Software® revealed a system of three to four individual ethmoidal cells on each side of the skull. The most anterior ethmoidal cell was usually also the largest, and may the ethmoid bulla, found in 70% of humans. One female skull showed an exceptional extension of an ethmoidal cell along the orbital floor. This enlargement of an ethmoidal cell in the space between the maxillary sinus roof and the orbital floor is also known as ethmomaxillary sinus or Haller cell, and occurs in 8% of humans. This is the first report, to our knowledge, of a Haller cell in any non-human primate. Apart from the fact that this finding is valuable for the understanding of the pathogenesis of certain sinus diseases in non-human primates, it suggests that certain anatomical variants of the paranasal sinuses known to date only from human anatomy may also occur in non-human primates. In particular, however, this study points to the need of caution in the interpretation of certain ridges, observed in partially broken fossil skulls, as distinct feature of a particular paranasal sinus.

Mitochondrial DNA origins and affinities of the Kanak of New Caledonia.

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Genetic analyses in the Pacific have extensively documented Melanesian and Polynesian variation and origins. However, molecular analysis on the Kanak, Austronesian-speaking peoples of New Caledonia, has been limited. New Caledonia's main island, La Grande Terre, is the largest in Remote Oceania, lying isolated in the southern-most extent of Melanesia. The island, settled during the Lapita expansion, is remarkable for its linguistic and cultural diversity. The present study is conducted on 128 individuals from a collection of samples gathered in the early 1960's from four regions of La Grande Terre. The control region of the mitochondrial genome was sequenced and preliminary results indicate that at least five previously identified Pacific haplogroups are represented. Percentages for these haplogroups are distributed as follows: B (.2) P (.16), Q (.09), M28 (.05), F (.04), unassigned (.45). The unassigned samples require further sequencing outside the control region for haplogroup identification and will likely expand the defined branches within these Pacific haplogroups. Although the Kanak are Austronesian speakers, only twenty percent fall within haplogroup B, which Merriwether et al. (1999) found to occur at a frequency near fifty percent in other Austronesian Melanesians. Findings are discussed in relation to mitochondrial DNA variation in other Pacific populations, clarifying the role this outlying island and its inhabitants played in Melanesian settlement, Polynesian expansion, and post-settlement interaction.

The skeletal remains from Kamennyi Ambar 5, a Middle Bronze Age Sintashta site of early metallurgy. Part I: dental pathology.

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Dental disease is an essential element of skeletal and paleoepidemiological analyses as associated with diet and stress levels in the group the collection represents. As part of a complete analysis on the Bronze Age site of Kamennyi Ambar 5 (KA-5), dental data were collected on 119 individuals. Extent and type of attrition, calculus, dental caries, and hypoplasias were scored accordingly. A pattern of age-related wear did not emerge; in fact, teeth rarely scored above the third level of wear. Nearly half of the total teeth presented mild calculus deposition (49.1%; n=385); 10.9% were free of calcified plaque. Caries occurred in just 4.44% of individuals (n=45) and on 0.95% of all teeth (n=525). Linear enamel hypoplasias occurred in 21.88% of individuals (n=32) and on 4.04% of the teeth (n=396). These results illustrate only slight dental wear indicating consumption of less coarse foodstuffs. The individual calculus deposition rates for KA-5 (76.19%; n=42) were much higher than that of agriculturalists (~30%) (Littleton and Frohlich, 1993) and people of the Iron Age Site of Sarai Khola (58.3%) (Lukacs, 1989), indicating a diet high in protein and low in acids derived from carbohydrate intake. This conclusion is supported by the low occurrence of carious lesions. The small number of hypoplastic events when compared to hunter-gatherers (45%), transitional groups (60%), and agricultural societies (80%) (Lukacs, 1989) suggests a healthy childhood with a minimally stressful lifestyle. Although the complete skeletal analysis supports these conclusions, we are currently testing them further via stable isotope and trace element analyses.

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The effects of travel costs on group size: a phylogenetic approach.

