THE LOWER PALEOLITHIC INDUSTRY OF AN KHE IN THE PREHISTORIC CONTEXT OF VIETNAM

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Abstract

*This article focuses on systematizing artifacts from investigations, surveys, and excavations of Paleolithic sites in the town of An Khe. It also describes the characteristics of the An Khe Paleolithic industry in terms of a technical complex of choppers and chopping tools, trihedral picks, and bifaces (hand axes). In the Early Paleolithic, choppers and chopping tools were prominent in Asia, and bifaces were the most prominent group of tools in the West. The early stage in An Khe is characterized by tools with a trihedral shape. The An Khe industry dates from 700,000 to 900,000 BP. It is older and different from other known Paleolithic industries in Vietnam, such as Nui Do (Thanh Hoa Province) or Xuan Loc (Dong Nai Province). The An Khe industry also differs from the typical Acheulean industry in Europe but shares many similarities with the Baise industry in Guangxi (China) in terms of material, size, type, and toolmaking techniques. From findings and research on such topics, we are introduced to a new idea about human origins in the territory of Vietnam, in particular, and the world in general. The prominent ideas are the boundary dividing the biface and chopper industries (Movius Line) in the Eurasian continent, the formation of Southeast Asian Paleolithic industries, the knowledge of *Homo erectus* in adapting to a specific environment, and the starting point of human prehistory in Vietnam.*

Keywords: Acheulean; An Khe Paleolithic; Baise; Biface; *Homo erectus*.

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1. RESEARCH FINDINGS

Paleolithic sites near the town of An Khe (Gia Lai Province) were discovered by the staff of the Institute of Archaeology in 2014 (Nguyen & Nguyen, 2015; Nguyễn, 2019). From 2015 to 2019, archaeologists discovered 19 more sites associated with the Old Stone Age in An Khe valley. Among these sites, four have been excavated: Go Da, Roc Tung 1, Roc Tung 4, and Roc Tung 7 (Figure 1) (Nguyễn, 2019). The results of the excavations and research were discussed in two international conferences: (1) “The Paleolithic of Vietnam in a Regional Context” organized by the Institute of Archaeology – Vietnam Academy of Social Sciences and the Department of Culture, Sports and Tourism of Gia Lai Province in 2016, and (2) “The An Khe Paleolithic Industry within the Context of Bifacial Industries from Asia” organized by the Department of Culture, Sports and Tourism of Gia Lai Province, the Institute of Archaeology – Vietnam Academy of Social Sciences (VASS) and Novosibirsk Institute of Archaeology and Ethnology of the Russian Academy of Sciences in 2019 and published in various scientific publications (e.g., Derevianko et al., 2016; Derevianko et al., 2018; Nguyễn, 2017a, 2017b, 2019). Some of the main research results are as follows:

The Go Da site in An Binh ward (An Khe town) has coordinates of 13°58'19.2" N and 108°39'05.1" E and is at an elevation of 421.5 meters above sea level. The Go Da site was excavated in 2015 and 2016. A total area of 94 m² was excavated, and the average thickness of the cultural layer is 25 cm. The structure is clay mixed with gravel, laterite, and weathered granite. A total of 111 stone artifacts were discovered in the excavation pits, including 17 picks, 10 chopping tools, 26 scrapers, 4 anvil stones, 1 crushing pestle, 6 amorphous cored tools, 20 flakes, and 27 stone cores. Twenty-one tektite fragments (meteorites) were also found (Nguyễn, 2019, p. 12).

The Roc Tung 1 site in Xuan An commune (An Khe town) is located at 14°02'15.2" N and 108°40'49.9" E at an elevation of 443 meters above sea level. The site was excavated in 2016, 2017, and 2018, and the cultural layer has an average thickness of 35 cm. From the first pit, excavated in 2016 to an area of 88 m², 127 tektite fragments and 123 stone artifacts were recovered, including 8 picks, 5 choppers, 6 scrapers, 1 uniface, 2 anvil stones, 37 flakes, and 27 stone cores. The second pit, excavated in 2017 and 2018 to an area of 70 m², has been preserved in a sheltered area (Nguyễn, 2019, p. 12).

