offers more insights into the biomechanics of the dynamic weight shift.

Chameleons, arboreal quadruped primates and marsupials use a crouched limb posture and relatively large limb excursions. Thereby step lengths and contact times are long, and peak substrate reaction forces are low. However, arboreal quadrupedalism does not necessarily demand three-dimensional limb excursions. Cineradiographic analyses show that forelimb abduction generally results from constraints in shoulder morphology. But, because the shoulder morphology differs in chameleons and mammals, each had to find different solutions to overcome these constraints. Chameleons support their parasagittal limb excursions by possessing the most mobile scapulocoracoid among sauropsida. In primates, by contrast, the "emancipation" of the arm from the scapula was the pre-requisite for developing locomotor modes reliant on shoulder joint mobility rather than on scapular excursions.

Craniometric investigation and biological variability of a North American historic Chinese cemetery.

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This study presents the craniometric analysis of an historic Chinese cemetery from Carlin, Nevada. Cranial measurements and statistical analysis were performed on 10 crania from Carlin located at the University of Nevada, Las Vegas and 61 crania from Kodiak Island, Alaska, a sample obtained from the NMNH at the Smithsonian. Both samples are considered first generation Chinese immigrant groups. All measurements on Carlin and Kodiak were taken by the author. Published data were used for comparison.

Multivariate statistical analyses were performed to ascertain biological variability within and among groups, with special attention paid to variability within the Carlin sample. Multivariate analyses permit the investigation of interrelationships among variables, examine group differences, and make other inferences among the variables and groups selected. In addition, the groups were tested using a Relethford-Blangero (1990) analysis for estimates of gene flow. Results indicate a relative degree of homogeneity within the Carlin sample. Comparisons to known disparate geographic groups place both immigrant samples closer to known East Asian populations. Within-Chinese group variability seems to discriminate Carlin from other known Chinese groups. This may be due to the small sample size or possibly some admixture with other groups, as there is no definitive evidence that all of the individuals buried in the Carlin cemetery were born in China. Biological variability has not been extensively published for Chinese groups residing in North America and this study presents the opportunity for further analyses, with important insights into an immigrant group that has often been overlooked.

Proteomic profiling of the extracellular matrix proteins in ancient bone.

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Proteomics is an emerging technology that evaluates normal and abnormal protein expression in tissues. Amplification deficiencies and the complexities of posttranslational modifications, make it necessary to concentrate more and more on the protein pattern of different tissues. Proteomic evaluation involves the detection and characterization of the protein components of cells and tissues by partial sequence analysis and database matching. Bone consists of about 2% cells and more than 90% calcified tissue, the extracellular matrix (ECM). After the death of an individual, the cells and the cellular molecules are relatively quickly degraded. Bone, particularly its compact component, protects the molecules inside the ECM after the death of an individual much better than other organs. The greatest problem to overcome was is how to extract and solubilize these proteins. We have developed a method to extract the ECM proteins from recent human bones and also from bones many thousands of years old unearthed from archaeological sites (Schmidt-Schultz and Schultz 2004, 2005). After 2-D-electrophoresis, more than 300 different protein spots can be stained by silver (detection range of silver is between 1-10ng). These spots represent biomarkers which play a role in special pathways. We identified among other proteins, for example, growth factors (e.g., IGF-II, TGF-ß, BMP-2), molecules from the immune system (e.g., IgG) and proteins, which are typical for special diseases (e.g., PSA).

Center of mass movements in arboreal and terrestrial prosimians.