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Evolutionary models of primate social organization emphasize balancing the benefits and costs of group living, often through enjoying predator avoidance while suffering increased feeding competition. As groups increase in size they may respond by spending greater time and energy increasing their day range traveling to additional feeding sites in order to maintain sufficient nutrient intake. We used published data for approximately 100 primate species to investigate the relationship between group size and day range while controlling for the confounding effects of body size and phylogenetic non-independence among species data points. In addition, we explored average values for the ecological cost of transport (ECT), a measure derived from body mass and day range observations that indexes the percentage of daily energy expenditure devoted to travel. Multiple regression analysis identifies group size as a strong positive determinant of day range, and thus ECT, independently of body mass. This interspecific trend is strong in both the species values and phylogenetically independent contrasts. Regardless of body size, primate species living in larger social groups tend to have larger day ranges. Species residuals from the multiple regression help identify dietary correlates of day range that are corroborated by the contrast residuals implicating dietary grade shifts among primate groups. While day range and ECT are related to group size, values for ECT are quite low (median 1.45%), suggesting that the burden imposed by increased travel costs in primate groups, independently of their sizes, may be relatively minor.

Mothers and children: Moving in new directions.

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Primate mothers and their dependent offspring must travel together, yet juveniles move differently from adults. Juvenile primates, though economical, are slower (the majority of children cannot walk at fast adult speeds until after 7 years) and require more energy relative to their body mass. Nonetheless, groups of adults and children are typical, prompting the question: is there a cost to group mobility?

To address this question, data from the human physiology literature were used to create a mobility optimization model. For children < 5 years, the velocity associated with the minimum cost to cover a distance was less than adults, but the same as that of adults for children > 5 years. Interestingly, a minimum cost for the group to travel a given time exists (unlike for individuals) and the associated velocity is slower than normal adult walking velocity. The data used to develop this model are, however, quite limited. For instance, the children were only asked to walk until steady-state oxygen consumption was achieved (>/= 3 minutes), so whether or not children can maintain an adult pace or consistent oxygen consumption is unknown. In order to understand group mobility strategies, data that allow realistic modeling of the costs and benefits are needed. Energy is an important resource to be optimized, though others, like time and maintenance of social bonds, may be equally important. Advanced modeling techniques, like agent-based modeling, offer the opportunity to include complex interactions and move mobility research in new directions.

Remodeling patterns of the human occipital bone: A preliminary report.

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It has long been acknowledged that skeletal growth is not a direct process of regularly distributed bony deposition on the external surface, but a highly specified progression which mainly constitutes in interrelated processes of movement: cortical drift, displacement and relocation. The current study aspires to approximate the remodeling mosaic of the occipital bone in *H. sapiens* from early childhood to adulthood in

order to explore patterns of bone and cerebral growth integration.
The study sample consists of 5 adult and 10 immature (2¼ to 8 years old) occipital bones deriving from skeletal remains of the 19th century. Preparation of the samples includes the elaboration of negative impressions and positive replicas coated with gold and observed with the Reflected Light Microscope.
Cerebellar fossae are typically resorptive in both immature and adult specimens. On the contrary cerebral fossae exhibit a resorptive surface in early childhood while at the age of seven depository fields appear which are also present in the adult group. The external surface contains very few traces of the remodeling activities due to taphonomic effects.
Intra-specific variation in the distribution of the remodeling fields and taphonomic effects on the surface are making the study of remodeling processes arduous. Nevertheless the results indicate that the cerebral fossa turns into depository, around the age of seven, which places this transition within the age interval of the completion of the cerebral development. Further research is needed in order to confirm and better interpret the findings of this preliminary report.
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Insights from sequencing the Neandertal genome.

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Neandertals, a hominid group that appeared in the European fossil record around 400.000 years ago and disappeared around 30.000 years ago, are believed to be our closest extinct relatives. Although Neandertals and modern humans overlapped in certain regions in time and space, the relationship between us and them is unclear and contentious. A genetic comparison between modern humans and Neandertals could both address the relationship between us and them and offer the possibility to identify genetic changes that happened specifically on the lineage leading to fully modern humans. It may also allow to identify genes and other features in the human genome that experienced positive selection after Neandertals and humans separated. Over the past few years we have applied novel high-throughput DNA sequencing technologies to determine the DNA sequences of large parts of the Neandertal genome. This allows us to estimate divergence times for various parts of the genome between humans and Neandertals and to look for evidence of a genetic contribution of Neandertals to modern Europeans. We have furthermore developed and applied various targeted methods to sequence specific parts of the Neandertal genome. Results from each of these approaches will be reviewed.

