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Abstract: Abstract

The starting point of this paper is that the Movius Line is no longer an appropriate way of studying the Early Palaeolithic of East and Southeast Asia, and should be disregarded. Instead, it is argued that the Early Palaeolithic of East and Southeast Asia needs to be seen as comparable to that in the rest of Eurasia, rather than the product of an isolated backwater. Contra Movius, East Asia was not isolated throughout the entire Early and Middle Pleistocene, but open to immigration during interglacials, as is indicated by its fossil hominin record. As in Europe and Southwest Asia, both bifacial and non-biface assemblages are present in China and Korea, thus indicating the presence of an Acheulean component, although the lack of agreement over how the Acheulean should be defined creates difficulties in establishing its extent in Southeast Asia. Regarding non-biface assemblages, Zhoukoudian was an unfortunate choice of an East Asian site that lacked bifaces, as bifaces are also rare or absent in a number of caves in Southwest Asia and Europe. Additionally, the absence of bifaces in some sites is not convincingly demonstrated because of the small size of the lithic assemblage. Finally, the simple flake industries in Southeast Asia are likely contemporary with Upper Pleistocene, Middle Palaeolithic and microlithic assemblages in India rather than with Middle Pleistocene, Acheulean assemblages, as proposed by Movius.

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Robin Dennell, FBA

Life without the Movius Line: the structure of the East and Southeast Asian Early Palaeolithic

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**Keywords:** Movius Line; Acheulean; Zhoukoudian; China; SE Asia

### **Abstract**

The starting point of this paper is that the Movius Line is no longer an appropriate way of studying the Early Palaeolithic of East and Southeast Asia, and should be disregarded. Instead, it is argued that the Early Palaeolithic of East and Southeast Asia needs to be seen as comparable to that in the rest of Eurasia, rather than the product of an isolated backwater. Contra Movius, East Asia was not isolated throughout the entire Early and Middle Pleistocene, but open to immigration during interglacials, as is indicated by its fossil hominin record. As in Europe and Southwest Asia, both bifacial and non-biface assemblages are present in China and Korea, thus indicating the presence of an Acheulean component, although the lack of agreement over how the Acheulean should be defined creates difficulties in establishing its extent in Southeast Asia. Regarding non-biface assemblages, Zhoukoudian was an unfortunate choice of an East Asian site that lacked bifaces, as bifaces are also rare or absent in a number of caves in Southwest Asia and Europe. Additionally, the absence of bifaces in some sites is not convincingly demonstrated because of the small size of the lithic assemblage. Finally, the simple flake industries in Southeast Asia are likely contemporary with Upper Pleistocene, Middle Palaeolithic and microlithic assemblages in India rather than with Middle Pleistocene, Acheulean assemblages, as proposed by Movius.

### **Introduction**

In a previous paper (Dennell 2014a), I reviewed the fieldwork conducted by Helmut de Terra, Teilhard de Chardin and Hallam Movius in Central Burma (now Myanmar) in 1937-1938 along the Irrawaddy River (Terra and Movius, 1943), and concluded that Terra, the expedition's geologist, was unsuccessful in identifying a sequence of four Middle and Upper

Pleistocene terraces along the Irrawaddy. Consequently, none of the material found by Movius on or in these alleged terraces is demonstrably Middle Pleistocene in age, and indeed, none of it has a secure stratigraphic context (see also Hutterer, 1977). Movius further failed to demonstrate that any of the material he considered from Burma and Southeast Asia (Movius, 1948) was the same age as Middle Pleistocene Acheulean assemblages from India and Southwest Asia. In a related paper (Dennell 2014b), I reviewed Movius's perception of the "Far East" as ancient, exotic but fundamentally conservative and backward, and argued that such views were Eurocentric and should not bias interpretations of its palaeolithic record. I further suggested that the Movius Line is a house built on sand that should be forgotten: it offers no useful insights into the Early Palaeolithic of East and South Asia, and obscures the complexity and variety of lithic assemblages on either side of it. If we are to make a fresh start, we should begin by recognising the spatial and temporal complexity of this Eurasian record. This paper sets out to explore this complexity. The emphasis is on East and SE Asia, as it was here that Movius's views had the greatest influence. These were largely negative in relegating East Asia to a marginal position in human evolution.

## **1) Preliminary considerations**

### **i) Movius and East Asia**

Under Movius's (1948) synthesis (see Fig. 1), the Early Palaeolithic world of Africa, Europe, and Asia comprised two monolithic blocks: an Acheulean one, defined by the use of bifaces in Africa, western Europe, Southwest and South Asia, and one defined by the use of unstandardized flakes and cores in East and Southeast Asia (see Fig. 1). Movius envisaged this dichotomy in cognitive terms; in other words, there were those who made handaxes because they were "progressive" and "dynamic", and others who did not because they were "conservative" and an example of "cultural retardation" (see Dennell 2014b for a critique of these views). As Movius (1948, p.411) stated the tools are "relatively monotonous and unimaginative assemblages of choppers, chopping tools, and hand-adzes..... as early as Lower Palaeolithic times, southern and eastern Asia was a region of cultural retardation .....it seems very unlikely that this vast area could ever have played a vital and dynamic role in early human evolution ... Very primitive forms of Early Man apparently persisted there long after types at a comparable stage of physical evolution had become extinct elsewhere". Movius's opinions were undoubtedly heavily influenced by Teilhard de Chardin, who was the senior figure in the field expedition to Burma in 1938 in which he collaborated

