DISCOVERY OF NEW OLD MATERIAL IN THE BASALTIC REGION OF LAMPANG (NORTHERN THAILAND): A TECHNO-FUNCTIONAL INTERPRETATION

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Abstract: A field survey allowed us to make the discovery of a series of stone tool artefacts over the basalt level of Ban Don Mun in Lampang province (Northern Thailand). This material has been studied from the technological point of view and gave us the opportunity to make the reappraisal of the series discovered by Pope in the 1980s by the same point of view.

Keywords: Thailand, Palaeolithic, technology.

Introduction

Further to Sorensen's work (Sorensen 1981) which was first described by MacDonald and MacDonald (1976), Pope undertook a survey in northern Thailand in 1978 (Pope *et al.* 1981) during which his team discovered new lithic tools in two different localities in Lampang province (Fig. 1). Unfortunately since 1987 the series collected by Sorensen in the 1970s and delivered in the National Museum of Chiang Mai was lost. However, we could reanalyse the pieces found by Pope that are kept in the Department of Anthropology at Chiang Mai University. After the technological analysis of this lithic material: MTS 86-1, 2, 3, 4 found at Ban Mae Tha village and BDM 1 found at Ban Don Mun village, we decided to make a new survey of these areas which appear to be highly significant sites of ancient human activity.

Indeed, the stone tools collected at the different Lampang sites, initially discovered by Sorensen, were assessed to be the oldest ever found in Thailand. These were reported to have been found under a basalt layer dated back to about 800 000 years old (Pope *et al.* 1986). The Ban Mae Tha site is an ancient river terrace embedded in the top of a lateritised gravel deposit which is overlaid by basalt 500 metres to the south of the place where the tools were initially found. At Ban Don Mun, twelve kilometres east of Ban Mae Tha, basalt flows directly cover a gravel deposit containing pebble tools. At this locality at least two distinct basalt flows exist, one with reversed and one with normal polarity (MacDonald, MacDonald 1976).

During our survey we collected 10 new lithic pieces on top of the basalt formation at Ban Don Mun and only one in Ban Mae Tha. As Sorensen pointed out, many tools have been found in the loose laterite on the top of Ban Don Mun (Sorensen 2001). Which does not imply that they have an antique age as supported by Pope and collaborators. In this paper we present the technological analysis of the series collected by Pope and of the new pieces discovered by our team and discuss the unexpected variability of these ancient tools.

This analytic work is an introduction to further valuable field-work we will undertake to determine whether the stone tools are from the surface or under (or both) the Lampang basalt plateau. This material is of great interest for studies of ancient

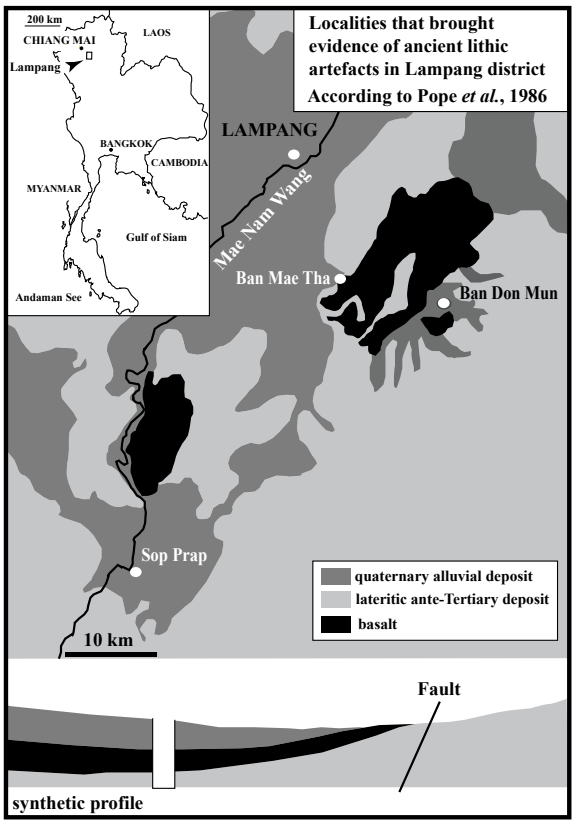

Figure 1: Map of location of Lampang sites (Ban Don Mun and Ban Mae Tha).

human settlement or activity in South-East Asia. It is also the opportunity, as a concluding remark, to attempt to cure some colleagues of their "Alzheimer trend" concerning the Movius line.

