The Evolution and History of Human Populations in South Asia: Inter-Disciplinary Studies in Archaeology, Biological Anthropology, Linguistics and Genetics

Michael D. Petraglia and Bridget Allchin (eds.)
Dordrecht, The Netherlands: Springer, 2007, 464 pp. (hardback),$129.00.
ISBN-13: 9781402055614.

Reviewed by PARTH R. CHAUHAN
Stone Age Institute, Indiana University, 1392 W. Dittemore Rd., Gosport, IN 47433, USA; parthrchauhan@gmail.com

This conference proceedings volume on South Asian paleoanthropology is divided into four general parts: 1) Setting Foundations, 2) The Modern Scene, 3) New Worlds in the Holocene, and, 4) Concluding Remarks. All four parts jointly represent a total of 19 chapters by 28 scholars from diverse disciplines. Two papers are general (introductory chapter and the concluding synthesis); five papers address the Lower Paleolithic record and associated dispersal evidence; one paper is on the Narmada pre-modern cranium; and one paper considers the impacts of the Toba super-eruption. The remaining ten chapters concern the modern human perspective and cover a range of diverse topics—modern human behavior, human and non-human genetics, biological anthropology, Holocene cultural interactions, origin of the caste system, and language diversity. Such a multidisciplinary approach covering a large number of topics often has two contrasting outcomes; the volume presents the evidence though unique and assorted perspectives but at the same time, it lacks a thematic focus thus making the chapters appear to be randomly included. The opening chapter by Petraglia and Allchin introduces the South Asian landmass and its potential for study through its various aspects—linguistically, archaeologically, culturally, and genetically. It is rightly pointed out that the region, where comparatively less work has been done, does not feature adequately in global human evolutionary syntheses. Hopefully, such volumes and related research efforts will begin to mitigate this problem. A minor but important point is that their geographic map of South Asia is too general and does not do justice to the eco-geographical diversity of the region. It shows more of the regions surrounding South Asia and does not visually highlight such key South Asian features as the Eastern Ghats, various plateaus (e.g., Chota Nagpur), key rivers (e.g., Narmada, Godavari), and so forth.

Though Turner and O'Regan (Chapter 2) discuss an important aspect of the earliest human dispersals from Africa, their chapter is not directly relevant to the faunal evidence from the Indian Subcontinent. Readers are encouraged to also refer to the work of A.C. Nanda, R. Patnaik, P.K. Basu and J.C. Barry for information on Plio-Pleistocene fauna of South Asia. The possibility of fauna—including apes—moving back into Africa during the Miocene is mentioned as is the strong possibility of bi- or multi-directional faunal dispersals instead of a unidirectional out-of-Africa dispersal during the mid-Miocene. Routes and directions are discussed from a faunal perspective utilizing barriers vs. corridors. Coastal zones are discussed as potential dispersal routes but no clear evidence is yet known, including littorally-associated Oldowan sites within and outside Africa. Though an age bracket (0.3–1.4 Ma) is provided on typological grounds for the Acheulean handaxes from Table Bay (South Africa), it represents almost the entire time span of the Acheulean. Faunal dispersal rates slow down during the Pleistocene and sea-level fluctuations and related taphonomic processes may have obliterated relevant paleoanthropological evidence. Though undated, it is possible that most or many of the typologically-Oldowan sites in the Arabian Peninsula pre-date 'Ubediya, the earliest Eurasian Acheulean. As there was major carnivore movement out of Africa during the Lower and Middle Pleistocene (panther, sabre-toothed cat, lion, African hunting dog), Turner's older work is cited regarding the delay of hominin entry into Europe possibly due to predator abundance during the Early Pleistocene. However, such conjectural scenarios (though not impossible) require proper long-term testing, especially considering the prominent presence of hominins in the Orce region at that early time. In addition, hominins were already behaviorally well-adapted to confronting predators and scavengers in Plio-Pleistocene Africa, so then why not in Europe and elsewhere in Eurasia? It also is pointed out that the geographic origin of some taxa is uncertain (e.g., *Parahyaena brunnea*) at about 2.5–2.0 Ma). Though the speciation of *H. erectus* in Eurasia is mentioned as a possibility, an overall sense of caution is also projected, primarily due to the lack of convincing fossil evidence.