with Helmut de Terra (as he had already in Kashmir in 1935) and Movius, who was by far the junior-most member of that expedition. Chardin was unambiguous about China's context in the wider palaeolithic world: "Early Palaeolithic China was a quiet and conservative corner on account of its marginal geographical position . . . . . in contrast with the already 'steaming' West, Early Pleistocene Eastern Asia seems to have represented . . . . a quiet and conservative corner amidst the fast advancing human world" (Chardin 1941, p.60). He went on to state that "East Asia gives the impression of having acted (just as historical China and in sharp contrast with the Mediterranean world) as an isolated and self-sufficient area, closed to any major human migratory wave" (1941, pp.86,88; italics mine). Movius and Chardin effectively stripped East Asia of any palaeolithic history, since it was seen as static and thus unchanging.

<insert Fig. 1 near here>

#### ii) Post-Movius views of "the Acheulean"

Although the Movius Line still remains in place, palaeolithic archaeologists now see the Early Palaeolithic in more subtle terms. For example, we now reject the implicit, if unintended racism, in Movius's dismissal of East and Southeast Asian hominins as primitive and backward simply because they did not make handaxes. We also recognise that foragers and hunter-gatherers are most unlikely to use the entire range of their non-perishable material culture in all situations and on all occasions: some artefacts – such as bifaces – may be situation-specific and used for specific tasks such as butchering large animals, or used in a social context to attract mates (Kohn and Mithen, 1999 [but see Hayden and Villeneuve 2009]) or enhance status; there may also have been gender or age differences in the ways that tool-kits were used. In other words, there may have been some members of "Acheulean" groups who used bifaces rarely or perhaps never, and some situations where bifaces were seen as unnecessary. We also now recognise that the absence of an item of material culture does not necessarily indicate an inability to produce it; instead, the absence of an item such as a handaxe from an assemblage may result from an absence of suitable material for making one, an absence of the need to make one even if suitable material was available, an unwillingness to transport one more than a certain distance before discard, or a reluctance to discard one. We are also perhaps more wary now than Movius's generation of structuring the remote past in terms of fossile directeurs that may have been very minor components of a past group's material culture instead of considering its commonest components. Most are also

wary of using bifaces to define a “handaxe culture” in social terms, with “the Acheuleans” in Africa, Asia and Europe somehow sharing a similar world-view despite the fact that Acheulean bifaces were made by different hominin species in Africa, Europe and Asia for hundreds of thousands of years.

Nevertheless, three major issues need to be addressed when considering the Early Palaeolithic record of East Asia, and China in particular. These are i) the view that the Early Palaeolithic of China is fundamentally different from that of Europe and Africa and the rest of continental Asia, because of isolation; ii) problems over how the Acheulean should be defined and iii) the different types of lithic evidence from caves and open-air sites. Each can be taken in turn. Southeast Asia will be considered after consideration of these issues.

## **2) How isolated was China during the Pleistocene?**

The longest-lasting legacy of Movius’s writings on East Asia, and China in particular, was the view that early palaeolithic China was fundamentally different from South Asia, Africa and western Eurasia because of its isolation. As a consequence of that isolation, it was seen as an unchanging backwater. The views of Movius (and Chardin) were diametrically opposite those of Weidenreich, who examined the hominin fossils from Choutoukien (now Zhoukoudian) in the 1930’s, and never envisaged East Asia as isolated and thus separate from the rest of Eurasia and Africa. For him, gene flow and intermingling of populations was fundamental in linking populations in East and Southeast Asia with the rest of the Old World (see e.g. Weidenreich, 1946, p.30; Wolpoff and Caspari 1998, pp.194-205). These differences of opinion have had a long persistence: palaeolithic archaeologists have tended to accept the reality of the Movius Line and then seek explanations for it in terms of raw material availability, cultural choice, population size and density etc. (see e.g. Watanabe, 1985; Pope, 1989; Pope and Keates, 1994; Schick, 1994; Lycett and Bae, 2010; Lycett and Norton, 2010), but physical anthropologists have often commented on the similarities shared by Chinese and non-Chinese hominin specimens. These differences stem from conflicting views over the extent to which China was isolated during the Pleistocene, and it is here that the issue of isolation is fundamental.