Reanalysis of the Lampang series

The reanalysis of the stone tools discovered by Pope during the 1980s at the Lampang BDM (Ban Don Mun) and MTS (Ban Mae Tha) sites from a techno-functional perspective based on an assessment of the dynamics of the tool production, was useful because this work had not been done before. The approach we use to analyse stone artefacts is known by the exotic French term "*schema diacritique*" which can be summed up as an in depth analysis of the removal sequence and its order throughout the *chaîne opératoire*.

This concept, innovative in the field of prehistory studies, was originally developed by Dauvois during the 1970s to explain a progressive and technological examination of the stone artefact by analysing the dynamics and sequence of the negative removals, to finally produce a kind of technical biography of the stone tool (Dauvois 1976).

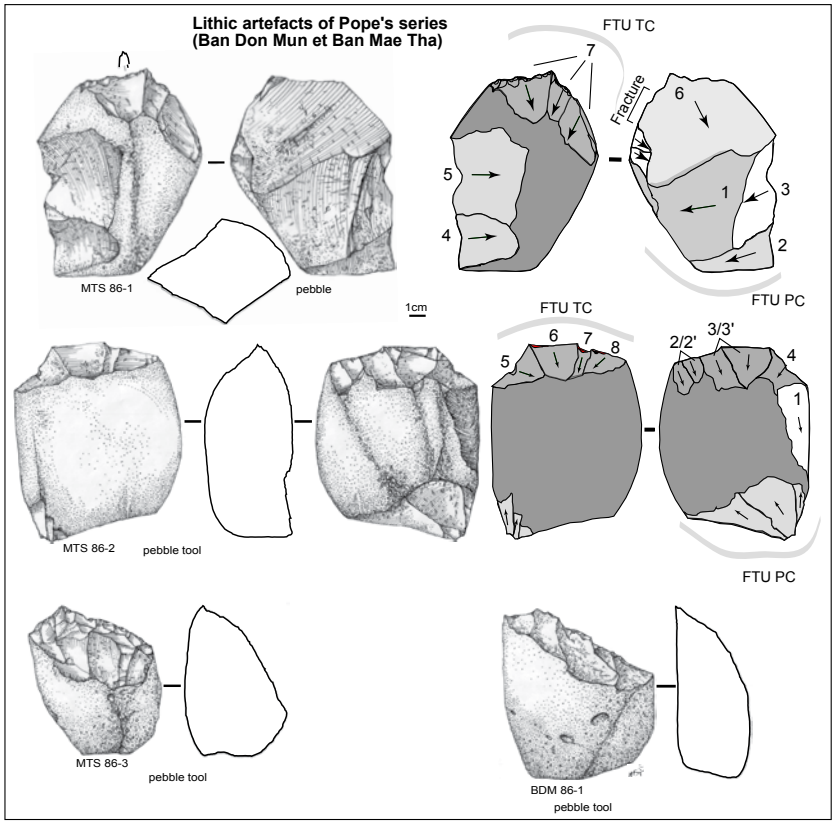

Figure 2: Technological analysis of lithic artefacts from Lampang series.

The concept of *chaîne opératoire* or reduction sequence (English term) relates to the different stages in the stone tool's life and death through conceptual and operational schemes: the strategy used to procure the raw material, shaping or debitage methods, retouching procedures, usage and function, and finally discard.

In this way, as announced before, the objective is to understand the technical biography of the pebble tool and map out the project of the prehistoric knapper which was to produce the "active part" or "cutting edge" on the surface of the pebble. This active part called the "Techno-Functional Unit" (TFU) (Boëda 1997) is the part of the tool used for a transformative contact (TC) upon the material which has to be worked (wood, bamboo, bone, etc.). Other TFU which are indirectly produced during fashioning are the part of the stone which is held or the prehensile contact (PC).

In the case of the Lampang assemblage, the *chaîne opératoire* is quite short and simple with a maximum of four major episodes (see the different on the sketch, Fig. 2) which immediately define the functional status of the pebble in terms of its use as a tool. Because only four pieces (one from Ban Don Mun and three from Ban Mae Tha) were determined to be representative of the Lampang series as a whole, we could make the full technological description of this material.