Dennell presents interesting theoretical perspectives regarding the possible presence of early *Homo* in northern and peninsular India, based mostly on the availability of stone for tool production in the Siwalik region (Chapter 3). A possibility of a short chronology for the Indian Subcontinent (specifically the Acheulean in peninsular India) and associated factors are discussed (similar to Korisettar). However, this is a risky approach as future work may reveal older sites in central and peninsular India. Despite the reported ESR age of 1.27 Ma, the site of Isampur in southern India is probably not among these as it does not resemble such early evidence, i.e., 'Ubeidiya. Though stone is thought to have been a rare commodity during the Pinjore times, the relatively high number of stone artifacts (n=607) recovered from the Pabbi Hills region suggests that stone was certainly adequate on the Pinjore landscape or in near-

  ISSN 1545-0031
doi:10.4207/PA.2010.REV81

by zones. It is also notable that none of the Pabbi Hills fossil and artifact occurrences were found to be spatially overlapping with each other. This may allude to one of several interpretations: 1) the stone tools were not used for butchery but other types of exploitation; 2) butchery evidence has not been preserved (this seems unlikely as fossils are abundantly preserved); or, 3) the lithic and fossil accumulations are not contemporaneous. The lack of Paleolithic sites in the Indus and Ganges Valleys cannot be used as evidence to discuss unsuccessful hominins because the relevant evidence may be deeply buried. The Paleolithic sites of Anangpur and Kalpi in the Ganges Basin are proof of this and demonstrate that hominins were moving on the landscape frequently enough to come across and exploit the associated raw material sources.

Stating that Middle Pleistocene hominins were better at dealing with environmental situations than their older counterparts may undermine the relative success of early *Homo* reaching SE Asia by 1.7 Ma despite extensive geographic barriers, diverse climates, variable and unpredictable resource conditions, and abundant predators on the landscape across Eurasia. I think dispersing early *Homo* populations were more enterprising and resilient than we probably give them credit for—where stone was not abundantly available, it is possible that other material replaced it (temporarily or permanently). One example of this is the recently-reported evidence of shell tools from SE Asia (Choi and Driwantoro 2007). The general notion that lithics were a *necessary* tool for dispersals and ecological adaptations may have been overestimated by archaeologists. Stone tools may have given more functional flexibility and more freedom to disperse/adapt but they may not have been always required for specific subsistence strategies (e.g., Joordens et al. 2009) and was certainly not a leading stimulus for short and long distance emigration (e.g., geographically wide-spread australopithecines). The limitation of even well-dated Oldowan lithic assemblages is that they do not preserve such information as the direction and factors of dispersals. In relation to Chapters 1 and 3, it is important to bear in mind that raw material in several zones of the Siwalik Hills (Boulder Conglomerate Formation) was available well before the Middle Pleistocene and thus contemporary with the fine-grained Pinjore Formation elsewhere. This suggests an earlier hominin presence at those specific locations, if not the region in general. The Omo River archaeological evidence at 2.3 Ma, cited by Dennell to demonstrate early exploitation of poor quality stone, has been critically examined by de la Torre (2004) who concludes that some of the assemblages may be of natural origin. This has important implications for the way we may interpret similar evidence in other regions, such as the early Oldowan-like assemblages in China which appear also to be made on small quartz nodules/fragments.

Although Dennell mentions that the absence of hominin fossils in the Siwalik Hills cannot be easily attributed to the lack of fieldwork, it is important to highlight that barring his BAMP project and the American work in the Miocene (both in northern Pakistan), *almost all other* paleontological investigations (though numerous) in the Siwalik Hills of Pakistan, India, and Nepal have been notoriously *un*systematic (i.e., lack of transect-guided surveys, non-comprehensive collections). In addition, qualified or experienced hominin paleontologists rarely have participated in these field campaigns, which were largely archaeological, geological, and vertebrate paleontological in scope. Thus, hominin fossils—especially fragmentary ones—could have been very easily overlooked during such surveys. Where Dennell correctly mentions that "no one has ever questioned the dating of the Soan Syncline sequence" by the preceding American geologists, it is important to remember that no geological work was subsequently carried out in the region by new teams (foreign or otherwise), thus no one has had any realistic opportunity to even confirm or challenge the previous American work. This is particularly true in recent decades and years where the region has become almost inaccessible due to ongoing socio-political problems. Therefore, the lack of a viable challenge should not be confused with the 'forced' acceptance or assumption that the initial age estimates for the Soan Syncline sequence are correct. This applies to any region in the Old World where initial work was done but was not subsequently confirmed for various reasons.

As Dennell and Possehl (Chapter 19) separately mention, only further research in the Siwalik Hills will help address the problematic issues of the region's paleoanthropological evidence. That being said, it should also be noted that because the Siwalik Hills preserve the main Plio-Early Pleistocene sedimentary exposures in South Asia, true absence of early evidence in this region should not be viewed as the absence of early *Homo* in the entire Subcontinent. It is possible that early *Homo* was present only in regions south of the Siwalik Hills. Also, fossil preservation bias according to body size has been logically demonstrated for the Pabbi Hills evidence but this should not be automatically assumed or used to generalize about comparable exposures elsewhere in the Siwalik region. In addition to taphonomic factors, specific ecological preferences of early hominins and associated ranging locations (e.g., Su and Harrison 2008) also may play a role in the preservation and recovery of hominin fossils in the Siwalik Hills. Additionally, the proposed role of the summer monsoon and its variable landscape effects on floodplains for hominin movement, occupation, and seasonal raw material access may have been slightly overstated. However, more high-resolution research is required to consider and properly test such possibilities. Finally, it is necessary to remember that, though well-known, the concept of 'colonization success' of early *Homo* also is applicable to zones within Africa as much as it is outside of that continent.

