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Acheulean handaxes from Fengshudao, Bose sites of South China

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ABSTRACT

Fengshudao (Guangxi province, southern China), adjacent to the northern part of the Bose basin, has yielded a lithic assemblage rich in handaxes. Through tektite dating, the site is estimated at 800 ka. The study provides elements regarding the technical characteristics of this material, giving evidence that an Acheulian population (practicing the mode II technology) settled in Fengshudao. This lithic assemblage clearly prefigures parts of the Levallois operating procedure.

1. Introduction

In 2000, two of the authors contributed to a paper in *Science* (Hou et al., 2000) regarding the early occurrence of Acheulian technology in South China. Some researchers called in question two key conclusions of this paper: (i) does the tektite dating represent the dates of Bose industry? and (ii) is the Acheulian from Bose comparable with Western Acheulean in technology and typology? (Koeberl et al., 2000). Actually, these two problems have been considered earlier and worked upon by multi-disciplinary studies in the Bose basin since the project began in 1986. The paper published in represented the stage of conclusion of our works. However, there is no absolute truth in the world. After exploring untiringly, a scholar can obtain a result that he thinks is true but only by presuming certain facts.

Considering the high complexity and the difficulty in doing research in the Bose basin, the authors maintain caution and care in their conclusions. Recently, important advances have occurred, giving clearer and deeper knowledge of some problems. This short article presents the Fengshudao site and discusses some results. This will be helpful for colleagues to understand the Bose stone industry.

2. The site of Fengshudao

"Fengshudao" means *Maple Island* in Chinese. The site is located at a reservoir which at present flanks the northwestern edge of the Bose basin. Originally this area was the small Yongle basin, drained by the Cheng-bi River. After cutting through a gorge, this river joins the You Jiang, draining the Bose basin. After the reservoir was built in 1963, the Yongle basin became an artificial lake, and the original high terraces including Fengshudao have become islands. As in the Bose basin, the Yongle basin has undergone similar geological processes during the Cenozoic, and the Fengshudao Paleolithic stone artifacts were preserved in the typical lateritized flood plain deposits which overlie the basal gravels of the high terrace. According to $^{40}Ar/^{36}Ar$ dating, the age of tektites associated with stone artifacts is 803,000 ± 3000 (Hou et al. 2000).

Up to now, more than 80 sites have been recognized in the Bose basin which covers about 80 km^2. However, the preserved condition of Fengshudao is the best one because the reservoir where the site is located in was built 10 years earlier than the discovery of the first Paleolithic site of the Bose basin, and the vegetation is very well preserved. Therefore, in the present state of knowledge, the Fengshudao industry is the most representative, and its analysis can help in understanding the characters of the Bose industry.

3. General characters of Fengshudao industry

The stone artifacts analysed in the present report number 401 in total. They comprise 147 specimens recovered *in situ* from the 2004 to 2005 excavation, and 254 collected from surfaces nearby, which were eroded out from the terrace deposit by waves on the reservoir. The raw materials of stone artifacts and manufactures are composed of quartzite, sandstone, volcanic rocks, chert, and quartz. Quartzite is the most frequent; chert and quartz are very rare. All are obtained easily from cobbles, boulders, and blocks which occur in the original river channel and valley slopes nearby. These raw materials are suitable for knapping tools. However, because of the

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complex geological background, they appear homogeneous but frequently contain inclusions and failures developing along the joints. This drawback in the raw materials strongly controlled the elaboration of technique in tool-making, and implied the development of certain technological and typological characters. For example, in the retouching of handaxes and other heavy-duty tools, more work is concentrated on the distal end, and less on the medial and proximal portions, which usually keep the original cortex; as well, most of these tools are usually thick.

The assemblage from Fengshudao consists of 59% tools, in which 31% are handaxes (Figs. 1 and 2) and 9% picks. The debitage includes cores (3%), flakes (14%), bipolar cores (2%) and bipolar flakes (3%). The other components are complete cobbles and boulders (2%), cobbles and boulders with a few scars (4%) and hammer-stones (13%).

