anthropology and (primate) paleontology. However, there is no consistent protocol for scanning, and the extent to which landmark-based 3DGM studies can potentially suffer from problems of inter- and intraobserver error has not been thoroughly investigated. To assess the precision, accuracy, and repeatability of craniodental landmarks (Types I, II, and II, plus curves of semilandmarks), a single macaque cranium was scanned with three different surface scanners and a microCT scanner. Ten iterations of each scan were landmarked by nine individuals with varying osteological knowledge and 3DGM experience to investigate whether landmarks can be placed at truly homologous points given inherent differences in researcher experience as well as quality of the digital model resulting from different scanners and scanning protocols. Initial results indicate that interobserver error is of far greater concern than inter-scan type error among all individuals and for all scan types. Regarding landmark types, semilandmark curves are much more prone to inter- (and intra-) observer error than most other single point landmarks, though Type III landmarks exhibit predictably high variance. Experience with osteology and morphometrics both positively contribute to accuracy and precision in multiple landmarking sessions, and later iterations in our trials exhibit less variance. We therefore suggest that researchers wishing to utilize digital landmark-based methods should combine data collected by different researchers only with caution and should perform multiple training sessions before collecting data for publication.

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A case of primate rafting and island hopping: Long distance dispersal and successful colonization over open ocean in a volcanic archipelago

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Primates are distributed in Africa, Asia, Madagascar, and the Neotropics. This distribution, combined with chronometric estimates of a crown age of ~71-63 Ma and the timing of the breakup of Gondwanaland, leads many to assume that primates must have reached this distribution in part by rafting. Others find the notion of primates rafting great distances over open ocean and successfully colonizing distant shores to be so utterly incompatible with primate ecology that there must be another explanation, such as ephemeral land bridges and/or primate origins being sufficiently ancient to explain primate biogeography with vicariance alone.

I identify a case of long distance dispersal and successful colonization by rafting and island hopping in the primate species *Tarsius sangirensis* and *T. tumpara*, endemic to Sangihe and Siau Islands, respectively, islands within the Sangihe volcanic arc. The 180m bathymetric contour of Siau and Sulawesi are separated by ~90km, while Siau and Sangihe are similarly separated by ~60km. Both are separated from Sulawesi, and from each other, by oceans that exceed 1000m in depth. Evidence indicates these species are sister-taxa, relative to the source population. Chronometric analysis indicates a divergence date of 3.4-11.1 Ma: far too old to be the result of human-mitigated dispersal, and far too young to be explained by ephemeral land bridges crossing such deep ocean.

This evidence many not settle the debate whether primates rafted from Africa to South America and Madagascar, but it does settle, conclusively, that rafting and island hopping happened at least once.

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Cranial morphometric variation and human sacrifice at the Epiclassic site of Xaltocan, Mexico

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The Epiclassic period in central Mexico (ca. AD 600-900) is characterized by economic, political, and religious problems due to the emergence of new communities and centers, following the collapse of the Teotihuacan state. Although the adoption or introduction of new forms of material culture has been widely documented, it is unclear whether these changes represent local development by a continuous population or the immigration of different groups into the Basin of Mexico. In the region of Lake Xaltocan, human skeletal remains provide a unique opportunity to address questions concerning population movement and interaction during the Epiclassic period, as well changes in the practice of human sacrifice. In a sample of 40 decapitated skulls, craniofacial variation was assessed with inter-landmark distances via direct measurement, sliding semi-landmarks via photographs, and three-dimensional landmark coordinates via digital surface models, together with ordinal scores on non-metric traits. Morphometric analyses showed a wide range of vault forms, including a large number of crania with antero-posterior modification and a small group of unmodified crania with highly dolichocephalic indices. Across different vault forms, facial patterns were diverse and showed no correlations with patterns of non-metric trait frequencies, dental modifications, or cut marks. Cut marks were observed mainly on the posterior part of the mandibular ramus (either left, right or both), and on the first cervical vertebra, which not only suggests that the decapitations were performed when the soft tissues were present, but distinguishes them from patterns reported at other sites in Mesoamerica.

The effects of sleeping platforms on next day cognition in captive orangutans (*Pongo* spp.)

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It has been hypothesized that with the advent of the Miocene, apes began to manufacture complex sleeping platforms to create more comfortable and stable sleeping environments which resulted in a lengthening of sleep architecture and augmented cognition. The cognitive effects of quality sleep in large bodied hominoids have yet to be tested. We hypothesize that orangutans (*Pongo spp.*) with nightly access to preferential sleeping materials (i.e., bedding hay, cardboard, sheets, blankets, memory foam mattresses, camping pads, comforters, and pillows) will show improved next day cognition. The focal subject was an adult male Azy (35) with previous computer touch-screen and cognitive testing experience. A training block exposed the subjects to different sequences that are all consistent with an artificial grammar (set of rules) and digitally recorded the duration of time following each sequence. The test block, exposed them to randomly introduced sequences that were either consistent with artificial grammar (i.e., grammatical sequences), or were not consistent (i.e., ungrammatical sequences) and recorded duration to completion. Several variables were measured; one variable (correct-touch % measuring the subject's overall accuracy), significantly improved after night access with high quality sleeping materials. Sleep deprivation and/or poor sleeping conditions leads to deleterious effects in humans and this research points suggestively to a similar effect in orangutans. Until further great ape data is generated on the relationship between cognition and sleep quality, we cannot conclude with certainty that the benefits of high quality sleep do not exist in other great apes.

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Female dispersal post-takeover is related to male quality in *Colobus vellerosus*

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Male takeovers affect male tenure and female mate choice and are important events influencing individual reproductive success in group-living primates. In systems with predominant female philopatry and high male reproductive skew, male takeovers affect female mate choice to a large degree whereas in species with facultative female dispersal (FFD), females have the option of deserting a new male. We use a species with FFD to investigate the factors that promote the desertion of females after male takeovers, using nine cases with complete data on the process of the takeover and the female dispersal outcome. These cases took place in six groups of *Colobus vellerosus* over 10 years (2003 - 2013) at the Boabeng Fiema Monkey Sanctuary. Immediate takeovers (where males were able to defeat the resident male rapidly; N=4) were never followed