'Out of Africa' - An Investigation into the Earliest Occupation of the Old World

Marco Langbroek
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In the last few years, there has been an increase in research on the earliest dispersals from Africa into various parts of Eurasia. The recent conference at Stony Brook University ("Out of Africa I: Who, Where, and When") and a recent, insightful paper by Dennell and Roebroeks (2005) are testimonies to this new academic trend that is addressing crucial questions about the earliest hominins and their adaptive and dispersal strategies in Eurasia. In that light, this volume by Marco Langbroek has been published at an appropriate time, providing researchers with an important review of data known to date.

Essentially the volume is a critical assessment of the chronology and nature of the earliest hominin dispersals from Africa into various parts of Eurasia. Following an introductory chapter, respective regions and their representative sites are discussed and assessed. All data presented is organized into a total of six parts, each of which is divided into sub-sections. Part I discusses evidence of human occupation in Eurasia prior to 1.4 myr and includes sites from Java, China, Pakistan, the Republic of Georgia, North Africa, and Spain. Part II deals with the evidence from 1.4-0.5 myr and includes sites from China, Southeast Asia, and southern Europe. Part III is dedicated to the archaeological record of Africa prior to 1 myr and also introduces the Movius Line. In Part IV, Langbroek elaborates on the Movius Line and discusses the associated evidence from northern Africa, Pakistan, Europe, and the Levant, with a separate section (4.2) including the evidence from England and France. Finally, Parts V and VI comprise a concluding synthesis and an Appendix with a bibliography, respectively. All chapters and associated comments are outlined in greater detail below.

In the introductory chapter, the author provides readers with the topics to be discussed in the subsequent chapters. An important feature of the book is also presented here—a list of discrete criteria used to assess the published claims of early occupation in Eurasia. Langbroek basically explains that legitimate artifacts must have a well-established stratigraphic context, that surface finds are inadequate, and sites should undergo vigorous taphonomic observations. There is also a lengthy introduction to the Movius Line, the Acheulian, and general chronology. An emphasis has also been placed on the relevance of a savannah environment and there is a brief mention of recognizing tools made by chimpanzees or hominoids in the archaeological record (referred to as "Pandora's Box"). However, this important issue is not re-addressed later in the volume.

Part I begins with a discussion of the evidence known from Sangiran and Mojokerto (Java). There are prominent sections on the geology and on 40Ar/39Ar ages in the region (published by Swisher and Larick, and their respective colleagues). Here, Langbroek takes the opportunity to highlight the importance of tektites at Sangiran. However, the discussion on Mojokerto is shorter and no stratigraphic columns are included for the site. This part also assesses the controversial evidence from Longgupo Cave and Yuanmou in China. Unfortunately, the latter site is only briefly discussed in comparison to the former. The stone tool assemblages from northern Pakistan are also reviewed properly but not adequately. For example, more detailed information, including stratigraphic illustrations and associated palaeomagnetism results could have been included with the text. Furthermore, the work by the British Archaeological Mission to Pakistan had a much longer history of research and publications than is shown. For example, the latest comprehensive archaeological and vertebrate palaeontological publication by the Mission is by R. Dennell and his colleagues (2004) on their work in the Pabbi Hills. Although Langbroek ends up supporting the comparatively older evidence from Riwat more than the evidence from the Pabbi Hills, he manages to cover all the salient issues for the early evidence in northern Pakistan. Section 1.4 involves a good review of the evidence from 'Ubeidiya and Dmanisi, however, Langbroek downplays the significance of these sites and, surprisingly, is very conservative about their respective chronologies.

Although the volume is predominantly about Eurasian occupation, the author deviates from this main geographic theme by including the evidence from Ain Hanech in northern Africa. Although this site is extremely critical in terms of Oldowan dispersals from eastern Africa, comparable evidence (or a lack thereof) from other key zones of Africa such as Morocco, Egypt, the Horn of Africa, and so forth, needs to be mentioned. As other researchers have done, Langbroek mentions the possibility of a younger age (1.0 – 1.2 myr) for the Ain Hanech Oldowan assemblages. However, I feel that the investigators at that site have adequately demonstrated, through palaeomagnetic applications and biostratigraphy, an older age ca. 1.8 myr for the Oldowan artifacts. Langbroek also stresses the evidence from El-Kherba, for general comparative purposes.

The final section in Part I is dedicated to the controversial evidence from the Orce Basin, Spain. Here, Langbroek elaborates upon the history of research in this highly interesting region and adequately reviews the geochronological and palaeontological evidence. A more detailed map illus-

trating all the important localities and sedimentary exposures from the Orce Basin would have been useful. From the review, however, it is clearly evident that more detailed work is needed here with a greater emphasis on global hominin and mammalian dispersal models.