There is little reason to doubt that China was isolated for much of the Middle Pleistocene because of the barriers to dispersal to the west: the Tibetan Plateau, the Taklamakam and

Gobi Deserts, the Pamirs; and to the southwest, the mountainous terrain of northern Thailand, Myanmar and Northeast India. During periods of increased aridity, the expansion of deserts in northern China and Central Asia would have further accentuated this isolation (see Dennell, 2009, 2013). However, during the equivalent of interglacials when temperatures and rainfall increased, there would also have been “windows of opportunity” for hominins and other animals to disperse into (and perhaps out of) China during the Early and Middle Pleistocene, during, for example, MIS 5, 7, 9, 11, 13 and so on. The likelihood that such dispersals occurred is reflected in the Chinese fossil hominin record. Rightmire (2001), for example, classified the specimens from Dali and Jinnuishan as *H. heidelbergensis*, which has to imply that “[the] spread of some populations of *Homo heidelbergensis* into the Far East cannot be ruled out” (Rightmire, 1998, p.225). For others, this possibility is a near-certainty: “*Homo erectus* at first existed by itself in China; *Homo heidelbergensis* then entered and the two coexisted for a time; finally *H. erectus* became extinct there, and *H. heidelbergensis* persisted alone: an early ‘replacement’ event.” (Groves and Lahr 1994, p.3). Others have commented on the overlap between *H. erectus* and non-*erectus* Middle Pleistocene *Homo*. As example, Wu and Athreya (2013, p.154) comment, “This overlap reflects the fact that the evolutionary trajectory from archaic to more modern forms was the result of highly variable patterns of population dynamics across the Old World between different regional groups”. As Howell (1999, p.223) remarked, “Such shifts are still ill-appreciated”. Under the “continuity with hybridisation model” of hominin evolution in East Asia (see e.g. Liu et al., 2010), “the suite of traits exhibited by Dali could be indicative of a local transition between *H. erectus* and *H. sapiens* that included some influence from western Eurasian populations during the Middle Pleistocene” (Wu and Athreya 2013, p.154). As Bae (2010, p. 89) comments, “The question of whether eastern Asian archaic *H. sapiens* should be classified as *H. heidelbergensis* can also be viewed in the light of dispersing hominin populations. In particular, if *H. heidelbergensis* dispersed from the western Old World and into eastern Asia some time during the Middle Pleistocene, then it would support the hypothesis that a third major dispersal event out of Africa occurred, as postulated by Templeton (2002, 2005)”. Bae (2010, p.90) further comments “even small amounts of gene flow from dispersing *H. heidelbergensis* groups into eastern Asia during the Middle Pleistocene is probably the most parsimonious explanation as to why similar morphological features occasionally appear among penecontemporaneous western and eastern Old World hominins”.

On the other side of the Asian landmass, the cranial fragment from Kocabaş, Syria, has been classified as *H. erectus* s.s. (Kappelman et al., 2008), and proposed as evidence for dispersal from Africa through Southwest Asia to East Asia. (It might perhaps have dispersed in the other direction, from East to Southwest Asia). In more detail, the authors note that it shares features with other Middle Pleistocene hominins from both Africa and Asia that are attributed to *H. erectus*, but is closest overall to Sangiran 17 from Java and Zhoukoudian X in China. They further note that the age estimate of  $490\text{--}510 \pm 0.05$  Ka is close to that of MIS 13, which would have been one of those “windows of opportunity” that allowed migrations both northwards and longitudinally across Asia (see Dennell, 2004). In a similar view, Sohn and Wolpoff (1993) consider that the closest similarities to the 350-400 ka cranium from Zuttiyeh, Israel, lie with Zhoukoudian and “suggest the possibility of an ancestral relationship ..... which shows Asia as a significant source area for at least some living populations.” (Sohn and Wolpoff, 1993, p.325). Dispersals by hominins and other mammals across continental Asia, either from west to east or vice versa, cannot be ruled out for Middle Pleistocene interglacials such as MIS 11 or MIS 13. However, because palaeolithic archaeologists have tended to regard China as isolated and fundamentally different, there are inevitably problems when it comes to explaining “the Acheulean”, to which we now turn.

### 3) Methodological issues

Before we consider the Middle Pleistocene archaeological record from China and SE Asia, two general methodological problems need raising.

i) definitional issues: what is an “*Acheulean*” assemblage?

Although “text-book” examples of handaxes and cleavers are unmistakable Acheulean items, there is a surprisingly large grey area where the presence of a handaxe or cleaver is less clear-cut. Definitions of assemblages as “Acheulean” can depend greatly upon the person(s) classifying them. At Dingcun, China, for example, Pei et al. (1958) classified objects as cores and choppers that were later classed as bifaces by Jia (1955, 1956); see Yang et al. (2014). As another example, Moncel (2013) sensibly illustrates some items from La Noira, France, that could be either crude cores or crude bifacial tools. (They could of course begin as cores, become bifacial tools and then cores again: artefact lifespans can encompass several stages – see e.g. Barkai et al., 2015 and associated papers on recycling). Depending on whether an

item is classed as a “chopper-core”, “bifacial core”, “pick”, “proto-handaxe” or “handaxe”, the Acheulean can float in and out of the archaeological record depending upon who has classified it.

