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European Society for the Study of Human Evolution 2017: old sites, new methods

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Title: ESHE 2017: Old sites, new methods

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The seventh annual meeting of the European Society for the Study of Human Evolution (ESHE) was held in Leiden, the Netherlands, from 21-23 September 2017. The evening before the conference began, Dr. Marie Soressi from Leiden University gave a public lecture on "Neandertals and us: news from our ancestors, and why it matters," with the stated goal of promoting the broader research interests of the society to the general public. This effort was clearly appreciated as the event was sold out.

The meeting commenced on Thursday morning. The audience of roughly 350 enjoyed the purple velvet seats and seamless organization offered at the Stadsgehoorzaal, a lovely neo-Renaissance theater and concert venue in the city center. As at previous ESHE meetings, there were no concurrent sessions, allowing the participants to see all 43 podium presentations and 27 Pecha Kucha talks. The 148 posters were on display throughout the meeting.

J. Jaubert (U. Bordeaux) led off with a presentation of new data on the circular structures found in Bruniquel cave. The circles and other structures were made exclusively from stalagmites, not stalactites, and included several hearths in which burned bone has been found. This was the first talk of several that focused on key archaeological regions and research projects. N. Conard (U. Tübingen) presented the past 21 years of excavation in the Swabian region of Germany, where several important sites with many key aspects of the Aurignacian, such as carved figurines and bone flutes, have been discovered. K. Harvati (U. Tübingen) discussed the results of an early-stage project in Greece that is providing some of the first evidence of Neanderthal occupation in the area, and that will now work to better contextualize the environmental conditions under which this area was occupied. A. Kruger (U. Witwatersrand) presented claustrophobia-inducing footage of the Rising Star Cave excavation, specifically the Dinaledi Chamber, where spatial data from a large number of hominin bones were collected using a combination of photogrammetry and laser scans. D. Adler (U. Connecticut) focused more specifically on the stone tool evidence from several sites in the Southern Caucasus, which suggests in-place development from the Lower to the Middle Paleolithic rather than importation of Levallois technology due to demographic shifts.

As in past years, there were several presentations on the development and application of new methods. Two ancient DNA papers explored Neanderthal diversity and behavior. M. Hajdinjak (Max Planck Institute for Evolutionary Anthropology) documented the recovery of Neanderthal and early modern human mitochondrial DNA from a large number of central and western European sites, and

suggested less structure within the Neanderthal mitochondrial genome than previously thought. V. Slon (Max Planck Institute for Evolutionary Anthropology) further discussed the importance of recovering DNA from sediments. This non-destructive means of obtaining hominin DNA also provides interesting information about hominin behavior; her results showed even more conclusively that Neanderthals and Denisovans swapped houses at least three times at Denisova Cave. As a complementary approach to ancient DNA, T. Higham (Oxford U.) emphasized the value of ancient protein analysis in a large-scale study of over 4000 nondiagnostic bones from Denisova Cave in Russia and Vindija Cave in Croatia, where taxonomic species differentiation of two, previously unidentifiable, Neanderthal bones was possible through collagen peptide mass sequencing.

New dating methods and results also made some big advances. A presentation by T. Devière (Oxford U.) on new direct single-amino acid radiocarbon dating of Neanderthal specimens from Vindija indicates these individuals were older than previously thought, predating the arrival of early modern humans to Europe. M. Frouin (Oxford U.) presented new dates from the recent re-excavation at Shanidar Cave in Iraq, where new thermoluminescence and optically stimulated luminescence dates were used to confirm the previous radiocarbon ages for the upper levels, and provide a clearer timeline for the Mousterian deposits and Neanderthal remains. By directly dating bone points, R. Hopkins (Oxford U.) revealed that, in several sites in east-central Europe, Early Upper Paleolithic split-based points were always older than lozenge-shaped points. D. Hoffman (Max Planck Institute for Evolutionary Anthropology) presented new methods for providing bracketing dates for cave art, without disturbing the art itself, by dating the under- and overlying calcite crusts. M. Duval (Griffith U.) explored the effect of micro-CT scanning of fossil dentition on Electron Spin Resonance (ESR) dating. Their analysis showed that the radiation from scanning can have a significant impact on the ESR age, and that researchers should consider these risks before scanning.