The Roc Tung 4 site in Xuan An (An Khe town) is located at 14°02'2.7" N and 108°40'35.7" E at an elevation of 440 meters above sea level. The site was excavated three times. The excavation area in 2016 was 88 m²; 123 artifacts (1 unifacial tool, 8 picks, 6 scrapers, 2 chopping tools, 1 anvil stone, 27 flakes, 41 worked pebble pieces) and 127 tektite fragments were obtained. In 2017, an area of 60 m² was excavated and 478 stone artifacts (14 chopping tools, 10 picks, 12 scrapers, 1 unifacial tool, 19 amorphous cored tools, 19 stone cores, 139 stones with flake scars, 209 flakes) and 252 tektite fragments were collected. By 2018, the excavation pit reached 100 m², but only 40 m² were excavated to the deepest layer. In total, 1,811 stone artifacts and 91 tektite fragments were obtained. The stone artifacts consist of 50 stone cores, 61 tools (22 choppers, 18 picks, 15 scrapers, 6 tools with two concave edges and a sharp point), 1,458 flakes, and 242

2. THE AN KHE PALEOLITHIC INDUSTRY

The Paleolithic sites at An Khe are mainly on hills and mounds with an average elevation of 420 to 450 meters above sea level. In general, the An Khe valley has a flat terrain with rich flora and fauna and abundant river and stream pebbles. These conditions are ideal for primitive peoples to exploit and make tools for long-term residence (Nguyễn, 2017b). In early 2020, the survey team of the Vietnam Institute of Archaeology, the Vietnam Museum of Nature, and Russian experts also discovered many other Paleolithic sites along the Ba River down to the Central Vietnam region.

Research results show that the cultural layer of the Paleolithic sites at An Khe is from 25 to 40 cm thick and located underneath the arable land of modern residents on a weathered, but solid granite layer. The artifacts in the cultural layer, which is still quite intact, are stone tools and tektite fragments (meteorites) with thin sharp edges (Nguyễn, 2019, p. 10).

The artifacts collected over the excavation seasons in An Khe are made of the same stone material, and the types of tools and manufacturing techniques are consistent, so the artifacts can be identified as tools made by the *An Khe Paleolithic industry*. The outstanding feature of this industry is the assemblage of stone tools made from the locally available river and stream pebbles. The tools are usually large to very large with smooth grain textures and made mainly of quartz or quartzite (Nguyễn, 2019, p. 10). Flake scars with little or no modification remain on the tool bodies. The most representative of these stone objects is the complex of hand axes (bifaces), thin-bodied picks, trihedral picks, and chopping tools. In this complex, chopping tools are found in abundance in Asia while bifaces are not common. The most outstanding feature of the An Khe Paleolithic industry is the complex of thin-bodied and trihedral picks (Nguyễn, 2017b; Nguyễn, 2019).

Figure 2. An Khe hand axes

Note: From (a) Go Da; (b) Roc Tung; (c) Roc Gao; (d) Roc Lon.

Source: Derevianko et al. (2016).

Hand axes are tools made with standard bifacial techniques. The outstanding feature of this type of tool is that it has a tapered tip made using the percussion flaking technique to remove stone flakes. Crafting materials are usually quartzite, chert, or flint. This is the notable form of the Acheulean industry. The dates span from the Lower Paleolithic to the Middle Paleolithic (age of the Mousterian industry). A hand ax is a type of multifunctional tool that the prehistoric inhabitants used in hunting, butchering, digging for food, cutting down trees to make camps, etc. (Nguyễn, 2017b). Hand axes of the An Khe industry are found in small quantities at various sites, including Go Da, Roc Lon, Roc Gao, Roc Huong, Roc Tung 4, Roc Tung 7, and Roc Tung 10. The most profound tools are the hand axes discovered at Go Da, Roc Tung, Roc Gao, and Roc Lon (Figure 2).

Apart from the common features of hand axes in Europe, hand axes at An Khe also have certain characteristics that are different from artifacts of the same type in terms of materials and manufacturing techniques. Hand axes at An Khe are made from quartzite pebbles, and the body of the tool has the shape of a javelin dart (Lanceolate). The handle is round and the other end is trimmed to a sharp point. The manufacturing technique is bifacial, tapering from the outer edge to the center. Most flake scars are found on two-thirds of the body (from the sharp tip to the handle). In general, hand axes at An Khe are usually large to very large with an average length, width, thickness, and weight of 20.7 cm, 11.9 cm, 7.4 cm, and 1.9 kg, respectively (Nguyễn, 2017b; Nguyễn, 2019, p. 11).