A far more serious problem is over the definition of the term “Acheulean”. When first used in Europe in the 19<sup>th</sup> century, the term was used to define Middle Pleistocene assemblages that contained handaxes. Later, when comparable discoveries were made in Southwest Asia and India, cleavers as well as handaxes became the main defining features. In recent years, some researchers have attached greater importance to LCT’s, or Large Cutting Tools, as the main innovation of the Acheulean, whereby large flakes >10 cm in length were routinely detached from cores. A variant of this proposal is by Sharon (2010), who has coined the term “Large Flake Acheulean” or LFA, to describe assemblages containing large flakes struck from cores. A number of researchers have used these proposals to re-classify assemblages as Acheulean on the grounds that they contain LCT’s. Semaw et al. (2009), for example, has argued that because the Developed Oldowan (or Oldowan B) contains LCT’s, it should be reclassified as Early Acheulean. Similarly, when summarising the material from the Danjiangkou Reservoir Region in Central China, Li et al. (2014) conclude “The techno-economic behaviours present in the LCTs of Danjiangkou Reservoir Region would in fact support the existence of the true Acheulean techno-complex in East Asia”. As a further example, Mishra et al. (2010, p.268) propose that the small assemblage (N=20) from Ngebung, Java, Indonesia, should be regarded as a Large Flake Acheulean “based on the production of large flakes” even though it lacks bifaces.

Whilst not denying the importance of LCT’s, their inclusion as a feature of the Acheulean has helped neither its definition, nor discussions about its geographical and temporal distribution. This is because it is unclear whether LCT’s are an “essential” or “inessential” attribute of the Acheulean in the Aristotelian sense: in other words, is any Pleistocene lithic assemblage automatically Acheulean because it contains LCT’s?; or can a lithic assemblage be Acheulean without LCT’s? Can LCT’s be present in non-Acheulean assemblages? Gaillard (2010) for example points out that “Large flakes (>10 cm), either shaped and/or retouched (tools) or unretouched (blanks), may be part of any type of non-microlithic assemblage, from Lower Palaeolithic to Neolithic”. What matters, she argues, is not the presence of a few pieces that may be classed as Large Flakes or LCT’s but the overall characteristics of the

assemblage. Likewise, bifaces are not unique to the Acheulean since “large bifacial tools also occur in sites considered as Hoabinhian” (Gaillard, 2010, p.245).

The key point here is that the term “Acheulean” is no longer monothetic (i.e. defined by a single essential attribute, such as the presence of a handaxe) but is now polythetic, and defined by the presence of handaxes, cleavers, large flakes and/or large cutting tools. Consequently, there is now no single definition of “the Acheulean”, and consequently the question of whether or not it is present in East and Southeast Asia depends largely on the criteria that are selected to define it. This raises two subordinate issues: if its presence is defined by a “significant presence” of bifaces or LCT’s, what % should be set to define a “significant presence”; and how large a sample is needed to demonstrate this? At present, there is no general agreement over whether an assemblage should be classified as Acheulean if it contains only one biface, or if a threshold percentage of e.g. 10% or 20% is required, as suggested many years ago by Kleindienst (1961). Norton and Bae’s (2008) argument in favour of maintaining a Movius Line *sensu lato*, for example, rests on the low numbers of bifaces in East Asian assemblages compared to comparable assemblages in other regions. However, the proportion of bifaces in a Middle Pleistocene assemblage can vary from 100% (as at Mudnur VIII; India; N= 9/9; Petraglia et al., 2005); to 1% (N=50/5,000), as at Kudaro I, Georgia (Lioubine 2002). Even at well-known Acheulean locations, the proportion of bifaces can be as low as 1.1% at Singhi Talav layers 3a, 3b and 4 (Gaillard et al., 1983) and 1.4%, as at Attirampakkam, layer 6, T3, India (2/286; Pappu et al., 2003), or <7%, as at many locations in Ubeidiya, Israel (Bar-Yosef and Goren-Inbar, 1993). In these cases, they would fall below a threshold of only 10% to be regarded as Acheulean. In any case, as pointed out by Li et al. (2014, p.171) “Setting an arbitrary proportion to characterize a site as Acheulean is actually a type-fossil approach used under the cultural history paradigm and masks the diversity and richness of hominid behaviours at local scales”

There is also no agreement on how large a sample of Early Palaeolithic assemblage should be in order to demonstrate convincingly the probability that bifaces (and/or LCT’s) are absent. If the sample size is set at 100, the absence of bifaces and/or LCT’s at several Early and Middle Pleistocene sites across Eurasia is not proven (see Table 1.