Incisor microwear textures of five bioarcheological groups.

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Dental microwear texture analysis is a valuable tool for inferring aspects of subsistence behavior in human groups and diet in other mammals, though studies to date have been limited to molars. Here we report on the first microwear texture analysis of incisors. Five bioarcheological groups were included in the study: Aleut from various islands in the Bering Sea (n=24), Arikara from the Mobridge site in South Dakota (n=18), ethnic Chinese workers from Kodiak Island (n=16), a Late Woodland Bluff sample from Jersey County, Illinois (n=18), and Puye Puebloans from Pajarito Plateau in New Mexico (n=18).
First, a white-light confocal profiler was used to collect point clouds representing labial surfaces of maxillary central incisors for each individual. The area sampled was 278 µm x 204 µm, and the data matrix had 0.18 µm lateral spacing and 0.005 µm vertical resolution. Resulting data were then imported into Toothfrax and SFrax scale-sensitive fractal analysis software packages (www.surfract.com) for surface texture characterization. Results indicate significant variation among groups in several microwear texture attributes including complexity, anisotropy, textural fill volume, and heterogeneity. For example, the Puye had the highest complexity values, whereas the Aleut had the highest textural fill volumes. Differences in incisor microwear among the groups are likely related to variation in diet, anterior tooth use, and exposure to abrasives. This study also suggests that incisors and molars may differ in the types of microwear texture attributes most likely to separate groups.
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An ethnographic and bioarchaeological assessment of Zuni warfare and leadership.

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The purpose of this study is to examine ethnographic accounts of Zuni warfare and social structure and how this is reflected in the biological and archaeological record. Examination of ethnographic accounts of Zuni social organization and ceremonial life should be reveal the ways in which the Zuni viewed warfare culturally and as a tool for socializing youth. Osteological data from Zuni burials should then also reflect an emphasis on warfare within the community through the presence of skeletal trauma. The skulls of 185 individuals from the protohistoric Zuni site of Hawikku, New Mexico were examined for evidence of antemortem and perimortem trauma. The data were then examined in relation to ethnographic and archaeological information, including identification of burials believed to belong to community leaders. The results indicate that 14 of 185 observable individuals displayed evidence of antemortem or perimortem cranial trauma. None of the individuals considered leaders, as determined through prior research examining associated grave goods and location of burials, displayed traumatic pathology. Also, the presence of trauma was not sex specific in the sample. The data suggests that Zuni ethnographic data could describe a more symbolic role for warfare, instead of the more commonly held belief that active participation in violence related to warfare was a part of daily life, resulting in a better understanding of leadership roles.

Troubling the waters of anthropology: Is wading the missing factor in the evolution of hominid bipedalism?

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Largely missing from the debate about the evolution of hominid bipedalism is a discussion of the possible role of wading in shallow water. This presentation reviews the literature that considers the concept, and suggests that it is the idea's mere association with the so-called "aquatic ape hypothesis" which accounts for its disapproval, as specific objections are largely absent. Outstanding questions exist about hominid origins relating to how bipedalism may have been practiced before traits evolved to make that mode of locomotion efficient. Recent findings have suggested solutions to these problems. One such study suggested that early hominids already walked with a Fully-upright (FUp) gait by showing that the Bent-Hip-Bent-Knee (BHBK) gait is 50-60% more energetically costly than a FUp human gait on land. Here, I report a similar study which confirmed these findings but also showed that in water the cost differential between these gaits is markedly reduced, especially in deeper water, at slower speeds and with greater knee flexion. For example, walking in waist deep water, at 0.6 m/s, with a 50 degree knee flexion reduced the cost differential between FUp and BHBK gaits to 18% ($p < 0.001$), whilst moving through water to the depth of the xiphisternum, at 0.3 m/s, there was no significant difference at all ($p = 0.631$).
On the basis of these findings, wading appears to be an extra factor which can only add value to the various models that have been published regarding the evolution of early forms of "non-optimal" hominid bipedalism.

Food material properties and their influence on the growth of cranial sutures.

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Previous studies have demonstrated positive relationships among food material properties, masticatory muscle properties, and cranial sutural morphology. In this study, lab mice were placed in different dietary groups to assess the impact that diet and masticatory stress may have