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During walking the center of mass (COM) of cursorial quadrupedal mammals oscillates in such a way that reduces muscle work by allowing exchange of gravitational potential (PE) and kinetic energy (KE). However, primates, especially arboreal species, exhibit deep joint yield that may limit oscillations of the COM and reduce the exchange of PE and KE. To date, no data have been collected comparing COM movements in closely related primates that differ in their habitual substrate use. In this study whole-body force plate recordings were collected for five adult *Lemur catta* and two adult *Eulemur fulvus* walking on a runway and simulated arboreal supports across a range of speeds (0.36-1.3 ms^{-1}). Although both lemurs moved more slowly on the pole than on the runway, energy recovery did not differ across substrates. However, *Lemur catta*, the more terrestrial species, showed recoveries that were higher (mean=49%) than that of the *Eulemur fulvus* (mean=34%). These results are surprising in two respects. First, *Lemur catta* is able to exchange energy at levels near that of nonprimate quadrupeds. Second, recovery values did not decrease significantly when animals moved on arboreal substrates. A possible explanation for these results may lie in the fact that, along with high joint yield, primates have relatively long limbs and high limb protraction. The interaction of these three variables could facilitate vertical oscillations of the COM that increase exchange of PE and KE during walking. These results imply a dynamic solution to the challenge of navigating arboreal and terrestrial substrates economically. Supported by NSF BCS-0452217, BCS-00525034 and Wenner-Gren Foundation

Endocast asymmetry in pongids assessed via non-rigid deformation analysis of high-resolution CT images.

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Human brains are asymmetrical, both in structure and function. The extent and pattern of asymmetries on the endocranial surfaces of pongids and humans, and how they might match expectations from published studies of their actual brains, is ultimately important for understanding what fossil endocasts might be able to tell us about the brains of these creatures, thereby potentially informing us about their behavior. Gross neuroanatomical asymmetries (known as petalias) favoring the right frontal and left occipital regions of the brain are common in humans, and are reasonably common in pongids. However, the combination of right frontal and left occipital petalias in the same specimen appears to be absent (or extremely rare) in pongids. The behavioral significance of this difference is unclear, but it is suggestive of a possible anatomical marker of evolved behavioral abilities in hominids. Published studies of endocranial petalias have typically used only a few measurements to quantify hemispheric differences. We applied a method in which a series of virtual endocasts are morphed into their respective mirror images. The degree to which left and right hemispheres mismatch is then measured at each point on the endocranial surface. Statistical population assessments of left-right asymmetry using this method will be described for analyses of 10 *Pan*

troglodytes, 10 *Pan paniscus*, 10 *Gorilla gorilla*, 10 *Pongo pygmaeus*, and 10 *Homo sapiens* endocasts. The extent and pattern of human endocranial asymmetries consistently differ from pongid endocranial asymmetries will be demonstrated, and functional implications of these differences will be discussed.

Ecological reconstruction using d[13]C values in the unaltered bone mineral of select primate species.

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Hair samples of modern C[3]-feeding primate species from ecologically distinct areas of MesoAmerica, South America, Africa and Madagascar vary by 6‰ in d[13]C in association with canopy cover. The pattern of variation suggests that recent- and paleo-ecological reconstructions should be possible using d[13]C values in the unaltered mineral fraction of bone from select primate species. Cebus capucinus (capuchin) and Ateles geoffroyi (spider) from La Selva, Costa Rica from a tropical wet forest have identical average d[13]C values even though the former is omnivorous and the latter is frugivorous. Alouatta palliata (mantled howler) from La Pacifica, Costa Rica, Brachyteles arachnoides (muriquis) from Fazenda Esmeralda, Brazil, a population of chimpanzees from East Africa, and two different Galago species from Gedi, Kenya from mixed evergreen and deciduous forest have d[13]C values similar to each other but significantly different from capuchin and spider monkeys. The differences are of the same magnitude and in the same direction as that in leaves from open canopies compared with closed canopies, and are independent of specific primate diet. Lepilemur leucopus from Beza Mahafaly Special Reserve, Madagascar and another population of chimpanzees from dry, deciduous forests have d[13]C values similar to each other even though lepilemur is a folivore and chimpanzees are frugivorous. Both species are significantly less negative than the ones from closed and broken forest canopy habitats. Published data from other C[3]-feeding fauna, including primates, largely match the pattern reported here, and indicate the expected level of accuracy in ecological reconstructions.

A Bronze Age woman in an Anglo-Saxon village.