In Chapter 4, Korisettar presents an interesting but questionable 'model' relating to the location and distribution of Paleolithic sites within the Indian Subcontinent, more specifically within various Purana-Gondwana Basins known for their resource abundance. First, the temporal continuity of Paleolithic occupations within the Purana-Gondwana Basins is not yet well-established due to the lack

of a reliable chronological framework for most of the South Asian evidence. Unfortunately, no maps show the distribution of individual sites in relation to specific basin boundaries. Instead, the included maps show that Paleolithic evidence is distributed as parts of isolated Quaternary fluvial basins within larger Purana Basins. Neither are the three areas (core, peripheral, and isolated) clearly demarcated on a single map of the Indian Subcontinent; instead, the latter two are vaguely described in the text in relation to specific geological belts. Instead of a viable and testable 'model,' the evidence of hominin occupation of basins as described by Korisettar represents a basic observation known to prehistorians, Paleolithic archaeologists, and paleoanthropologists since the beginning of such studies in India in the mid-19th century (though explicitly and formally pointed out by Korisettar for the first time here). Korisettar possibly makes the mistake of recognizing a pattern when and where there is no pattern. For example, Gujarat and the Thar Desert contain a considerable number of Paleolithic sites but are not parts of any Purana basins. Moreover, only such topographic features as basins will preserve adequate Quaternary sedimentary sequences and, in turn, paleoanthropological evidence. There may be other reasons for the low profile of hominin occupation of some zones—e.g., the Deccan Trap region, where assemblages on basalt may not have survived post-depositional site formation processes (Mishra 1982). Unfortunately, Korisettar does not present any tables of site counts within and outside the Purana Basins. Adequate references to specific information are unfortunately missing (e.g., p. 90: "…some of the sites in Bihar…") and vague generalizations have been made (e.g., "Disruption of drainage networks…" in the western frontiers). When considering these problems, the basin 'model' requires closer re-evaluation in light of specific site locations, counts, artifact densities, survey and preservation bias, location of drainage and fluvial systems, associated taphonomy, and so forth. Several more issues require comments here. The Ganga Basin is not completely devoid of Paleolithic sites (e.g., Anangpur and Kalpi) and in the Siwalik Hills, Lower Paleolithic sites also are found on Siwalik slopes, channel beds, and other geomorphological contexts, and not just restricted to terrace surfaces. There is also no direct evidence of '*severe cold conditions and low biomass of food resources*' in the Sub-Himalayan region during the Lower and early Middle Pleistocene. Such generalizations have been made by over-relying on older published reviews (e.g., by K.S. Valdiya) that also require revision and support through new multidisciplinary data.

Although broad inferences have been made (and some may even be accurate, such as Paddayya's seasonal model), the level of study or resolution of paleoenvironmental data is not yet high or fine enough to correlate hominin behavioral patterns to monsoonal patterns. While the role of the South Asian monsoon during hominin occupation must have been a significant one, we also need to appreciate that in other regions (e.g., the Levant, Africa, Europe) where equally extensive or even lengthier/richer hominin occupation took place, there were no comparable monsoon regimes. There is also no paleontological evidence of large Pleistocene herbivores moving southwards into peninsular India from the Siwalik region. Description of faunal movement from the Siwalik Hills to peninsular India is described as if there was no fauna in peninsular India prior to this alleged migration (see Nanda [2008] for related information). Such faunal populations also could have evolved in the same region from preceding populations, evidence for which is scarce due to the preservation bias of the temporally relevant sediments (pre-Middle Pleistocene) south of the Siwalik Hills.

While it is probably true that the NE Indian region was not a suitable corridor for hominin dispersals until probably the Late Pleistocene, it may be premature to rule out the chance of recovering Paleolithic evidence in '*dense evergreen forest ecosystems*' in the Subcontinent and elsewhere in the Old World. Evidence for the occupation of similar ecozones comes from modern hunter-gatherer and related populations (e.g., South American rainforests, NE Indian and central/southern Indian hill zones, Papua New Guinea and similar regions, the Congo, and so forth) (also see Morrison, this volume). Many cave and rockshelter sites also are known to be located in forested environments which are generally resource-rich. Therefore, the true 'lack' of Paleolithic sites in forested contexts may actually be a result of survey and preservation bias and poor archaeological visibility due to dense vegetation cover. Korisettar's basin 'model,' as it currently stands, simply represents a general contextual observation and may be untenable as a formal interpretative and theoretical model in the classic sense. For example, the presence of early Paleolithic sites outside such basins and even along coasts in other regions of the Old World would directly contradict the basin model.

