

Why is there a lack of Mode 3 Levallois technologies in East Asia? A phylogenetic test of the Movius–Schick hypothesis

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Received 3 January 2007; revision received 25 June 2007

Available online 17 August 2007

Abstract

The ‘Movius–Schick hypothesis’ claims that an absence of Levallois (Mode 3) technologies in East Asia is due to the lack of a strong ancestral Acheulean (Mode 2) tradition in that region. Hence, this hypothesis is based on the assumption that similarities between Acheulean handaxes and Levallois cores can be interpreted as being phylogenetically homologous (i.e. due to common technological ancestry) as opposed to being homoplastic (i.e. due to convergent technological evolution). Here, the phylogenetic basis of this hypothesis is tested using a formal cladistic procedure. Under the framework of an ‘iterative’ approach to phylogenetic analysis, a series of post-hoc tests and re-evaluations of results follow the initial cladistic analysis. Results of these combined analyses indicate that morphological similarities between Mode 2 Acheulean handaxes and Mode 3 Levallois cores can, most parsimoniously, be seen as phylogenetically homologous. Hence, these results support the tenets of the ‘Movius–Schick’ hypothesis in suggesting that a lack of Levallois industries in East Asia may be due to the paucity of an ancestral Acheulean tradition in that region. The implications of these phylogenetic analyses for the concept of Palaeolithic ‘Modes’ are discussed. It is further suggested that low demographic levels (i.e. small effective population sizes) in East Asia may have constrained the technological phylogenetic trajectory of East Asia compared with that seen in other regions of the Old World during the Lower Palaeolithic. In addition, it is hoped that several methodological issues discussed here will contribute to the growing field of cultural phylogenetic analysis.

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Keywords: Lithics; Cladistics; Cultural evolution; Phylogenetics; Mode 1; Mode 2; Mode 3; Acheulean; Levallois; Movius Line

Introduction

Famously, Movius (1948) noted that strong evidence for an Acheulean tradition is absent in southeast Asia, and that Mode 1 technologies (i.e. polyhedrons, ‘choppers’ and flakes) continue to be made long after distinct Acheulean assemblages appear over much of the Palaeolithic Old World.

Subsequently, the geographic demarcation line between the Mode 1 industries of southeast Asia and the Acheulean (Mode 2) industries of the Indian subcontinent became known as the ‘Movius Line’ (Swartz, 1980). Movius (1969, p. 71) also observed that Levallois (Mode 3) industries were absent in East Asia, and intimated at a possible link regarding the absence of both traditions within the region. This notion has subsequently been extended by Schick (1994, 1998) who has argued that since Levallois technologies are potentially the descen-

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dant of Acheulean traditions, the absence of Mode 3 Levallois traditions might ultimately be explained by the lack of a strong ancestral Mode 2 Acheulean tradition within eastern Asia. Here, the phylogenetic basis of this hypothesis is tested using a formal cladistic procedure of analysis.

The Movius–Schick hypothesis

Movius's (1948, 1969) observation regarding the lack of a clear 'Acheulean' technological tradition in East Asia is a frequently discussed issue (e.g., Swartz, 1980; Schick, 1994; Clark, 1998; Keates, 2002; Corvinus, 2004; Norton et al., 2006). However, in addition to the paucity of Acheulean (Mode 2) assemblages, Movius (1969, p. 71) also went on to observe that "the well-known Levallois technique... is also completely lacking throughout the Far East as far as southeastern Asia and Northern China are concerned" (see also, Schick and Zhuan, 1993; Gao and Norton, 2002). Hinting at a possible link between the absence of these two technologies, Movius (1969, p. 71) commented that normally the Levallois technique "is found in association with the more specialized hand-axe cultures in other regions of the Old World, and in fact the known distribution of the two is very nearly coincidental". More recently, Schick (1994, p. 592) has suggested that the absence of an Acheulean Mode 2 tradition and Mode 3 technologies in southeast Asia "may serve as a corroboration of important technological differentiation between east and west and also as a possible key to potential reasons behind these differences". Schick (1994, p. 593), emphasis in original) also avers that the "absence of *both* technologies in eastern Asia is not easily explained on grounds of lack of suitable raw material, preeminent use of non-lithic raw materials for tools, or different functional requirements", an assertion supported by more recent work (Brantingham et al., 2000). Elsewhere, Schick (1998, p. 456) is more explicit about the link between these two traditions asserting that:

"procedures of Levallois technology can in many ways be seen as an outgrowth of Acheulean procedures, with an emphasis on strategic flaking to shape the mass or form of the flakes removed, on platform preparation to achieve this end, and overall shaping of the mass of the core, it may be significant that both of these technological patterns are lacking in much of eastern Asia".

The view that Mode 2 Acheulean technologies are the direct ancestor of Mode 3 Levallois industries is, of course, in line with the ideas of many others (e.g., Leroi-Gourhan, 1966; Copeland, 1995; Tuffreau, 1995; Tuffreau and Antoine, 1995; Kooyman, 2000, p. 73; deBono and Goren-Inbar, 2001; Petraglia et al., 2003; Tryon et al., 2006). Hence, in drawing upon the earlier observations of Movius (1948, 1969), Schick (1994, 1998) would see the lack of Mode 3 Levallois industries in southeast Asia as the result of an absence of 'ancestral' Mode 2 Acheulean traditions. However, this hypothesis—which might more formally be termed the 'Movius–Schick hypothesis'—rests entirely on the untested assumption that Acheulean bifaces should be regarded as the most appropriate ancestors of Levallois technologies. Moreover, this hypothesis also relies on the implicit assumption that morphological and technological similarities between Acheulean bifaces and Levallois cores are evidence of technological genealogical proximity, a premise that should always be tested rather than assumed (McLennan and Brooks, 2001; O'Brien and Lyman, 2003; Richter, 2005).

Some workers have argued that occasional occurrences of 'handaxe-like' technologies in East Asia render the Movius Line obsolete (e.g., Yi and Clark, 1983; Hou et al., 2000; Gamble and Marshall, 2001). However, the resemblance of these 'handaxes' to those from Acheulean assemblages in terms of morphological features (i.e. degree of bifacial knapping, profile form, thickness) has led many to question the technological comparability of these artefacts with conventional Acheulean bifaces (Schick and Zhuan, 1993; Schick, 1994; Corvinus, 2004; Norton et al., 2006). Moreover, the density of accepted Acheulean sites on the Indian subcontinent (i.e. a region just west of the Movius Line) contrasts starkly with the paucity of purported 'Acheulean' sites to the east of the Movius Line (Chauhan, 2004; Petraglia, 2007). As Norton et al. (2006, p. 534) concluded recently, "if a map of East Asian Paleolithic sites were drawn, the conspicuous lack of biface-bearing sites in East Asia is still prominent". Likewise, we are gaining increased knowledge of the age and distribution of Mode 3 Levallois technologies in Africa, the Near East, the Indian subcontinent and Europe (e.g., Rolland, 1995; Misra, 2001; Shea, 2003; Tryon, 2006; Lycett, 2007b; White et al., 2006). In contrast, eastern Asia continues to exhibit a dearth of Levallois technologies (Schick and Zhuan, 1993; Schick, 1994, 1998;

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