Technical analysis of the MTS-86-1 pebble

Three technical shaping episodes were used to produce this tool:

1 - First episode: A reasoned selection of a large ovoid sand stone pebble. Then, from a cortical/natural striking platform, the prehistoric knapper detached three large transversal flakes noted 1, 2, 3 which are deep (around 2/3 of width of the piece) and perpendicular to the morphological axis of the pebble. The negative bulb situated on the proximal part of the negative removal of this first episode was used as a striking platform for the next series noted 4, 5 on the sketch.

2 - Second episode: The production of cortical flakes 4 and 5 from the opposite direction to that in the first series 1, 2, 3. Finally, the sequence 1, 2, 3 / 4, 5 was based on a basic shaping method using a simple "alternating platform system".

3 -Third episode: The retouching of the cutting edge (TFU formation) through a short sequence which began by a large and flat removal (6) which intersects (overlaps with) the negative removals 1 and 3 from the first knapping episode. Some step fractures are visible on the left side of this surface. This removal 6 was used as a suitable and flat striking platform for retouching the edge by a series of concave flakes noted as group 7. The purpose of this operation was to adjust the sharp edge.

This final sequence 6/7 created the TFU: a good cutting edge ready for use.

The pebble tool obtained can be assigned to the family of transversal cutting edge tools following a strict conceptual scheme based on the initial search for a core with specific features. This *chaîne opératoire* is a part of the variability of the shaping method.

Technical analysis of the MTS 86.2 pebble tool

This object was also made following four technical shaping episodes:

1- First episode: The selection of raw material based on its morphology. In this case, the choice of one block, a sand stone pebble with a volume favourable to the creation of a bevel perpendicular to its morphological axis.

2- Second episode: The predetermination of the bevel or cutting edge segment. This bevel was predetermined by only one removal episode which was intended to delimit the imminent transversal cutting edge. These predetermined removals are generally situated on both or either lateral side of the mesial part of the edge of the pebble. Here, the predetermined removal is noted 1 on the diacritic sketch.

3- Third episode: After this predetermination episode, the knapper looked for a flat or slightly convex surface which could be either natural (cortical flat surface) or in this example, brought out by a short series of flat and hinged removals. These are noted 2/2', 3/3' and 4 according to the order of the knapping product. This flat surface appears to have provided a correct "sharp angle" for the TFU (see episode 4). If a plate surface exists naturally/cortical on the surface of the pebble (flat = surface without natural convexity or concavity!) it is easier to apply a TFU and it is not necessary to open a flat surface by flat and hinged removals. TFU making by retouch: retouch of flat/slightly convex edge involves increasing or decreasing the original angle.