<insert Table 1 near here>

Table 1: Sample size and the absence of bifaces

Site	Source	Age	N artefacts
Karain E, V.1, Turkey	Otte et al., 1998	370-400 ka	4
Karain E, V.5-V.4, Turkey	Otte et al., 1998	>400 ka	14
Ngebung, Java	Sémah et al. 1992	Middle Pleistocene	20
Kuldara, Tajikistan	Ranov 1995	0.9 Ma	94
Pakefield, UK	Parfitt et al., 2005	760-787 ka	34
Happisburgh site 3, UK	Parfitt et al. 2010	c. 850 or 950 ka	78
Sima del Elefante, Spain	Lombera-Hermida et al. 2015	1.0-1.3 Ma	86

#### 4) Caves versus open-air sites: Zhoukoudian and the Acheulean

When Movius wrote his synthesis in 1948, Choukoutien (now Zhoukoudian) was the only Middle Pleistocene archaeological site known in China. The excavations prior to WW2 recovered thousands of artefacts, none of which could be classed as handaxes, cleavers or LCT's. On this basis, Zhoukoudian became the prime exemplar from continental East Asia of a simple flake and core industry that was Middle Pleistocene in age and thus contemporary with Middle Pleistocene bifacial assemblages in India and Southwest Asia, Europe and Africa. Evidence from south China and Southeast Asia would seem to support this generalisation: excavated caves such as Guyanyindong, Panxian Dadong, Tonzi (see Wu and Poirier, 1995; Miller-Antonio et al. 2004) in south China have produced flake and core assemblages, but no indications of bifaces or LCT's.

However, as Kuhn et al. (1996) pointed out, bifacial Acheulean assemblages are known overwhelmingly from surface locations, and rarely from deep cave sequences. Few caves with long sequences contain Acheulean material. Although bifaces are present, they are often rare – only 7/289 (2.4%) in Azyk, for example, and 50/5,000 (1%) at Kudaro I (see Dennell,

2009, p.320). Caves with long sequences and artefact samples of >500 but lacking bifaces include Atapuerca Gran Dolina (Spain), Qesem (Israel), Yabrud (Syria), Yarimburgaz (Turkey) (N=1675; Kuhn et al. 1996), Truegolyna (southern Russia), and Selungur (Kryrkystan [N=1417; Islamov 1990]). Panxian Dadong (N=1805; Miller-Antonio et al., 2004), Zhoukoudian localities 1 and 15. Locality 1 at Zhoukoudian is thus by no means exceptional as a long cave/fissure system that lacks bifaces. As at Yarimburgaz, local stone was available at Zhoukoudian of a size suitable for making handaxes if the inhabitants had so wished. That is to say, they either did not have the cognitive abilities to make one – as implied by Movius – or chose not to, as implied by Kuhn et al. (1996) and Schick (1998) for Yarimburgaz and ZKD respectively.

If the caves of Gran Dolina, Atapuerca, and Yarimburgaz had been the only European Middle Pleistocene sites in 1948, Movius might well have concluded that Europe “cannot be considered in any sense as “progressive” from a cultural point of view”; the tools are “relatively monotonous and unimaginative assemblages (it) was a region of cultural retardation ... it seems very unlikely that this vast area could ever have played a vital and dynamic role in early human evolution”.

Assemblages with bifaces and LCT's are known from open air locations in China, as in Europe, Southwest Asia and India. Those in North and Central China include Dingcun (Yang et al., 2014), Lantian, the Luonan Valley (Wang, 2005), Yunxian (N=9/317; Lumley et al. 2008) and the Danjiangkou Reservoir Region (Li et al., 2014); and Chongnokni in the Korean Peninsula (Bae 1987; Norton et al., 2006). Of these, Yunxian is Early Pleistocene, Bose likely ca. 0.8 Ma (Hou et al. 2000) and Dingcun and Chongnokni likely late Middle Pleistocene; the age of most of the other Chinese bifaces and LCT's is unclear but likely to be Middle Pleistocene.

#### i) Non-biface European Middle Pleistocene assemblages

In Movius's (1948) synthesis, East and Southeast Asian Middle Pleistocene hominins used a “chopper-chopping tool” assemblage. As mentioned above, this marked them as “conservative”, “primitive”, and resident in a cultural backwater. Curiously, he never levelled the same negative views at eastern Europe, where it was recognised that handaxes were very rare east of the Rhine, as remarked decades ago by McBurney (1950). Examples are sites like Markleeburg, Bilzingsleben, Schönungen in Germany, Vértesszöllös in Hungary, Korelevo in

the Ukraine, and various sites in the UK attributed to the Clactonian. Researchers of the European early palaeolithic have tended to seek ecological explanations, or have stressed the importance of tradition, without the implications that hominins who did not use bifaces were primitive compared to those who did.

#### ii) raw material issues

Clearly, the manufacture of a biface (or a flake >10cm in length) requires blocks, nodules or cobbles that are larger than the finished item, and amenable to repetitive flaking. Where these conditions are not met, the absence of bifaces and large flakes may simply indicate that the local inhabitants lacked the means of making them, but not a lack of ability to do so. One example is the Nihewan Basin, China, where the rock is poor-quality crystalline that shatters easily when struck, and rarely allows the working of a large artefacts; also Tajikistan, where the raw material were pebbles ca. 3-5 cm long (Ranov, 1995); Bizat Ruhama, Israel, where artefacts were typically <3cm long; (Zaidner, 2003; Zaidner et al., 2003) and Evron Quarry, Israel, where the mean core length was only 35 mm (Ronen, 1991; Ronen et al., 1998). Here, it is likely the hominins were using a raw material of necessity, rather than prime choice