Part II includes data situated between 1.4 and 0.5 myr in age and discusses the well known evidence from the Nihewan Basin, particularly Donggutuo, Xiaochangliang and also Gongwangling. The unique Mode 2 site-complex of Bose is also included here as a possible Early Acheulian occurrence east of the Movius Line. Langbroek rightfully stresses the problem of interpreting the stratigraphic association of tektites with the archaeological material, elaborating on the issue between fluvial reworking and palaeodeflation. While he also discusses contemporary evidence (ca. 800 kyr old as at Bose) from Kuldara in Tadjikistan in central Asia, he does not attempt to elaborate on how or why these respectively exclusive Modes 1 and 2 assemblages can be contemporaneous.

In any case, Langbroek could have dedicated more discussion to and accompanying figures for the Kuldara site, the most important and only well-studied site representing this geographic zone. In this section, Langbroek takes readers back to Southeast Asia, particularly the mainland as well as other islands (e.g., Flores). A good number of pages are dedicated to this region as a lead-in to the evidence known from Australia, followed by a short summary of this section. He places particular attention on the evidence from Thailand and associations of specific faunal assemblages from this region with those from Vietnam. Key Lower and Middle Pleistocene sites in southern Europe are also addressed in a separate section: the evidence from Atapuerca, and Monte Poggiolo, as well as the Ceprano skullcap are described. As a conclusion to this section, Langbroek accepts Atapuerca as the (currently) most reliable site to gauge the earliest occupation of southern Europe. While he concedes the importance of the Spanish and Italian corpus of early sites, he is cautious about their current chronological framework. For northern Europe, he limits the earliest occupation to 500 kyr; however, following Langbroek's publication, the earliest evidence in Great Britain has recently been pushed back to 700 kyr (Parfitt et al. 2005). Parts I and II are summarized in Chapter 2.4, where Langbroek also provides a GLOBE elevation map illustrating the geographic location of the sites mentioned up to this point.

The first part of Chapter 3 is dedicated to the paleoanthropological evidence in Africa prior to 1 myr ago, again with a map showing principal localities in East Africa. This section is an important body of text that familiarizes readers with the behavioral and palaeoecological background to early hominin dispersals from their source area of eastern Africa; however, this entire section may perhaps have been better placed following the introductory chapter. Nonetheless, Langbroek addresses many critical issues regarding early dispersals—different types of grassland ecosystems, the emergence of savannah types and associated hominin evolution, biogeography, subsistence resources, scavenging opportunities, Early Acheulian ecological adaptive strategies, and differentiating between Developed Oldowan and Early Acheulian assemblages in terms of seasonal subsistence strategies. In addition, he delves briefly into important current theories regarding ecological adaptations and biological evolution of early *Homo* species. For example, Langbroek extensively cites the works of Aiello, Potts, Dominguez-Rodrigo, and others. Before concluding Chapter 3, Langbroek introduces readers to the 'Movius Line enigma' in relation to the earliest out-of-Africa migrations; but a more comprehensive review of the Movius Line is provided by Schick, whom Langbroek cites. As a supporting figure, a schematic map of the Old World is provided, illustrating various geographic zones being colonized at different times (shown with relative ages). Curiously, there are no age brackets shown on this map for the Dmanisi and Ain Hanech zones, nor for eastern and southeast Asia.

Part IV is dedicated to redefining the Movius Line in light of Acheulian or Mode 2 discoveries east of this line. This part is ambiguously organized in that it first addresses the geographic expansion of the Acheulian into north Africa, Europe, the Levant, and South Asia (as one sub-section representing evidence of sites that breach the Movius Line), but ends up highlighting (through another sub-section) the Acheulian landscape at Boxgrove. In fact, Chapter 4.2 is entirely devoted to the evidence from Boxgrove and the 'scatters and patches' approach as originally established by Glynn Isaac at East African localities. Although it is not explained clearly in the text, Langbroek specifically selects Boxgrove to understand the adaptive strategies and dispersal of the Acheulian out of Africa, as it represents one of the most well-studied Acheulian sites in northwest Europe, In other words, it is in close spatial proximity to the then-boundary of the Movius Line in that region. However, this sub-chapter could have been improved considerably had Langbroek also discussed at some length the dichotomy between Acheulian (Mode 2) and Clactonian (Mode 1) assemblages in Great Britain. Nonetheless, Langbroek's approach to explaining Acheulian dispersal mechanisms is commendable because he stresses and considers such factors as biface reduction techniques, land-use strategies, artifact transport patterns, planning depth, decision making, and 'routed foraging'. As a concluding comparison, Langbroek (p. 93) states that "…the most notable aspect to emphasize is that the European Early Acheulean compared to the African Early Acheulean complex sensu lato is much more akin to the Developed Oldowan than to the Africa Early Acheulean sensu stricto. The similarities lie in the prolonged trajectories of fabrication, use and discard of handaxes in space and time, and links with use in the context of a flake-core component."