In Chapter 5, Paddayya highlights the rich Acheulean evidence from the Hunsgi-Baichbal region including Isampur, which he has studied for several decades. His documentation of contemporary edible floral/faunal resources in his study region was the first of its kind. However, a detailed report of the Isampur excavations and lithic analyses is still pending and required to permit useful comparisons with other Acheulean evidence in the Old World. Unlike the cautious approach taken by others, Paddayya is more cavalier when accepting the controversial ages of Isampur (1.27 Ma) and Riwat (2.0 Ma). Though hominins were probably in the subcontinent during the Early Pleistocene, there are currently no unequivocal absolute dates older than 400 Ka in the entire Subcontinent (Chauhan in press). Paddayya rightly points out the need to approach the Indian Acheulean from a holistic and multidisciplinary perspective with greater emphasis on cognition and sociality at a regional adaptive level. Though the two divisions of "early" and "evolved" Acheulean are mentioned for the Hunsgi evidence, it is generally difficult to divide the South Asian Acheulean as such. The wet-dry season model is described as being testable but this may not be so easy, as related evidence is not adequately preserved and/or the resolution of the paleoenvironmental reconstructions is not high enough. Plus, such testing will require more than

just an emphasis on faunal evidence—palynology, stable isotopes studies, geochemistry, and other related methods also are crucially required. R.B. Foote's hypothesis about early man avoiding the Western Ghat region because of its high rainfall and thick vegetation also requires further reconsideration. Such eco-zones represent rich resources and were probably frequently exploited (seasonally) by early humans and the lack of corresponding evidence may be due to various reasons (e.g., thick vegetation not allowing proper surveys, lithics being transported after use instead of being discarded, inadequate surveys).

The history of investigations of the remarkable site of Attirampakkam is outlined by Pappu in Chapter 6, with emphasis on Foote's observations and subsequent revisions in methodology, descriptions, and general interpretations. Key past problems in methodology and interpretation are discussed in the general context of Indian prehistory (pp. 132–133); Pappu's research at Attirampakkam represents a major step to confront and dispel them. Most importantly, this site will soon represent the most comprehensively-studied prehistoric sequence in the entire Subcontinent. Therefore, the results of the lithic analysis and multiple chronological applications are eagerly awaited and should reveal valuable information about long-term hominin adaptations at a single location.

In Chapter 7, a novel approach to interpreting the Narmada cranium is presented by Athreya using four different models relating to hominin taxonomy and may represent the last definitive and comprehensive taxonomic study of this specimen. Few such global studies have been able to include measurements of original hominin cranial specimens, for which Athreya is commended. The primary weakness of such studies using different possible analytical models is that one has to perhaps (over)rely on various statistical probabilities instead of reaching a confident and conclusive answer. Athreya is essentially forced to address the taxonomy of an incomplete fossil cranium using a poorly-defined and controversial hominin species—the presence of *Homo heidelbergensis* in South Asia is questioned while confronting its taxonomic validity. Ultimately, that species is provisionally not considered to be present in South Asia due to insufficient evidence. Also, Athreya's reference to the Narmada cranium as "Middle Pleistocene *Homo*" (as Jones also does in this volume) is probably unwarranted because Patnaik et al. (2009) recently concluded that it may be as young as ~50 Ka due to the fluvial mixing of associated deposits. If so, it may have been contemporary with the youngest *Homo erectus* populations from SE Asia (if *their* dating and context are also reliable). Accepting the mosaic features of the Narmada cranium as a result of the region's intermediate position between Africa and Asia may be problematic at this stage, especially based on such an ambiguous and (directly) undated specimen. The region was possibly a dispersal corridor to reach E/SE Asia during the Early Pleistocene and Upper Pleistocene but this does not seem to have been true for much of the Middle Pleistocene due to the lack of Acheulean evidence north and east of South Asia (i.e., the Movius Line). Therefore, the geographically-mosaic-features perspective assumes only unidirectional hominin movement (into South Asia from the East but not vice versa), which requires a convincing explanation. If this is not true and the region was largely isolated, the mosaic features may simply represent large-scale phenotypic overlap in early Asian *Homo* independent of regional gene flow. Therefore, expecting a regional species or sub-species during the Middle and early Upper Pleistocene in South Asia should not be fully ruled out yet.