Several discussions of morphology and behavior stood out among the presentations. D. Raichlen (U. Arizona) used data from a study of the walking pattern and resultant footprints among modern humans to interpret footprints from Laetoli. This results suggested that by 3.6Ma, the hominins at Laetoli used a modern-human-like straight-leg walk. In contrast, comparisons of Neanderthal hand bone trabeculae to those of modern human groups by N. Stephens (Max Planck Institute for Evolutionary Anthropology) suggested that they engaged in very active behaviors, likely related to tool-use, unlike that of most modern humans. F. Landi (Hull York Medical School) examined the locomotor behavior and measurements of the position of the foramen magnum across several hierarchical groups within the Primates, and found no correlation in any grouping, suggesting that these measurements cannot inform us about locomotion. T. Smith (Griffith U., Harvard U.) summarized a

considerable body of work combining barium/calcium isotope ratios with enamel developmental microstructure analysis in teeth, in order to document the age and pattern of weaning in both living primates and fossil hominins.

Virtual reconstructions and geometric morphometrics were frequently applied to evaluate morphology in incomplete fossil remains. D. García-Martínez (National Museum of Natural Sciences, Spain) used a combination of ribs from modern humans (adult and juvenile) and chimpanzees to virtually reconstruct the ribcage of Nariokotome boy, and consider how further rib development might affect the shape of the fully developed adult ribcage of *H. erectus*. P. Arnold (Max Planck Institute for Evolutionary Anthropology) conducted virtual experiments on Neanderthals and Neolithic modern humans to assess neck mobility in these species, with Neanderthals showing a decreased range of motion compared to the modern humans. A body mass estimate for Lucy was provided by T. O'Mahoney (U. Manchester) using virtual reconstructions specifically focused on the shoulder, thorax, and pelvis.

Finally, dietary behavior was another major topic. O. Paine (U. Colorado Boulder) presented nutritional and mechanical data on a variety of African grasses, and argued that some of them could have been good food sources for early hominins, including *Paranthropus*. M. Will (Cambridge U.) compared Neanderthal and Middle Stone Age modern human use of coastal sites and marine foods, and concluded that both groups made regular use of these resources; the only difference being that modern humans did so more frequently. E. Reuveni (Bar-Ilan U.) used publicly available exomes from Neanderthals and modern humans to identify genetic adaptations that allowed the Neanderthals to dispose of waste products due to the consumption of excess protein and fat, indicating adaptations to a large-game-dominated diet.

EHSE offers 1500€ prizes for the best student poster and Pecha Kucha presentation. This year's winner for the poster prize was J. Beier (U. Tübingen), for her project, "Skull trauma probabilities in Neanderthals and Upper Paleolithic modern humans". She tested the idea that Neanderthals had more dangerous lives by comparing the frequency of lesions on multiple skull fragments while accounting for the degree of preservation of the bones. There were no significant differences in trauma patterns between the two groups, suggesting that Neanderthals were no more prone to traumatic skull injuries than modern humans. The best Pecha Kucha prize was awarded to A. Sorenson (Leiden U.), for his project, "MTA bifaces used as percussive fire-making tools by late Neanderthals." He analyzed the use-wear and residue left by a variety of hard-object percussive activities, and concluded that the wear patterns on the flat surfaces of MTA bifaces matched only those from use as a "strike-a-light". The

prevalence of such wear patterns in many MTA sites across Western Europe indicate a broad-spread and persistent fire-making technology among the Neanderthals.

After three intense days of presentations, the closing party was held in the foyer of the National Museum for Antiquities (Rijksmuseum van Oudheden). The participants enjoyed Indonesian food at the steps of a striking Egyptian temple to the goddess Isis, and were treated to the recent (re-)acquisition of a spectacular Bronze Age ceremonial dirk, which had its own unique history of loss and recovery by the Dutch. Those who had signed up for the excursion did not have to travel far; in small groups, the attendees were able to see original material from the Dubois excavations of Trinil, including the skull cap, femora, engraved shell, and excavation notes, at the Naturalis Museum just outside of Leiden city center.

The next ESHE meeting will be in Faro, Portugal from 13-16 September, 2018. Abstracts and meeting information can be found at www.eshe.eu

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