Langbroek concludes with Part V—concluding synthesis and summary. Here, he briefly summarizes his previous chapters and reviews the factors responsible for "Out of Africa 1" (Mode 1) and "Out of Africa 2" (Mode 2) and cites such examples as the works of Dennell and Roebroeks and the carnivore guild arguments of Turner (see Langbroek's

bibliography). Langbroek uses these data (ecological and faunal) to highlight hunting as a major behavioral shift during the Middle Pleistocene in Europe from the earlier confrontational scavenging. Unfortunately, under the section A new 'Movius Line'?, he raises more questions than answers. However, he does go into some detail in partially explaining the Mode 1-2 dichotomy from an environmental perspective, titled Arid-mesic gradients over Eurasia?, and accepts the possibility of Homo erectus first evolving in Asia rather than in Africa. Indeed, it may also be reasonable to follow the suggestion of Dennell and Roebroeks (2005) and consider alternative explanations for the "Out of Africa" dispersals through discrete regional biogeographic perspectives rather than through broad geographic zones.

Langbroek is perhaps overly cautious about accepting chronological frameworks and has not relied heavily on sites of varying controversies throughout Eurasia. As a result, he is of the opinion that the earliest occupation of Eurasia took place no earlier than 1.3 myr. However, I feel that such sites as Dmanisi, Sangiran, Mojokerto, and Riwat, rather than being controversial, are well-dated enough to accept a significantly older age bracket for the earliest hominin dispersals and colonization outside of Africa. He also places "Out of Africa 2" at no earlier than 0.5 myr, but sites such as Gesher Benot Ya'aqov in the Levant prove otherwise. Although they are preliminary and need to be corroborated, the recent ESR results (~1.2 myr) at an Early Acheulian quarry site in peninsular India (Paddayya et al. 2002) should also be taken into consideration for an "earlier-than-expected" southern route for "Out of Africa 2." The Indian subcontinent represents a geographic counterpart to the Acheulian assemblages of northern-northwestern Europe (e.g., Boxgrove) in that the former region represents the southeastern-most occurrences of rich Acheulian assemblages in the Old World and can contribute significantly to understanding why Early Acheulian dispersal reached a lateral equilibrium here. In addition, many Acheulian sites throughout Eurasia are earlier than the 0.5 myr limit that Langbroek sets.

Part VI comprises an appendix and a bibliography. The former is devoted to a cosmic impact in southeast Asia and its ecological repercussions on *Homo erectus* populations.

This volume is a critical assessment of the evidence that integrates hominin behavior, ecological adaptations, and cognitive developments to understand early dispersals and colonizations. However, there are some minor criticisms. In the introductory chapter, a comprehensive table of all sites discussed and their associated attributes would have been extremely useful for readers, particularly for comparative and organizational purposes. It would also have been more convenient if the sub-sections were arranged geographically from west to east. Rather, the evidence from each respective chapter is discussed from east to west. A major weakness of this book is the lack of ample or adequate illustrations of artifacts, stratigraphic sections, and maps of the evidence discussed. Indeed, illustration of key artifact specimens would have proved to be useful for regional comparisons. Langbroek downplays the relevance of faunal compositions, particularly certain taxa associated with early human dispersals (e.g., *Pachycrocuta*, *Theropithecus*, *Homotherium*), in that he does not include tables of importance vertebrate taxa recovered at the sites he discusses. Although Langbroek cites Hyodo et al. (2002), it should be noted that some new findings challenge the young ages for early hominin occupation in China (e.g., Gao et al. 2005). As a minor point, at times, the language or certain phrases are too informal and do not project a professionally scientific tone. A more substantial criticism is that there are some important references that the author could have utilized and included in his bibliography (e.g., Bar-Yosef and Belfer-Cohen 2001); and a basic index would have useful. Some newly published papers relevant to dispersal research are provided at the end of this review.

The above criticisms are mainly minor and overall, this volume is a good reference source, although it can be updated and improved considerably, in light of recent publications involving new discoveries and renewed dating campaigns. The most valuable attribute of this volume is that it provides the palaeoanthropological community with a near-comprehensive review of controversial, as well as widely-accepted, data pertaining to the earliest Mode 1 and Mode 2 occupations outside of Africa.

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