In the following chapter (Chapter 8), Jones reviews and addresses the important and controversial topic of the potential impact of the ~74 Ka Toba super-eruption on South Asian hominin populations, a hotly-debated topic with often polarized viewpoints. Jones integrates archaeological, geological, and population genetics evidence to address a number of key related issues such as Acheulean-tephra associations and the first arrival of moderns. Since then, three key papers have been published on the topic: two of them with opposing conclusions based on different approaches (Petraglia et al. 2007; Williams et al. 2009) and the latest by Jones (in press) on the Son Valley evidence. In this volume, Jones questions whether modern humans were in India at the time of the Youngest Toba Tuff (YTT: ~74 Ka). Unfortunately, the genetics bracket for initial modern human entry into the region is uselessly wide (61–20 Ka) and varies from study to study. Based on archaeological comparisons, Petraglia et al. (2007) suggest that moderns were possibly in India before YTT invoking a southern coastal dispersal from Africa to India (Jwalapuram). However, recent dating demonstrates that some of the South African Howieson's Poort sequences (with which Jwalapuram statistically and morphometrically clustered) are actually *younger* than the Indian evidence, thus questioning the reliability of technomorphological similarities in identifying long-distance cultural connections and technological dispersal and/or possible regional innovations. On the one hand, Jones says that *Homo sapiens* presence/extinction in India at YTT cannot be ruled out and that more than one *Homo* species may have been present before/after YTT. Due to possible refugia and geographic-level variation of YTT impacts, the complete extinction of all South Asian hominins at ~74 Ka is unlikely. Genetic studies suggest a population expansion event by moderns soon after YTT but, again, this estimate is situated within a lengthy temporal bracket. These general interpretations are problematic when attempting to interpret the lithic evidence from Jwalapuram, which suggests that the same hominin species produced the pre- and post-YTT lithic assemblages. From their broad homogenous nature, it is probably unlikely that two different hominin species produced the respective assemblages. If modern humans became extinct due to YTT, then precisely how long did it take for hominins to re-occupy India after YTT? It is even possible that the YTT event was partially or fully responsible for the gradual and formal end of diminutive-biface production during the South Asian early Middle Paleolithic.

Though the paper presents interesting data, there are several conceptual and interpretative problems. Several

Narmada Quaternary formations are listed, but the latest important work by the Geological Survey of India (see Patnaik et al. 2009) is not mentioned. They have proposed seven formations and Dhansi is actually Early Pleistocene, thus not correlating to the younger formation(s) in the nearby Son Valley. Also, the Acheulean associated with YTT strata cannot be used to imply a late survival of the South Asian Acheulean because the main examples are typologically Early Acheulean (e.g., Bori, Morgaon). Another problem is related to context—artifacts have never been found *within* the YTT but are always found in younger strata separate from the YTT, thus possibly representing considerable time gaps between the final deposition event of the tephra and subsequent hominin presence at discrete locations. In short, the lithic-tephra associations are generally vertical, never horizontal, and may not be contextually adequate to accurately hypothesize about post-YTT scenarios. Unfortunately, not enough work has been done to accurately hypothesize about the *precise* changes (if any) in faunal turnovers, ecology, technology, demography, dispersal, and so forth, and the meaningful integration of all this data. The Mentawani faunal refugia interpretation may be partly applicable to parts of India and more faunal research is required in relation to YTT in South Asia. In addition to the two post-YTT population bottlenecks that Jones mentions for modern humans and a chimpanzee species, similar contemporaneous events have also been documented in orangutan, macaque, and tiger populations (see Williams et al. 2009). When considering the low or possibly inadequate number of stratified lithic-fauna-hominin-YTT associations throughout the Indian Subcontinent, combined with the possibility of affecting factors *other* than Toba, it may *never* be possible to reveal the full and true impact of the Toba super-eruption on South Asian hominin populations. Thus, the real challenge lies in accurately pinpointing and distinguishing between these Toba and non-Toba factors of impact, especially from the archaeological evidence. When briefly discussing the Acheulean-tephra associations in India, Jones states that M.-Y. Lee and colleagues propose that the Kukdi/Bori tephra is the Oldest Toba Tuff (OTT). Actually, Lee and colleagues never explicitly refer to the Kukdi/Bori tephra in their paper but simply suggest a possible presence of OTT in the Indian Subcontinent in general; moreover, their hypothetical OTT distribution boundaries fall considerably short of the main Acheulean-tephra associations in India including Kukdi/Bori (Chauhan in press). Obviously, significantly more work is required across the entire Indian Subcontinent and in regions closer to the Toba volcano to resolve all of these issues.