Uniface tools account for a large number of artifacts in the An Khe stone tool assemblage (Nguyễn, 2017b). The most typical tools are those discovered at the Roc Lon, Roc Tung, and Roc Huong sites. The entire collection of artifacts is made from large quartzite pebbles nearly oval in shape. The manufacturing technique is to flake away most of the large side, while the other side retains the pebble material. On the tool body, there is still a pebble shell at one end. The flake scars are mostly on two edges, tapering from the outer edge to the center to create a convex curved edge. The two edges are hewn from the pebble sides, creating interwoven flake scars with high precision. Typically, tools are thick at the handle and thinner at the other end. The cross section of the body is elliptical. The average size is 17.82 cm in length, 13.6 cm wide, 8.4 cm thick, and 2.3 kg in weight (Nguyễn, 2017b).

Unifaces (also known as cleavers) similar to those at An Khe have been found at various Paleolithic sites around the world. However, they often differ in shape. For example, Paleolithic tools with a rectangular shape have been found from the Soan culture of India. The manufacturing technique was to cut off one side to create a beveled edge on that side. The handle is large, the two vertical edges are nearly parallel, and the body is rectangular in cross section. This typical cleaver-like artifact has not been seen in the collection of An Khe Paleolithic artifacts (Nguyễn, 2017b).

Picks account for a large number of artifacts at the An Khe Paleolithic sites. This group is divided into two types by shape: (1) 100 specimens having a thin-bodied spike, and (2) 20 specimens having a trihedral spike. Manufacturing techniques are divided into three groups: (1) specimens in which the trihedral spike has three planes that form a sharp

tip, the material is quartzite, and the tool is large; (2) specimens made from cobblestone with two natural planes, so the ancient toolmaker only needed to add one plane to form the tool, and (3) specimens formed of pebbles with one natural plane so the ancient toolmaker needed to add two more planes to form a pick (Nguyễn, 2019, p. 11). In general, these techniques produced small, even flake scars, tapering to create a point. The other end is a large handle that still retains the pebble shell. The cross section is triangular with an average size of 19.80 cm in length, 11.90 cm wide, 8.07 cm thick, and 2.32 kg in weight (Figure 3) (Nguyễn, 2017b).

Figure 3. An Khe trihedral picks

Note: From (a) Roc Giao; (b) Roc Tung 4; (c) Roc Tung 10; (d) Roc Huong.

Source: Derevianko et al. (2018).

Chopping tools and choppers account for a large portion of the An Khe Paleolithic collection. These artifacts are all made from pebbles containing quartz or quartzite. The body of the tool is oval and usually large. The flake scars are mainly at the narrow end of the pebble, creating a thin, sharp edge. Specimens made using the unifacial technique are called “choppers”; those made with the bifacial technique are “chopping tools” (Nguyễn, 2019, p. 11). In general, this group of tools at An Khe often has a sharp edge, and most of the natural pebble shell remains on the body and handle. The percussion flaking technique is still rudimentary. Along with choppers and chopping tools in the An Khe Paleolithic industry, unifacial tools are also found as well as other types such as knives, scrapers, anvil stones, stone cores, flakes, and worked pebbles (Figure 4).

Figure 4. An Khe stone artifacts

Note: (a) Chopper from Roc Tung; (b) Scraper from Roc Gao; (c) Scraper from Roc Tung; (d) Knife from Roc Tung; (e) Flake tools from Go Da; (f) Cores from Go Da.

Source: Nguyễn (2017a).

Two absolute dates have been determined by the potassium-argon method for the An Khe industry. Two tektite samples were analyzed at the IGEM RAN Geochemical and Geochronological Isotope Laboratory of the Academy of Sciences of the Russian Federation. Model 15.GD.M4.L1-2 from the Go Da site was dated $806,000 \pm 22,000$ years BP and Model 16.RT1.H1.F6.L2.2 from the Roc Tung site was dated $782,000 \pm 20,000$ years BP (Derevianko et al., 2018; Nguyễn, 2019, p. 12).

3. THE AN KHE INDUSTRY AND EVIDENCE OF THE PALEOLITHIC IN VIETNAM

3.1. The Nui Do Industry (Thanh Hoa Province)

The Nui Do (Mount Do) site was discovered in 1960; the total number of specimens in three collections (1961, 1963, and 1968) is 2,684. However, the artifacts

were mainly collected on the surface of the eastern slope of Nui Do. The location of the collected stone tools is at 20m to 80m above the surrounding level. The raw material of the tools is basalt, and the main types are hand axes, chopping tools, scrapers, sample tools, stone cores, and flakes. Flakes account for over 95% (Clacton flakes account for over 95% and Levallois flakes account for 1.3-4.7%). Stone cores account for about 2.7%, and the rest are hand axes, proto-hand axes, choppers, and cleavers, which together barely reach 1% (Nguyễn, 2017b). In general, the collection of stone tools at the Nui Do site has the following characteristics:

Figure 5. Nui Do hand axes (Thanh Hoa Province)

Source: Boriskovsky (1966).