#### iii) preservational issues

In a few cases, the absence of bifaces may be a factor of differential preservation. Chirki (India) provides a good example. Here, the layer 2 assemblage contained almost no handaxes, cleavers, or other heavy-duty items, unlike the underlying assemblage from layers 3. The initial explanation of the differences between these two assemblages was that layer 3 contained an Acheulean assemblage of handaxes, cleavers, and other heavy duty items, whereas layer 2 contained a Middle Palaeolithic, non-biface, non-Levallois flake assemblage. Mishra (1986), however, pointed out that the basalt at Chirki was friable and easily weathered and thus the absence in layer 2 of handaxes, cleavers, and heavy-duty items could have resulted from their subsequent disintegration when re-deposited in a fluvial gravel. In contrast, basalt tools in layer 3 were minimally transported, and thus able to survive.

### **5) Southeast Asia**

In Movius's 1948 synthesis, and replicated many times subsequently, the Middle Pleistocene bifacial assemblages of India, Southwest Asia, western Europe and Africa were assumed to be contemporaneous with simple flake and core assemblages from Southeast Asia. However,

it is more probable that the Southeast Asian assemblages are contemporaneous with Middle Palaeolithic and later Upper Palaeolithic and microlithic assemblages in India.

i) *Movius's (1948) synthesis of the Early Palaeolithic of Southeast Asia*

Movius (1948) linked Terra and Paterson's (1939) Soanian and his own Irrawaddian data with collections of artefacts from Southeast Asia – the so-called Fingnoian, Pacitanian and Tampanian – and assumed that these were all contemporaneous with bifacial, Acheulean assemblages to the west. None of these claims can be upheld.

The Soanian was a product of the fieldwork by Terra and Paterson (1939) (aided in part by Chardin) in 1935 in the Soan Valley of modern Pakistan. This fieldwork served as a template for the more ambitious field programme of Terra in Burma in 1938. Terra claimed a four-fold sequence of terraces along the Soan River to which a series of non-bifacial flake assemblages could be correlated. This evidence was re-examined by Rendell in 1980/1, who concluded that there was no evidence of Terra's river terraces, and that none of the Soanian assemblages had a secure stratigraphic framework. She and Dennell (Rendell et al. 1989; Dennell and Rendell, 1991) thus concluded that the Soanian in Pakistan had no validity. In India, flake assemblages attributed to the Soanian are likely late Middle Pleistocene in age, as at Toka (Chauhan, 2007), and probably part of the Middle Palaeolithic.

In Southeast Asia, the Fingnoian was created by Heekeren (1948), who collected six (and retained three) stone artefacts from gravels by the Meklong River whilst a prisoner of war during WW2. Notwithstanding his courage, he was unable to demonstrate that the gravel deposit was Middle Pleistocene in age. The Tampanian in 1948 comprised artefacts from Kota Tampan in modern peninsular Malaysia that were published in a short note by Collins (1938). Subsequent research has shown that Kota Tampan is Upper Pleistocene in age, with age estimates variously reported as ca. 74 ka (Majid and Tjia 1998; Reynolds 1993) or as recent as 30 ka (Oppenheimer 2014). The Pacitanian comprised material collected by Koenigswald (1936; see also Koenigswald and Ghosh 1973) from the Pacitan River, Java; Chardin, Terra and Movius inspected the deposits and collections after their fieldwork in Burma in 1938. Movius (1943) and Terra (1943a, 1943b) considered the Pacitanian to be younger than the Burmese material and suggested it was late Middle/Upper Pleistocene in

age. Bartstra (1984, 1985) subsequently proposed that the artefacts came from a veneer capping the local sections and were thus very recent.

ii) the Southeast Asian early palaeolithic record in 2015

Even today, “no stone tools have been recovered from contexts contemporary to the earliest *Homo erectus* fossils in Java” (Mishra et al., 2010, p.269) and remarkably little archaeological evidence from Java can be safely assigned to the Middle Pleistocene.

Although it is possible that one day, unambiguous Acheulean assemblages will be found on Java, as suggested by Mishra et al. (2010), there is currently no clear evidence one way or the other. The most convincing evidence is a small assemblage of ca. 20 pieces that includes a cleaver and several flakes from a Middle Pleistocene sequence at Ngebung (Sémah et al. 1992; Simanjuntak and Sémah 1996), and a chopper and retouched flake at Sambungmachan in a layer dated to the Middle or Late Pleistocene (Jacob et al., 1978). The earliest large and stratigraphically-secure assemblage is from the lowest level of Song Terus cave, with ca. 800 pieces from an alluvial deposit, of which ca. 40% are retouched flakes (Simanjuntak et al. 2010): as noted above, bifaces are rarely found in deep caves, so the absence of bifaces here is not conclusive evidence of their absence in the region.

Although Java has a long and rich record of hominin occupation from 1.5 Ma onwards, it lies on the southwest margin of Sunda and mainland southeast Asia, and its sequence is not necessarily continuous, or representative of mainland SE Asia. (Faunistically, Java has more in common with the Siwalik fauna of North India than with the Oriental fauna of South China; see e.g. Colbert, 1943; Bergh et al., 2001; Nanda, 2002).