Chapter 9 represents the issue of behavioral modernity in South Asia, a topic also covered by James previously in *Current Anthropology*. If geographic size was a major factor in contributing to behavioral modernity, then the European and Indian evidence should be similar, but it is not. Also, scholars keep repeating the mistake of treating Africa as one homogenous geographic unit instead of considering its mosaic ecological, climatic, and regional cultural variations. The Indian modern 'package,' as in some other regions, appears to have assembled gradually unlike Europe, where the Upper Paleolithic 'revolution' is most prominent after 45 Ka. This may have been due, in part, to the large number of caves and rock shelters within a geographically restricted zone (parts of Europe), thus encouraging long-term habitation and intense cultural interaction with neighboring groups, ultimately leading to increased symbolic expression and regional technological innovations. As with some other papers in the volume, there are several minor errors and shortcomings. For example, the Middle Paleolithic site of Samnapur has never been precisely dated, despite the age bracket given and the earliest blades in India occur with Acheulean contexts such as in the Bhimbetka rock-shelter sequence (Chauhan 2009). Also importantly, there is no proven correlation between different ecological parameters and associated flake manufacturing types—the variation in the latter may just be a regional cultural phenomenon. The Middle Paleolithic site of Kalpi in the Ganga Valley and Site 55 in a post-Siwalik context in northern Pakistan are both ~45 Ka old but both are drastically different from each other in terms of assemblage composition and technological features (bone tools, stone-lined platform, blade frequencies, heavy-duty tools, varying microlithic occurrences). Such contemporaneous typological and behavioral diversity suggests that the South Asian Lower, Middle, and Upper Paleolithic phases perhaps need to be viewed as comprising geographically-varying technological changes in relation not only to ecological and subsistence parameters, but also in relation to both *in situ* development and external influences. However, it may be inappropriate to introduce new techno-chronological terms ("Later Paleolithic") at this time, especially without any absolute dates from key stratified sites. Indeed, Sali's (1989) provisional divisions of Early and Late Upper Paleolithic and Early and Late Mesolithic are still useful and applicable for the South Asian evidence of this time period.

The chapters by Endicott (10) and Stock et al. (11) respectively approach the South Asian evidence from genetic and physical anthropological perspectives and thus complement one another. One of the most obvious problems in relation to the initial timing of the earliest modern dispersals is the frustratingly wide range of age-brackets currently known. For example, broad error margins evident in the coalescence times of the ancient haplogroups—e.g., 89–35 Ka and 70–50 Ka for arrival into the Indian Subcontinent; 81–56 Ka for Y-chromosome non-African coalescence, 73–55 Ka for India (again different); 60–50 Ka for moderns into India (also see Jones' chapter). Regarding genetic studies and population history of the Indian Subcontinent, a number of instrumental studies have been published in recent years and deserve special mention here—e.g., Eswaran (2002 ["diffusion wave"]), Atkinson et al. (2008 [South Asian population expansion events]), and Reich et al. (2009 [differences between northern and southern Indian populations]). The concept of geographic barriers is not fully convincing as a factor for the genetic/cultural isolation of modern human populations in South Asia following initial colonization. If these barriers were crossed at least once to

get into India and on to SE Asia, then they were probably crossed and re-crossed multiple times. Also, if geographic expanse and natural resources resulted in demographic expansion between 30 and 20 Ka, then why did expansion not occur even earlier? Why precisely *after* 30 Ka? Such questions remain to be convincingly answered. The prolonged *in situ* development and the evident lack of subsequent movement into and out of the region may have been due to other yet unknown factors instead of primarily geographic barriers. In addition, the broad homogeneity of South Asian cranial features resulting from long term isolation and gene flow between South Asian groups indirectly contradicts the well-known endogamous nature of most South Asian tribal populations. Though not exclusively focusing on South Asian specimens, two recent studies incorporating global cranial samples (Betti et al. 2010; von Cramon-Taubadel and Lycett 2008) are relevant for interpreting and studying Indian cranial diversity in relation to genetic drift, natural selection by climate, and relative distance from the point of geographic origin, i.e., Africa.

The chapters by Lukacs (12), Walimbe (13), and Stock et al. (11) contain overlapping interpretative elements, including slightly redundant background information at times. In Walimbe's contribution, there appears to be a slight overemphasis on Hawkey's observations (as well as Misra's), some of whose conclusions, such as minimal gene flow between Indus and Deccan populations, also are evident exclusively from the archaeological evidence. Regarding pathological conditions, a South Asian Chalcolithic site recently has yielded the oldest human osteological evidence of leprosy at 2000 B.C. (Robbins et al. 2009). Morrison (Chapter 14) addresses the important topic of cultural identity in the later prehistory of the Subcontinent, namely the Holocene evidence from a general perspective. The very concept of 'tribal' is discussed in the context of Holocene cultural integration and also the limitation in using modern Indian tribal groups to infer Paleolithic life-ways. Foraging is viewed as a long-term cross-cultural adaptive/strategic behavior instead of culturally/geographically restricted in space and time. Boivin's contribution, represented by Chapter 15, is one of the first integrative approaches to understanding caste and she aptly points out the serious need for a more in-depth analysis by different scholars working together. Though doubted by some scholars, the marked division of labor within the urban Harappan realm may hint at a 'proto-caste system' in its rudimentary form, if not as a full-fledged established system as known later on. A minor correction of the Sankrit word 'Purusha'—it literally means *man* or in this case in the *Rig Veda*, it signifies the *primeval cosmic giant* (not "original body"). In Chapter 16, McMahon and McMahon offer useful avenues of specific quantitative methods to allow future comparisons of South Asian language affiliations with the relevant linguistic, genetic, and demographic backgrounds. As with Turner and O'Regan's chapter (Chapter 2), it does not deal directly with the South Asian evidence but encourages such specialists to utilize new approaches. Magee et al. (Chapter 17) and Fuller (Chapter 18) both discuss the genetic evidence of specific South Asian domesticated animals. Fuller goes several steps further by presenting one of the most data-rich papers in the entire volume through a masterful synthesis of linguistics, agricultural botany, and domesticated faunal genetics. As a minor point, a proper legend in his Figure 5 would have been better instead of the unnecessarily long and descriptive caption.