- The Nui Do hand axes consist of seven large basalt specimens 16.5 cm to 21.2 cm in length weighing from 1.0 to 2.0 kg. The manufacturing technique is bifacial. The flake scars are quite rudimentary (Figure 5) and not modified like the standard hand axes in the Acheulean (Nguyễn, 2017b). Six additional bifacial hand axes were discovered at Nui Do. These have rough flake scars reminiscent of, but not as standard as, Acheulean hand axes. In general, the evidence of hand axes is the basis for dating the Nui Do site.
- Nearly 100 chopper specimens were discovered. The choppers are variable in shape and made from pieces of basalt. The manufacturing technique is percussion flaking. The flake scars are mostly on one face to create a usable edge, while the opposite end acts as a handle.
- At the Nui Do site, 22 cleavers were found. The body of the tools has a rectangular shape; the cross section is trapezoidal, rectangular, or elliptical.

From a bigger picture, the study shows that the Nui Do site is a residence-factory site of the Paleolithic period characterized by artifacts dating from Chellean to Acheulean (about 400,000 years BP) (Boriskovsky, 1966; Phạm & Luru, 1973; Hà, 1973). Another study by Nguyễn (1989) indicates that the collection of artifacts at the Nui Do and Nui Nuong sites had many quadrilateral-shaped hand axes dating back to the Early Metal Age; therefore, the Paleolithic period was the early stage in Nui Do, and there is evidence of mining and preliminary processing of quadrilateral axes in the Metal Age.

Studies show that the An Khe industry differs from the Nui Do industry: (1) Tools in the Nui Do industry were made from sedimentary rock and basalt. In the An Khe industry, prehistoric people used pebbles made of quartzite, quartz, or siliceous clay. (2) In An Khe, there was almost no use of Clacton or Levallois stone flaking techniques, and also no proto-hand axes or cleavers as in Nui Do. (3) In the Nui Do industry, there is no evidence of bifaces or trihedral tools as in the An Khe industry (Nguyễn, 2017b).

The common feature of the An Khe and Nui Do industries is that hand axes were discovered in both places. The hand axes differ in that the An Khe hand axes are made from river and stream pebbles, whereas the hand axes in Nui Do are made from sedimentary rock. Hand axes at An Khe have a javelin shape, and most flake scars are two-thirds of the body length. The two large sides of the tool went through the hard-hammer technique to remove the natural shell. At Nui Do, the hand axes have a near-ovoid shape, the two edges are hewn and convex, and there are no traces of modified flake scars on the body. The effective edge is obtuse and sometimes pointed; the handle is wide and curved (Nguyễn, 2017b). In general, from the perspective of tool geometry, the hand axes in the An Khe industry have different and rather older characteristics than the hand axes in the Nui Do industry.

3.2. The Xuan Loc Industry (Dong Nai Province)

In 1968 and 1971, Saurin discovered and published work on two early Paleolithic sites, Nhan Gia (Hang Gon VI) and Dau Giay, in the Xuan Loc area of Dong Nai Province (Saurin, 1971). After 1975, archaeologists also discovered new archaeological sites such as Sau Le Hill, Suoi Da, Suoi Dat, Cam Tien, Cau Sat, Gia Tan, and An Loc (Nguyễn, 2017b). The stone artifacts were collected on the surface without any cultural layer. Based on the tool characteristics, archaeologists in Vietnam believe that these artifacts have the same age as artifacts of the same type at the Nhan Gia and Dau Giay sites (Hà, 1998).

Three hand axes similar to typical Acheulean hand axes were found at the Nhan Gia site (Saurin, 1971). In addition to hand axes, Saurin found five trihedral tools, three multifaceted tools, one pick, one scraper, one ax-shaped tool, and one bola. At the Dau Giay site, one hand ax, two scrapers, one pick, and one trihedral tool were found. Among the artifacts found at the Nhan Gia site were three unifacial and two bifacial specimens. The shape of these tools resembles those of the typical Acheulean industry.

Figure 6. Stone tools from Xuan Loc (Dong Nai Province)

Note: a) Bifacial tools from Nhan Gia; b) Trihedral tool from Nhan Gia; c) Trihedral tool from Dau Giay.

Source: Saurin (1971).