Observation shows that the tool-makers at Fengshudao had used free-hand percussion, anvil technique, and bipolar technique. The free-hand percussion is the principal technique for flake production, and the anvil technique was used at the early stage of flaking on boulders generally. The bipolar technique was not frequent. Cores are commonly prepared, not only by a series of scars for revising the platform angle on some cores, but also by a spall which is a kind of special flake resulting in the modification of the platform. In addition, a few Kombewa (or "Janus") flakes are also recognized in Fengshudao. This method of flaking is common in Africa (Owen, 1938; Texier and Roche, 1995; Sharon 2007) among the Acheulean assemblages, and it also occurs in South, South-east and East Asia (Wang 2005, 2006; Gaillard et al., 2010; Simanjuntak et al., 2010). Moreover some of the cores show a sort of prepared surface from where one or more heavy flakes were removed.

4. Handaxe manufacture

Among the 129 handaxes from Fengshudao, 57% are made on flakes as blanks and the other ones are made on cobbles. The average dimensions of handaxes are $15 \times 12 \times 7$ cm.

4.1. Processing sequence for production of handaxes on flakes

1. Acquisition of raw materials: relatively good quality rock was selected, in the form of cobbles or boulders.
2. Knapping used large flakes as handaxe blanks whose forms are close to the future tools; anvil technique was sometimes used at this stages, as well as a direct technique. In most cases, the flakes show a large longitudinal invading removal on their upper face, followed by opposite longitudinal invading removals, and some centripetal or crossed removals.
3. Further shaping occurred for the flakes, on both faces by short removals.
4. Secondary shaping fixed the distal part, with short longitudinal or centripetal removals.
5. Finishing: on the edges of the distal and medial part of the handaxes, with small retouches.