The final chapter of the volume is by Possehl (19) who provides a rough synthesis of all the previous 18 contributions. It should be noted that he is a Harappan specialist (all the more surprising that a separate chapter is not dedicated to that civilization), and thus probably not the most suitable scholar to address the Paleolithic chapters. Here, an Indian prehistorian could have also been included as a co-author with Possehl or even as an author of a separate chapter (see Camps and Chauhan 2009 as an example of five discussant chapters by five different authors, selected according to time periods and topical areas). As a result, several awkward phrases could have been avoided or modified (e.g., "Mode 1 travelers;" "Mode 1 hominins"); although Possehl is referring to the earliest Oldowan dispersals, it can be easily confused with younger Mode 1 occupation (e.g., Kuldara at 800 Ka). Regarding early dispersal directions, it is probably not possible to look for "many routes into the Subcontinent" as there was only one dominant one—the northwest corridor. The discussion on the Movius Line, though interesting and important, seems out of place here as it was not a part of the volume and does not properly address India's role in contributing to its paleoanthropological significance. The South Asian Upper Paleolithic phase requires a better comprehensive evaluation and absolute dates before it can be casually dismissed, which Possehl rightfully acknowledges. For example, instead of being typo-morphologically present in India in the manner it was in Europe, it was probably present in a unique or atypical South Asian regional form. The rather late survival or production of microlithic elements up to very recent times in South Asia (e.g., Roy, 2008) is important and pertinently underscored by both Possehl and Morrison.

The most important contribution this volume makes is that the South Asian paleoanthropological and cultural evidence is highlighted through a relatively new and well-known international publishing series. It also introduces diverse lines of research to be pursued and will hopefully encourage and stimulate new methodological approaches and fresh interpretations of human evolutionary scenarios in a unique region of Asia. Unfortunately, these features of promise come with a hefty price—selective racial, gender, and departmental bias in the conference and volume contributions. For example, the conference invitees and volume authors appear to have been specifically selected and several chapters were later solicited from scholars who were not a part of the conference. Conversely, specific prominent people who participated in the conference were deliberately excluded from the proceedings volume, reasons for which are unclear (see Kennedy 2008). To go beyond a mere quibble, South Asians should have been invited to play more prominent roles during the conference

(as chairs and discussants) and in the volume (as co-editors and discussants). Instead, *all* chairs and discussants during the conference were exclusively Western male scholars based in the UK and the US. Out of the 28 contributors listed, only five are South Asian. Out of these five, Paddayya and Korisettar may be obligatory solicitations, being Petraglia's closest Indian 'collaborators.' Regarding the Western contributors, they are predominantly biased towards those from UK institutions and only four are American (Athreya, Lukacs, Morrison, and Possehl). In addition, many of the Western contributors are from the editors' home institution (Cambridge University) (e.g., Lahr, Stock) or include mainly close collaborating colleagues (e.g., Fuller, Kivisild) of Petraglia and his wife Boivin, also a contributor. The only two then-graduate students in the volume (James and Jones) were also students of Petraglia at Cambridge at the time of the conference. No South Asian graduate students, recent PhDs, and other active and senior archaeologists, geneticists, and anthropologists appear to have been considered. This blatant marginalization of past and present South Asian contributions to the discipline negates a recent attempt (Boivin et al. 2008) to demonstrate successful Western-Indian 'collaboration,' making it appear more as damage control. In a day and age where multidisciplinary paleoanthropological research in developing regions such as South Asia is encouraged and practiced constructively across gender, racial, cultural, intellectual, and economic boundaries, such biased enterprises are not only surprising but also demeaning and demoralizing to non-Western researchers overall. Besides the occasional typos and other minor errors, references are missing from reference lists of at least three chapters, demonstrating that the editing could have been more thorough. Though some of the data in many of the chapters also has been published elsewhere, it is anticipated that this important volume will encourage more meaningful and comprehensive global comparisons through a more active inclusion of South Asia in future human evolutionary paradigms.

REFERENCES

Atkinson, Q.D., Gray, R.D., and Drummond, A.J. 2008. mtDNA Variation Predicts Population Size in Humans and Reveals a Major Southern Asian Chapter in Human Prehistory. *Society for Molecular Biology and Evolution* 25: 468–474.

Boivin, N., Korisettar, R., Petraglia, M. 2008. Successfully negotiating international archaeological collaboration: An East-West example. *The SAA Archaeological Record*, 8 (2): 8–11.

