

## Out of Africa 1: Who, Where, and When?

The second Stony Brook University Human Evolution Workshop held was between September 27–October 1, 2005. This year's conference focused on early hominin dispersals from Africa into Asia between 1–2 Mya. The goal of the conference was to try to identify the major currents of paleo-anthropological thought about the timing of early hominin dispersals into Eurasia, which species were involved, and the biological and behavioral context of these dispersals. The event, convened by Richard Leakey, involved a one-day public symposium at Stony Brook University, followed by a four-day retreat and workshop at a conference facility near Stony Brook overlooking Long Island Sound (Fig. 1). All participants were required to contribute precirculated papers.

As with the first Stony Brook Human Evolution Workshop in 2004,<sup>1</sup> the initial activity was a rigorous review and critique of the chronology of archeological sites and hominin fossil localities germane to the workshop. In this case, these were sites with purported evidence of hominid presence outside of Africa with potential dates of more than 1 Mya. Similar critical reviews assessed claims for stone-tool assemblages and hominin fossils in the same time range. These exercises proved to be a valuable springboard for discussions about variability in the criteria used to establish hominin presence outside of Africa and the priorities for future research efforts.

At present, the oldest reliably dated site for the appearance of hominins outside of Africa is very nearly a dead heat among China, Indonesia, and Western Asia.<sup>2</sup> Archeological sites from the Nihewan Basin in northern China date to 1.5–1.1 Mya. Yuanmou, from southern China, may be older (ca. 1.7 Mya), but the small sample of stone tools and hominin fossils left many with questions about this site.

Indonesian hominin fossil sites date to as much as 1.9–1.2 Mya. Dmanisi (Georgia), dated to 1.8 Mya, remains a standout in Western Asia. The oldest sites in Europe, Fuente Nueva, Barranco León, and Atapuerca Sima de l'Elefante, all in Spain, are claimed to date to 1.3–1.2 Mya. In all of these regions, and in the Levant and South Asia, reliably dated paleontological sites older than 1.8–2.0 Mya lack clear evidence of a hominin presence. Similarly, the number of credibly dated sites in all these regions increases after 1.0 Mya. One interesting feature about the dating evidence is the lack of a clear geographic trend. Sites that were located nearly as far as possible from Africa, such as those in China and Indonesia, were as old as, if not older than, those located near presumed Afro-Eurasian dispersal routes, such as Dmanisi and Ubeidiya (Israel). Potts proposed that this pattern reflected a rapid hominin dispersal followed by a prolonged period of "settling in," during which hominin archeological visibility gradually increased. Alternatively, several participants suggested that this pattern may be an artifact of poor preservation and less-thorough paleoanthropological surveys in areas closer to Africa, such as eastern Europe, the Arabian Peninsula, montane western Asia, and the Indian Subcontinent.

After chronology, the discussion turned to questions surrounding hominin identities and models of their evolutionary relationships. There was broad agreement that most of the more complete Asian fossil crania fell within the scope of *Homo erectus*, while the status of the Dmanisi hominins remained unclear. The similar ages of African and East Asian *Homo erectus* discoveries occasioned some discussion about whether this hominin first emerged in Africa and subsequently migrated to Asia or if, instead,

it evolved in Asia from an earlier hominin population that had dispersed there at some earlier point then later invaded Africa, a position long advocated by Louis Leakey. It was generally agreed that morphological similarities between Chinese and Indonesian *Homo erectus* fossils pointed to sustained levels of gene flow between these regional hominin populations. Connections between the East and West Asian and African populations were less clear, owing largely to a gap in the fossil record of South Asia.

Efforts to find faunal correlates for the dispersal of *Homo erectus* were not highly successful. A survey of the faunal record found some coincidences between appearances of *Homo* and appearances of *Theropithecus*, *Hippopotamus*, *Megantereon*, *Crocota*, *Pelorovis*, and *Kolpochoerus*, but no clear pattern of association emerged, largely due to debate over the systematics of the fossil mammals.

The nature of the behavioral changes involved in the dispersal of *Homo erectus* occasioned considerable discussion. There has been a growing consensus in the paleoanthropological literature that the increases in stature among early *Homo erectus* fossils over earlier and contemporary hominins reflects an increase in higher-quality food sources in their diets, most likely meat or fat, either scavenged or hunted. Meave Leakey, in her presentation, noted correlated shifts in the African carnivore guild that coincided with the emergence of *Homo*. The major such shift was a decline among large carnivores of specialists and an increase in generalists across the Plio-Pleistocene. Increased hominin carnivory, in the context of what was almost certainly a flexible, situationally variable, omnivorous diet may have been a factor in these changes.



Figure 1. Participants of the symposium pose for a photo overlooking Long Island Sound during the retreat and workshop.

The increased evidence of the production of flaked stone tools after 2.5 to 1.8 Mya has usually been seen as linked to such increased hominin meat consumption. The presence of cutmarks on bone from some of the most ancient sites known supports a link but, as Shea noted, ethological and ethnographic studies of stone-tool use suggest that stone implements were used for many other kinds of tasks, including processing plant foods and, most ubiquitously among humans, shaping wood and other organic materials into implements that were in their own right. Thus, linking either the increase in evidence of stone-tool production after 1.8 Mya or the origins of the Acheulean industry, with its distinctive “handaxes” and allied forms, involves accepting a stronger link between lithic technology and carnivory than is strictly demonstrable in the ethnographic and ethological records. Although the lithics are vastly more common and more durable than other lines of paleoanthropological evidence, traditional archeological methods for characterizing stone artifacts do not allow this evidence to be easily integrated into

models of strategic variation in hominin behavioral ecology.

The question of continuity among dispersed hominin populations came up at several junctures in the conference. Many of the regions examined presented a similar picture, one of a few well-dated fossil or archeological occurrences before 1 Mya, but with the amount and quality of evidence of a hominin presence improving significantly thereafter. Many of the conference participants agreed that an early hominin presence in a particular region does not necessarily imply prolonged evolutionary continuity in that region thereafter. As Dennell<sup>3</sup> noted in a recent review of the subject, the amount of time represented by the gaps in evidence for many regions vastly exceeds the amount of time for which there is strong affirmative evidence of a hominin presence.

The “Out of Africa 1” conference concluded with a general assessment that its participants had accomplished much in fostering discussion among researchers who ordinarily work in separate regions. One of the main conclusions of the conference was that evidence of a hominin presence outside of Africa more than 1.8 Mya

remained inconclusive. Clear and convincing evidence of sustained human occupation of temperate Eurasia is largely younger than 1.0 Mya. There was also a consensus that scientific progress on early hominin dispersals is currently hampered by a glaring gap in our knowledge about the course of human evolution in the Indian subcontinent, Arabia, and adjacent regions. Explorations of potentially fossiliferous deposits of Early Pleistocene age in these regions should be high on the agenda of twenty-first century paleoanthropology.

## REFERENCES

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