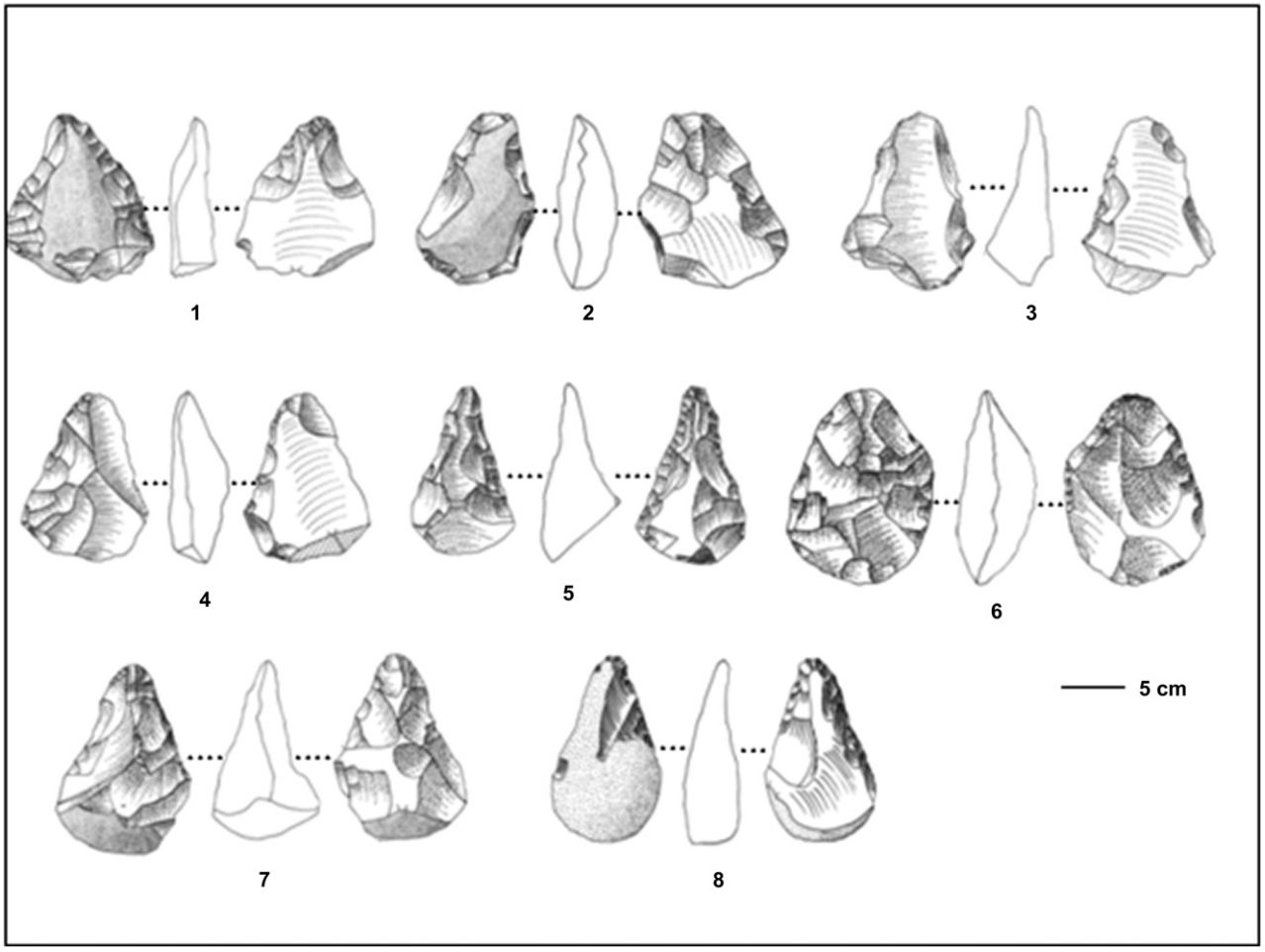

Fig. 1. Flake handaxes.