Betti, L., Balloux, F., Hanihara, T., Manica, A. 2010. The Relative Role of Drift and Selection in Shaping the Human Skull. *American Journal of Physical Anthropology* 141: 76–82.

Camps, M. and Chauhan, P.R. 2009. *Sourcebook of Paleolithic Transitions: Methods, Theories, and Interpretations*. Dordrecht, The Netherlands, Springer Press.

Chauhan, P.R. 2009. The South Asian Paleolithic record and its potential for transitions studies. In M. Camps & P.R. Chauhan (eds.), *Sourcebook of Paleolithic Transitions: Methods, Theories and Interpretations*. Dordrecht, The Netherlands, Springer Press, pp. 121–139.

Chauhan, P.R. in press. Comment on 'Lower and Early Middle Pleistocene Acheulian in the Indian Sub-Continent' by Gaillard et al. 2009 (*Quaternary International*). *Quaternary International*. doi:10.1016/j.quaint.2010.01.021.

Choi, K. and Driwantoro, D. 2007. Shell tool use by early members of Homo erectus in Sangiran, central Java, Indonesia: cut mark evidence. *Journal of Archaeological Science* 34 (1): 48–58.

Mishra, S. 1982. On the effects of Basalt weathering on the distribution of Lower Paleolithic artefacts in the Deccan. *Bulletin of the Deccan College Post Graduate & Research Institute* 41: 107–115.

de la Torre, I. 2004. Omo Revisited – Evaluating the Technological Skills of Pliocene Hominids. *Current Anthropology* 45(4): 439–465.

Eswaran, V. 2002. A Diffusion Wave out of Africa – The Mechanism of the Modern Human Revolution? *Current Anthropology* 43(5): 749–774.

Jones, S.C. in press. Palaeoenvironmental response to the ~74 ka Toba ash-fall in the Jurreru and Middle Son valleys in southern and north-central India. *Quaternary Research*. doi:10.1016/j.yqres.2009.11.005.

Joordens, J.C.A., Wesselingh, F.P., de Vos, J., Vonhof, H.B., and Kroon, D. 2009. Relevance of aquatic environments for hominins: a case study from Trinil (Java, Indonesia). *Journal of Human Evolution* 57: 656–671.

Kennedy, K.A.R. 2008. South Asian Paleoanthropology: New Perspectives. *Journal of Mammalian Evolution* 15: 223–225.

Nanda, A.C. 2008. Comments on the Pinjor Mammalian Fauna of the Siwalik Group in relation to the post-Siwalik faunas of Peninsular India and Indo-Gangetic Plain. *Quaternary International* 192: 6–13.

Patnaik, R., Chauhan, P.R., Rao, M.R., Blackwell, B.A.B., Skinner, A.R., Sahni, A., Chauhan, M.S., and and Khan, H.S. 2009. New geochronological, palaeoclimatological and Palaeolithic data from the Narmada Valley hominin locality, central India. *Journal of Human Evolution* 56: 114–113.

Petraglia, M.D., Korisettar, R., Boivin, N., Clarkson, C., Ditchfield, P., Jones, S., Koshy, J., Lahr, M.M., Oppenheimer, C., Pyle, D., Roberts, R., Schwenninger, J.-L., Arnold, L., and White, K. 2007. Middle Paleolithic Assemblages from the Indian Subcontinent Before and After the Toba Super-eruption. *Science* 317(5834): 114–116.

Reich, D., Thangaraj, K., Patterson, P., Price, A.L., Singh, L. Reconstructing Indian population history. *Nature* 461: 489–494.

Robbins, G., Tripathy, V.M., Misra, V.N., Mohanty, R.K., Shinde, V.S., Gray, K.M., Schug, M.D. 2009. Ancient Skeletal Evidence for Leprosy in India (2000 B.C.). *PLoS ONE* 4(5): e5669. doi:10.1371/journal.pone.0005669.

Roy, B. 2008. Modern microlith makers in Mandla, Madhya Pradesh (India): continuity or re-invention? *Antiquity*

82 (318). Online project gallery.
Sali, S.A. 1989. The Upper Palaeolithic and Mesolithic Cultures of Maharashtra. Deccan College Post-Graduate and Research Institute, Pune.
Su, D.F., Harrison, T. 2008. Ecological implications of the relative rarity of fossil hominins at Laetoli. *Journal of Human Evolution* 55: 672-681.
von Cramon-Taubadel, N., Lycett, S.J. 2008. Brief Communication: Human Cranial Variation Fits Iterative Founder Effect Model With African Origin. *American Journal of Physical Anthropology* 136: 108-113.
Williams, M.A.J., Ambrose, S.H., van der Kaars, S., Ruehlemann, C., Chattopadhyaya, U., Pal, J., Chauhan, P.R. 2009. Environmental impact of the 73 ka Toba supereruption in South Asia. *Palaeogeography, Palaeoclimatology, Palaeoecology* 284: 295-314.