal role of children in the Sarmatian tribes (Kornel Sóskuti) and describing the sociological consequences of child's death visible in archaeological data in the Latène Period in Switzerland (Ursina Zweifel), finishing with the analysis of biface knapping and the hypothesis that the worst products belong to children from the Acheulean (Mathieu Leroyer).