Sixty five years after Movius’s 1948 publication, the only well-dated Early Palaeolithic assemblages from Southeast Asia are those from Flores (which has its own unique record of *H. floresiensis*) (Morwood et al. 2004; Brumm et al. 2010) and the late Middle Pleistocene cave site of Panxian Dadong, southern China (Miller-Antonio et al. 2004). More than 30 years after Hutterer (1977, 39) asserted that “the evidence for palaeolithic cultures in Southeast Asia is very meagre, often highly ambiguous, and in many cases quite useless”, there is still no palaeolithic material from mainland SE Asia that is demonstrably Middle Pleistocene in age, and thus contemporaneous with Middle Pleistocene Acheulean assemblages in South and Southwest Asia. In northern Thailand, there are many undated or poorly-dated archaeological sites, but the only dated archaeological evidence are three flakes from under a basalt dated to 0.73 Ma (Pope et al., 1986) at Mae Tha, Lampang

Province, that are questionable on stratigraphic grounds (Marwick, 2009, 54). There are also some cranial fragments from Had Pu Dai, Thailand (Subhavan, 2009), that may be considerably more or less than the claimed date of 500 ka (see Dennell, 2014b), and one tooth classified as *Homo* sp. from the late Middle Pleistocene cave of Thum Wiman Nakin, (Tougaard et al., 1998), but otherwise there is no clear evidence of occupation before the Upper Pleistocene. From northern Vietnam, evidence is limited to perhaps one hominin tooth (Schwartz, 1994; 1995) from the cave of Tham Khuyen, ca.  $475 \pm 125$  ka (Ciochon et al., 1996) and attributed to *H. erectus*, and two teeth of “archaic” *Homo* sp. from the cave of Ma U’Oi (Demeter et al., 2004; 2005) that are late Middle to Late Pleistocene in age.

The contrasts in Movius’s 1948 synthesis are **not** between Middle Pleistocene Acheulean assemblages in South and Southwest Asia and simple Middle Pleistocene flake assemblages in mainland SE Asia, but either between Acheulean assemblages in South and Southwest Asia and no evident occupation in Southeast Asia; or between simple, Upper Pleistocene, Middle Palaeolithic and early microlithic assemblages in India and Southwest Asia and Upper Pleistocene flake assemblages in mainland Southeast Asia. Movius was correct to draw a contrast between the Acheulean of South and Southwest Asia on the one hand and the simple flake and core assemblages of Southeast Asia on the other, but wrong to assume that they were contemporaneous. In the Middle Pleistocene, mainland Southeast Asia appears to have been either uninhabited or so lightly occupied as to leave no definite trace. In the Upper Pleistocene, this region appears to have been colonised by hominins/humans using simple lithic assemblages that were contemporary with the post-Acheulean, Middle Palaeolithic and early microlithic assemblages further west. Why these Middle Palaeolithic and early microlithic did not disperse further east from South Asia into Southeast Asia is currently unanswered.

## **6) Discussion**

The main point of this paper is that the Movius Line is no longer a useful or valid concept for studying the Early Palaeolithic of East and Southeast Asia. To quote Bar-Yosef (2015, p. 84) “Although old terminologies die hard, this term may finally be about to disappear from the literature”. There are three reasons why the Movius Line should (at last) disappear. The first is that the East Asian early palaeolithic record should not be seen as inherently different from the rest of the Eurasia on the grounds that it was an isolated backwater. Although the climatic

downturns of the Middle Pleistocene were severe and long-lasting, there were nevertheless windows of opportunity during interglacials when hominins could, and probably did extend their distribution northwards and longitudinally across Asia (Dennell, 2004, 2015). Even though physical anthropologists frequently have strong and different opinions over how the Chinese hominin skeletal record should be interpreted, several accept that *H. erectus* in China was not isolated from other Eurasian populations throughout the entire Middle Pleistocene. Instead, it is appreciated that the East Asian fossil record is complex and likely the outcome of both autochthonous and allochthonous developments. Allochthonous factors now include the likelihood that Denisovans were present in Southeast Asia at some point (hence their genetic imprint among modern New Guineans and Bougainville Islanders, [Reich et al., 2011]), and *H. heidelbergensis* may at some period(s) have been an immigrant to East Asia. The Chinese archaeological record also supports the probability of contacts with areas to the west. As in Europe and Southwest Asia, both biface and non-biface assemblages are present, and those with bifaces can be classified as “Acheulean” or “Acheulean-like”. However, clarity over the nature and extent of “the Acheulean” in East and Southeast Asia is currently impeded by the lack of agreement over how it should be defined, and how large a sample of lithic artefacts is needed to demonstrate the probability that bifaces were absent. These problems aside, there is sufficient evidence now that bifacial, Acheulean, assemblages are present in China. This leads to the second point, which is that “the Acheulean” is primarily a record from open-air localities, and Zhoukoudian was thus an unfortunate (if inevitable) choice of Movius in 1948 of a “typical” Chinese Middle Pleistocene site in that many other cave sites across Eurasia lack bifaces. There needs to be greater recognition of the fact that caves and open-air sites can contain very different kinds of information, so comparisons need to be made between cave sites in Europe and East Asia, or between open-air sites in Europe and East Asia, but not by mixing the two types of sites. Thirdly, in mainland SE Asia, the flake assemblages that Movius thought were contemporary with the Acheulean ones of India are instead likely contemporary with Middle Palaeolithic and microlithic assemblages. The key question then becomes, if microlithic assemblages were dispersed through coastal colonisation, why did they not reach SE Asia?