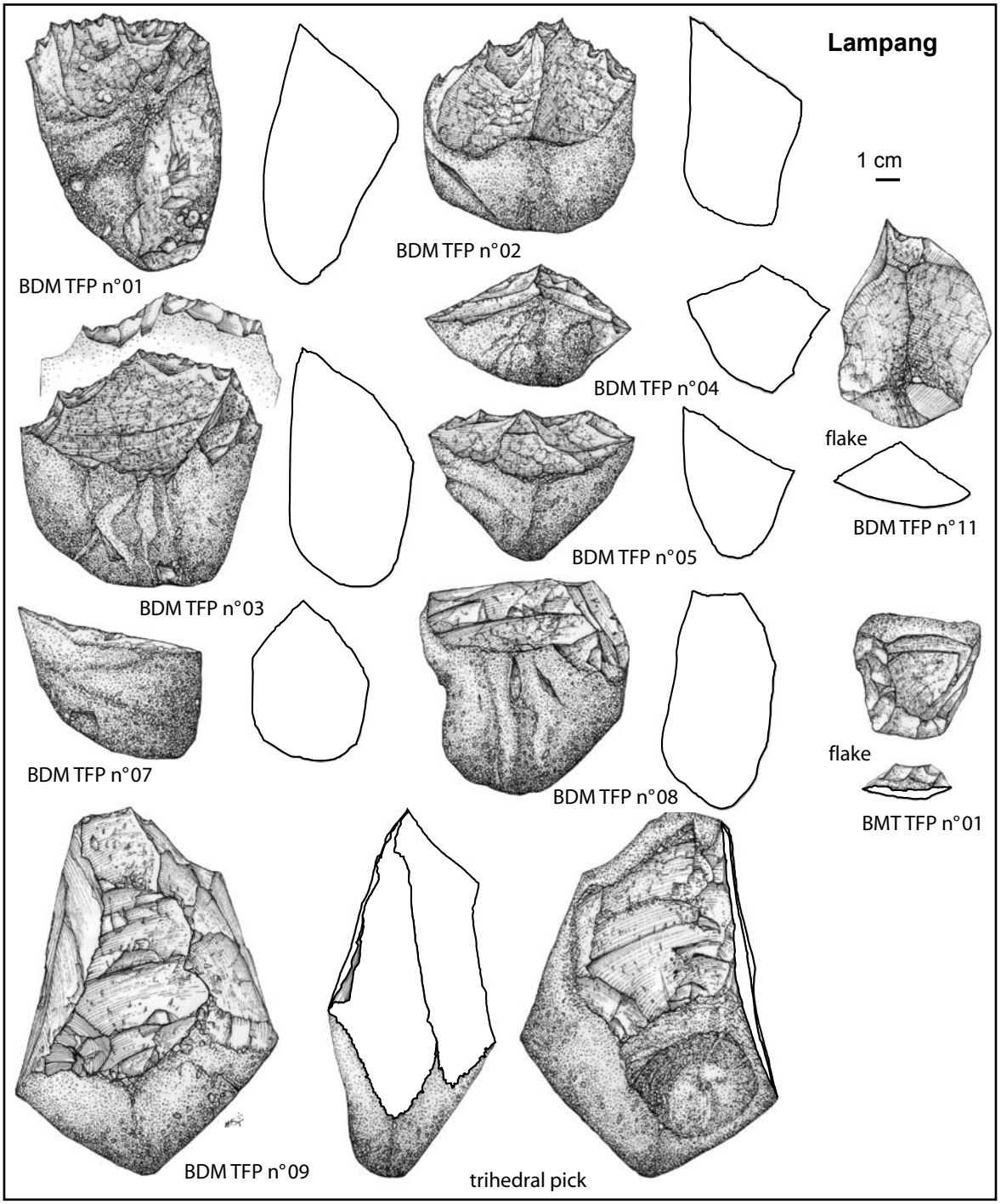

Figure 3: New stone tools from Lampang.

4- Fourth episode: The last removal episode noted 5, 6, 7, 8 finished creating the active transversal edge TFU by opposite inset and concave removals. The TFU was now ready to use.

At the opposite edge of the TFU (distal active cutting edge), the hyper-convex part of the pebble was retouched and is now known as the "Prehensile contact or PC". The direction of the force applied to the pebble (when in use) would have started from this prehensile contact (PC)/or proximal edge.

Technical analysis of the MTS-86-3 pebble tool

In the basic lithic terminology the MTS-86-3 pebble tool could be classified as a typical chopper. However at the extremity of the pebble some specific morpho-technical criteria describe the production of the cutting edge (TFU). In this case, the placement of the cutting edge was preferentially chosen by the knapper according to some morpho-technical criteria:

- The extremity of the pebble selected was naturally thin and relatively flat.
- This cortical and flat surface presented an angle (< 90°) for retouching and obtaining a good sharp cutting edge.

In this case, the association of a pre-sharpening and sharpening step was extensive and rapid with the aim of easily obtaining a relatively open final cutting angle with a plano-concave cross section.

Technical analysis of the BDM-86-1 pebble tool

This pebble tool is also a chopper (denticulate chopper).

As for the precedent pebble tool, the TFU was positioned on the extremity of the pebble which is the easiest to knap. During the pre-sharpening phase we could observe only four negative removals (from the left to the right) which created a slanting cutting edge and therefore the initial volume of the pebble remained unchanged.

The sharpening was discontinuous along the edge because the functional project here was to obtain notches with a TFU with a plano-convex section.

New pebble tools from Lampang: implications, perspectives and cogitation…

The major pieces found by our team in Lampang can be classified into the same groups and typological types as the series collected by Pope (Fig. 3): chopper, chopping-tool, and sometimes small flakes. We note the same technique of direct percussion with a hard hammer and the same raw material (sandstone). We have also identified a similar method on large pebble applied by the knapper aimed at producing a flat surface (natural/cortical) associated with a suitable opposing angle and efficient delineation of the TFU.

