adults). Subtle differences in the leg may exist between these arboreal quadrupeds (reflecting more leaping in *M. murinus* and more grasping in *C. medius*). Overall, these results indicate that muscle mass ratios are highly conserved phylogenetic characteristics of primates, and are present at birth despite the altrichial state of neonates.

**Brucellosis in ancient Nubia: Morbidity in biocultural perspective through time at Semna South, Sudan.**

M.M. Aubin. Department of Anthropology, Arizona State University, Tempe.

Brucellosis today causes considerable morbidity and economic distress worldwide and is rampant in many parts of the world, including north Africa (WHO, 1997). However, there has been a minimal amount of paleopathological work on brucellosis (e.g., Ortner, 2003) and only one study of the disease in an ancient population (Capasso, 1999). This study is an examination of the skeletal manifestations of brucellosis in the ancient Nubian population of Semna South, Sudan. It assesses the disease's impact on morbidity in the population as well as provides evidence of consumption of dairy products for a site in which archaeological data is lacking. It documents brucellosis lesions in Meroitic (n=374), Ballana (n=37) and Christian (n=12) period adult Nubians (350 B.C. - A.D. 1200).

Archaeological presence of the primary brucellosis vectors, especially goats and cattle, in Nubian and Egyptian sites indicates potential brucellosis presence. While isolated cases from ancient Egypt (Baker, n.d.; Hodgkins, 2003) have been reported, disease frequencies in archaeological north African populations are, so far, absent. Analysis of the Semna South skeletal materials, in accordance with clinically defined criteria (Özaksoy, 2001; Rajapakse et al., 1987), yields a total brucellosis frequency of 2.11% from vertebral lesions. All of those identified were from the Meroitic sub-sample; all but one were male, and all were at least 30 years old at time of death. However, chi-square statistics showed no statistical significance to these trends. All infections appeared long-standing and may have caused considerable debility in those affected.

**The right preferences? Bilateral asymmetry in the upper and lower limbs of modern humans.**

B.M. Auerbach, C.B. Ruff. Center for Functional Anatomy and Evolution, The Johns Hopkins University School of Medicine.

Studies of post-cranial asymmetry have the potential to elucidate epigenetic effects on limb bone morphology, but are often limited in terms of numbers of individuals, representation of different populations, or dimensions included. This study examines postcranial bilateral asymmetry in a large world-wide sample of Holocene humans (n=775; 474 males and 249 females). 19 highly repeatable measures of bone length, average midshaft diaphyseal breath, and articular breadth were taken on humeri, radii, femora, and tibiae. Asymmetries were calculated as (right-left)/((right+left)/2) x 100.

Greatest asymmetries occur in upper limb diaphyseal breadths (humerus , 3.30%, radius, 2.30%), both right biased. Upper limb lengths and articular breadths demonstrate significant, but smaller right-side bias (0.5% -1.40%). Conversely, a small but significant *left* side bias is evident in many of the measures for the lower limb, with again the greatest lateralization in diaphyseal breadths (0.5% - 0.8%). Lower limb lengths and articular dimensions demonstrate smaller and more variable asymmetries. Sex differences in asymmetry are generally minor, except in humeral diaphyseal breadth, which is more asymmetric in males (4.5%, vs. 2.6% in females, $p<.01$). There is little if any correlation between length and diaphyseal breadth asymmetry in any bone.

These results support the interpretation of greater epigenetic plasticity in limb bone cross-sectional dimensions than in lengths or articular breadths. The greater upper limb diaphyseal breadth (but not length) asymmetry in males is consistent with this interpretation. Previously observed "crossed symmetry" patterns between upper and lower limbs are supported. Effects of subsistence strategy and geography are further investigated.

**Validation of plaster endocast morphology through 3D CT image analysis.**

B. Avants[1], J. Gee[1], P.T. Schoenemann[2], J. Monge[2], J.E. Lewis[2], R.L. Holloway[3]. [1]Department of Radiology, University of Pennsylvania, [2]Department of Anthropology, University of Pennsylvania, [3]Department of Anthropology, Columbia University.

A crucial component of research on brain evolution is the comparison of fossil endocranial surfaces with modern human and primate endocrania. The latter have generally been obtained by creating endocasts out of rubber latex shells filled with plaster. This process involves a number of procedures that, as with any casting process, could conceivably introduce subtle errors. The extent to which endocast replicas match the actual endocranial surfaces has been difficult to determine with any confidence. To investigate this, high-resolution CT scans were taken of two endocasts (made by Prof. Ralph Holloway) along with their corresponding crania. 3D virtual endocasts were created from the cranial CT scans and rigidly registered to their corresponding 3D latex/plaster endocast CT images. The degree to which points on the surfaces of the cranial-derived virtual endocasts mismatch their registered latex/plaster versions can then be assessed on a voxel-by-voxel basis and viewed in 3D.

Analysis of the differences indicate that 84% of the voxels in one pair, and 92% of the voxels in the other are within 2 mm either way of the virtual endocast. Both comparisons show that the areas of largest mismatch occurs around the cranial base. While the average error is relatively small, variation in the pattern of error across the surfaces clearly differs between the two endocasts. This study gives an idea of the size of possible error inherent in plaster endocasts, thereby indicating the level of confidence we can have with studies relying on comparisons between them and, e.g., hominid fossil endocasts.

Image analysis research using MRI of human and primate brains has suggested that the frontal lobe as a whole in humans is not especially elaborated, while other research has suggested that the prefrontal itself is larger as a percentage of total cortex than in non-human primates.

**Discovery of Sambungmacan hominid fossils and its contribution to the study of human evolution in Australasia.**

F. Aziz[1], Y. Kaifu[2], H. Baba[2, 3], T. Jacob[4], S. Narasaki[5]. [1]Geological Research and Development Centre, Bandung, Indonesia. [2]National Science Museum, Tokyo, Japan. [3]University of Tokyo, Japan. [4]University of Gadjah Mada, Yogyakarta, Indonesia. [5]Board of Education, Gunma, Japan.

The Pleistocene deposits of the Sambungmacan District, Central Java, have so far yielded four hominid fossils. Sambungmacan 1 (Sm 1), an adult male cranial vault with an incomplete base, was found in 1973 during the construction of a canal at a meander site of the Solo River. Morphological evaluation of Sm 1 varies among researchers, but the specimen