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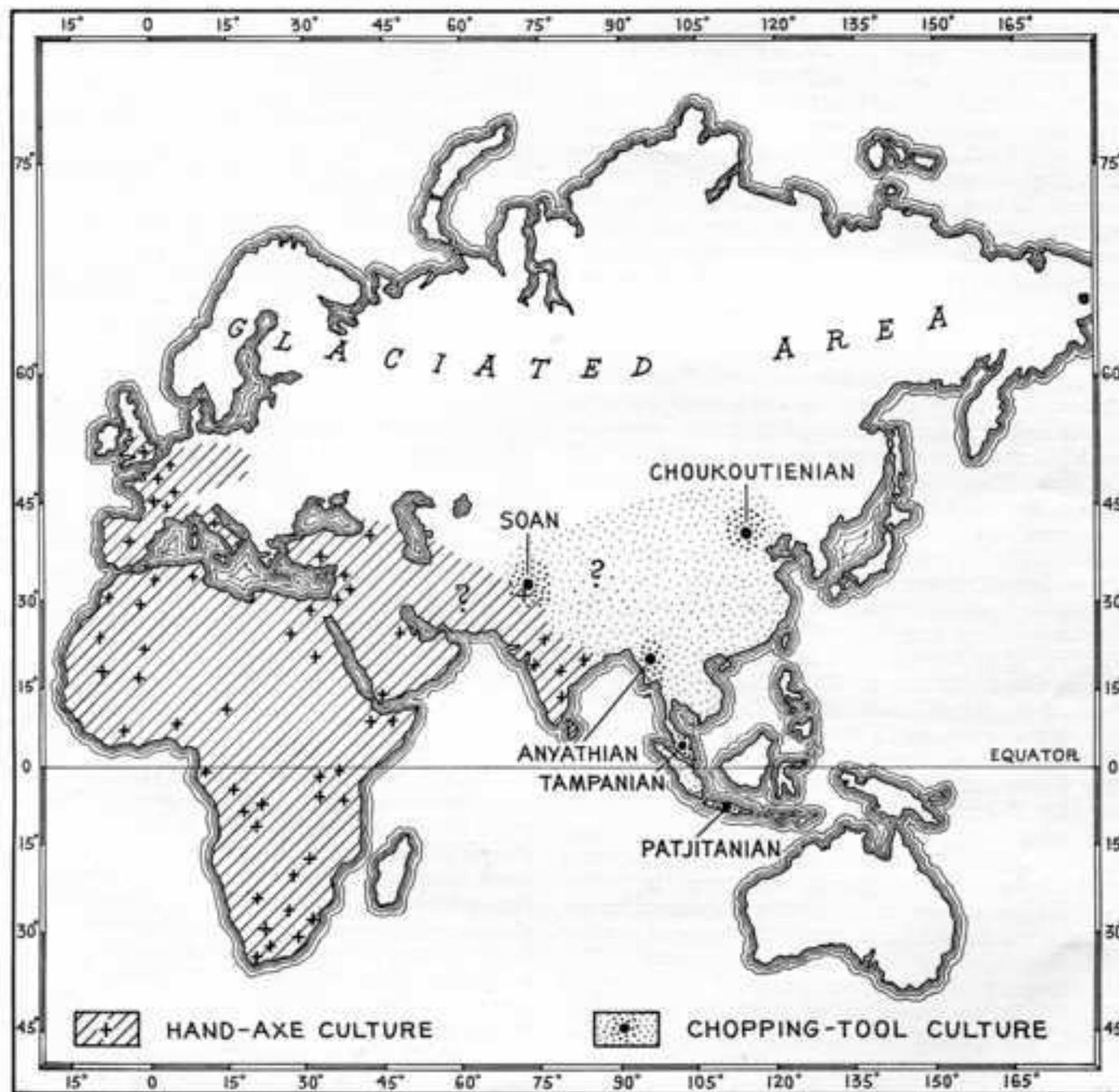
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Fig 1: Movius's (1948) synthesis of the Early Palaeolithic

This well-known image contrasts flake and core assemblages of East and Southeast Asia with Acheulean handaxe assemblages of India, Southwest Asia, Africa and Europe. Note the inclusion of the Soanian flake and core assemblages in northern India (now Pakistan) that Terra and Paterson (1939) identified in their fieldwork in 1935. (Source: Movius 1948, Map 4).

Figure

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MAP 4.—The distribution of Lower Palaeolithic hand-axe and chopping-tool cultures in the Old World during late Middle Pleistocene times.