The material from our survey could also be considered as a basic Lower Pleistocene lithic assemblage on pebble for Thailand, except for one artefact which provides new data and leads to new questions about the methods and form used by prehistoric knappers. This piece is unique but very interesting because to date, it was basically unknown in the Ancient Palaeolithic stone tool corpus of Thailand. This artefact, BDM TFP 9 (Fig. 3), is a "cortical *trihedral pick":* a pointed chopper made from an elongated cortical pebble. It is a kind of hand-axe knapped using an economical strategy with elongated and symmetrical morphological features. Our discovery of this unique pebble tool leads to some new considerations concerning the interpretation of the lithic assemblage of the region and the morphological features of these pebble tools which have an elongated shape and a new concept of axial symmetry associated with a trifacial shaping method.

Everything considered, if the knapper could shape a trifacial /trihedral axe, he surely had the capacity to shape a "hand-axe"…The technical boundary between a trifacial and a pure bifacial shaping strategy is quite small: just a basic question of symmetry.

Our focus in this work has been to individualize the tracks of functionality under the pebble by determining the Techno-Functional Unit (TFU) to redefine the tools made from pebble through their technical and functional coherence and to avoid the imprecise definitions derived from global shape/ pattern descriptions alone.

The discovery of this one trihedral pick leads us on a new path of research examining the question of whether the Acheulian culture, associated with the hand-axe, existed in Thailand following similar discoveries in India, Nepal, China, Myanmar, Vietnam, Malaysia, Indonesia and the Philippines.

This case opens the way for discussions on the unexpected variability in pebble tools (chopper, chopping-tool, pointed-unifacial pebble, trihedral pick with cortex, etc.) and a techno-functional redefinition of the most Ancient Palaeolithic stone tools of Thailand. Indeed, while the question is still unanswered regarding the position of the lithic assemblage on the surface or under the basalt, the larger issue raised concerns the existence of the mythic Movius line. If trifacial pieces do exist in Thailand, where unifacial Hoabinhian tools are very common for the more recent period, the discovery of bifacial pieces is expected soon…

Concluding remarks

It was the discoveries of « archaic » lithic industries made on pebble without bifacial technique in Thailand but also in Laos and Myanmar that led to the theoretical Movius line (Movius 1948). This line would separate two cultural domains, one from the the western part of India (Penjab) (Rendell *et al.* 1989; Misrha 1992; Gaillard 1993, 1996) with bifacial features similar to Africa, and a second so called *Soanian* region including China and far-eastern territories such as Thailand and Vietnam with only choppers and chopping-tools. Even if recent synthetic paleoanthropological books still refer to the « Movius line» as a reality, it should be recalled that the bifacial phenomenon is known in the Bose Basin in Guangxi province, and the middle and western part of China where, for example, bifacial artefacts are dominant in the lithic assemblage in the Langhian Valley near Xi-an (Shaanxi province) (Hou *et al.* 2000).

Even if continental South-East Asia is poor in well-dated Acheulean industries with bifaces, this material was discovered, and has been well-documented, at the Mont Do site in Vietnam (Pham Huy Thong 1976; Ha Van Tan 1980). This is also the case for the discoveries in Xuan Lôc in the 1970s (Saurin 1971) which should have officially dispelled the myth of Movius' line only a few years after its worldwide diffusion by Bordes (1968). Southward, in insular Indonesia, many lithic tool assemblages containing bifaces, bifacial pieces, and cleavers or massive scrapers with bifacial retouching are well-known. The Acheulean Indonesian sites are mostly known in Eastern Java, in the deposits of the Baksoko River near Pacitan under the name of *Pacitanian.* Some Acheulean material also exists in the south-western part of Sulawesi at Cabenge, and a recent discovery was made in the Ogan River near Baturaja, in Sumatra Island (Forestier *et al.* 2005). Thus while the bifacial toolkit of African and Eurasian Acheulean civilisation is well-known, South-East Asia is still to divulge the complete mystery of its lithic technology. Nevertheless, if the technological reappraisal of south-eastern lithic artefacts is the main point, the former is the dating of such material. Indeed, as it has been demonstrated elsewhere in the world (Soriano 2003) and has been pointed out for Asia by Sorensen (2001), archaic does not means ancient.

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