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During the excavation of a late Anglo-Saxon settlement at Bishopstone, Sussex UK, a crouched burial was unearthed. Carbon dating confirmed that this was a late Bronze Age burial (3260 -3000 BP). The burial was found in close proximity to Anglo-Saxon burials that are part of a cemetery. Further, it was located between the trenches of two

buildings dating to the Saxo-Norman period. The burial was interred in a crouch position laying on its right side oriented with the head to the north. This orientation clearly distinguishes it from the Saxon burials, which are in a supine position with their heads to the east. Skeletal analysis revealed that these were the remains of a 25-year-old woman. She showed no signs of trauma or disease with the exception of some osteoarthritis in the lower vertebrae. While this particular osteobiography would seem of limited value, this individual raises a variety of questions about not only its possible association with the Anglo-Saxon cemetery, but also with respect to the potential location for an as yet still unknown late Bronze Age settlement and cemetery in the area.

Ranging patterns in wild hamadryas baboons in Ethiopia.

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Hamadryas baboons have large home ranges and long daily path lengths, and they are attributed to the sparse distribution of food and water in their habitats. This study investigated the ranging patterns of a band of 200 hamadryas baboons at the Filoha site in central Ethiopia from March 2005 - February 2006. Unlike other hamadryas sites, a permanent water source and palm forest providing a high availability of doum palm fruit, a preferred food resource, are located in close proximity to a commonly used sleeping cliff. Therefore, I predicted that home range size would be smaller and daily path lengths shorter than those at other hamadryas sites, an inverse relationship between daily path length and time spent feeding on palm fruit, and that daily path lengths would be shorter during the dry season so as to remain closer to permanent water sources.
The baboons' home range size of 38.5 km[2] is larger than reported for other hamadryas populations and their mean daily path length of 8.8 km (N=105) is comparable to that reported elsewhere. Furthermore, monthly mean daily path length and the percentage of feeding time devoted to doum palm fruit were positively correlated. Finally, the mean daily path length in the dry season (8.1 km, N = 43) was not significantly shorter than that of the wet season (8.6 km, N = 15). These results indicate that the ranging patterns of hamadryas baboons at Filoha do not reflect the year-round availability of water and a preferred food resource.

The role of micro-morphological stress markers in the differential diagnosis of infectious bone diseases.

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Light microscopy, particularly the use of polarized light, has such a high value for differential diagnosis of diseases in archaeological bones that it can no longer be neglected because a reliable diagnosis is the basis not only of individual case reports but also of the etiology and epidemiology of diseases in ancient populations.
Selected examples of micro-morphological stress markers caused by various pathological processes are presented (e.g., faserfilz-osteons,polster, grenzstreifen). Emphasis is placed on the differential diagnoses of proliferative reactions at the microscopic level, for instance, specific and non-specific periosteal and osteitic reactions. Thus, there are micro-morphological features which are important indicators of particular diseases or groups of diseases. In this context, micro-morphological structures which are characteristic of non-specific hematogenous osteomyelitis, treponematoses, tuberculosis and leprosy are presented and which make a reliable diagnosis relatively easy. Furthermore, the differential diagnosis of porotic orbital roofs called cribra orbitalia and porotic hyperostosis of the skull vault is discussed at the microscopic level and the importance of the microscopic vestiges of meningeal reactions on the endocranial lamina of the skull for assessing morbidity and mortality in ancient populations is demonstrated.

Monoamine oxidase A (*MAOA*) gene promoter variation influences aggressive behavior towards an unfamiliar intruder in rhesus macaques (*Macaca mulatta*)

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In a variety of species, highly aggressive behavior toward unfamiliar conspecifics may increase reproductive opportunity, social rank, and protection of self and offspring. In the regulatory region for the human monoamine oxidase (*MAOA*) gene, there is a loss-of-function repeat polymorphism (*MAOA*-LPR). The low-activity *MAOA*-LPR allele has been associated with antisocial behavior in humans and, in rhesus macaque males, an orthologous variant has been shown to predict various forms of aggressive behavior. We wanted to examine how macaques would react to an unfamiliar conspecific (or intruder) and whether individual behavioral responses would vary as a function of *MAOA*-LPR genotype. Behavioral responses to an age- and sex-matched intruder were recorded in adolescent and adult rhesus macaques (males, *N*= 52; females, *N*= 92). Factor analysis was performed using principle component extraction followed by varimax