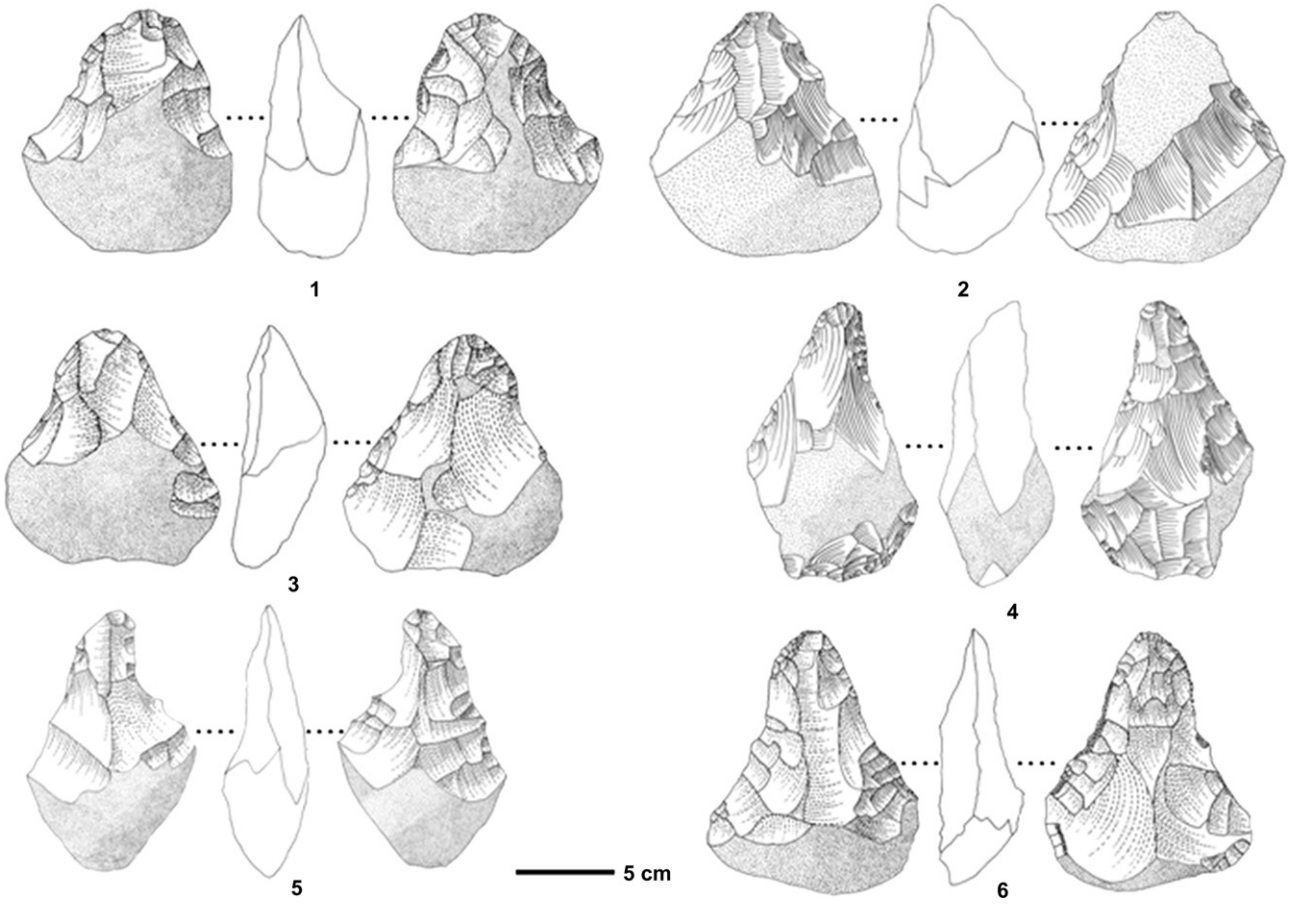

Fig. 2. Cobble handaxes.

4.2. Processing sequence for production of handaxes on cobbles

1. Acquisition of raw materials: relatively good quality cobbles were selected, with shapes close to that of the desired handaxes.
2. Overall shaping: one or two longitudinal very invasive removals were flaked in a direction parallel to the longitudinal axis of the future handaxe, this procedure being very characteristic; secondarily centripetal or crossed removals were made.
3. Secondary shaping: work on the distal part by one or more non-invasive removals, either longitudinal or/and centripetal. Shaping of the medial part with non-invasive removals.
4. Finishing: on the edges of the distal and medial part of the handaxes, with small retouches.

5. Discussion and conclusion

a. Some handaxes show a very plane face, parallel to the surface defined by the handaxe edges. This flatness results from a thinning method involving crossed or unidirectional removals. The manufacture of such thinned handaxes, and the process of core reduction to produce invasive flakes from prepared surfaces, both recall the Levallois method.
b. In the collection from the Fengshudao excavation, there is an obvious lack of cleavers. Two plausible explanations are: (i) either the excavations have not yet exposed them or (ii) because the Fengshudao raw material is not homogeneous, most of the flakes cannot exceed 5 cm in all directions.
c. The differences between distal, medial and proximal parts of each handaxe are readily explained by the material heterogeneity. Unlike many European handaxes (which, in any case are later), having usually benefited from much better and more homogeneous materials, the Acheulian tools from Bose or Fengshudao often show fractures, as a consequence of the cracks present in the raw materials every 5 cm.

With the true bifacial technology present at Fengshudao (Bose, China), the lithic industry conforms to the Mode II Acheulian variability, as known in any other part of the Old World. The main specific characters are the slight convexity of predominant removal preparation, and the recurrent unidirectional method during the procedure of knapping. Clearly these features prefigure the Levallois method, and are a strong incentive for carrying out further research in that field. Finding the actual Levallois technique in a Chinese site (just as ancient than Fengshudao, or even more), is a challenging issue, and the authors are confident of success in the future.

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