According to Saurin (1971), the trihedral tools at Nhan Gia have these characteristics: One side of the tool still retains the natural basalt shell, the two large faces are flaked and formed into two planes, and the other end is crafted into a pointed end. Studying these artifacts, Nguyễn (2017b) assumed that the first tool specimen was flaked on both sides and shaped similarly to the *coups de poings* hand ax of the Abbeville-Acheulean period. This tool is very similar to the bifaces of the Patjitanien industry in Java (Indonesia). In the collection of stone tools from Dau Giay, there is also a plaice-shaped basalt hand ax manufactured by the bifacial technique. In terms of manufacturing technique, this tool is more advanced than the typical bifaces found at the Nhan Gia site (Figure 6).

Studying the geometry of the bifaces at Nhan Gia, Saurin suggested that these tools are characteristic of the original Acheulean industry. The hand axes at the Dau Giay site belong to the developmental stage of the Acheulean. However, it should be emphasized that these tools were discovered on the surface of the red soil, dating from Mindel to early Mindel-Riss, about 650,000 years BP (Nguyễn, 2017b). Comparing the Paleolithic collection at Xuan Loc with some other Paleolithic industries in Southeast Asia, Saurin believed that the cultural sites in Xuan Loc belong to the Paleolithic period in Indochina (Saurin, 1971, pp. 10-11).

In August 2016, we carried out a survey in the Xuan Loc area to study the previously discovered and published artifact collections. We noted that all of these artifacts were collected on the surface without any cultural layer. We believe that, in the collections considered to belong to the Paleolithic in the Xuan Loc area, there is only one biface discovered in Sau Le hill that has the same characteristics as those discovered by Saurin. There is evidence from the remnant artifacts that the flake scars considered man-made are actually natural cracks.

Studies of hand axes and picks found at Xuan Loc show that they differ in material and size compared to artifacts of the same type in the An Khe industry. In addition, the

hand axes and picks at Xuan Loc are half the size of similar artifacts at An Khe. Hand axes at Xuan Loc have an oval shape, and the cross section and longitudinal body are of lenticular shape. The trihedral picks at the Xuan Loc site do not have obvious flake scars as do those at An Khe (Nguyễn, 2017b).

In summary, tools called "hand axes" at Xuan Loc have similarities in terms of size, material, shape, and manufacturing technique to those of the same type discovered at Lang Ga (Gia Lai Province), Buon Kieu (Dak Lak Province), Tam Hamlet, Cu Jut district and other Neolithic sites in Krong No (Dak Nong Province), Eo Bong (Phu Yen Province), or artifacts discovered at the Dinh Quan site (Dong Nai Province). These sites are estimated to date back to the Neolithic period (7,000–6,000 years BP) (Nguyễn, 2017a, 2017b; Lê, 2019; 2020, p. 48).

4. HISTORICAL–CULTURAL VALUE OF THE AN KHE PALEOLITHIC INDUSTRY

4.1. The origin of human prehistory in Vietnam

The origin of human prehistory in Vietnam is usually based on the remains of *Homo erectus* in Tham Khuyen and Tham Hai (Lang Son Province) dating back more than half a million years. The discoveries from the An Khe Paleolithic sites have now provided additional materials that allow us to form new perceptions about the prehistoric residents of Vietnam. Accordingly, based on the characteristics of the An Khe industry, these are tools of *Homo erectus*. In addition, the starting point of human prehistory in Vietnam has been pushed back to nearly one million years.

Around the world, sites dating between 1.8 and 0.2 million years BP are attributed to *Homo erectus*, the direct ancestor of *Homo sapiens*. In Vietnam, in addition to the An Khe sites, the distribution of Paleolithic sites also includes the upper area of the Ba River (Gia Lai Province). These are Paleolithic cultural sites from a fairly early age of human prehistory and are considered one of the cradles of human ancestors – *Homo erectus* (Nguyễn, 2017b).

The available data on the An Khe industry have added to the map of the bifacial industry around the world. The date of the An Khe industry is also quite early, from 0.9 to 0.7 million years BP (Nguyễn, 2017b). Worldwide, the dates of the bifacial industry vary widely. In Europe, it dates at 0.6-0.5 million years BP, in Ubeidiya (1.4 million years BP), Gesher Benot Ya'aqov (0.9 million years BP), South Arabia (0.4 million years BP), Turkmenistan and Kazakhstan (0.3-0.25 million years BP), Mongolia (0.3-0.25 million years BP), Isampur, India (1.2 million years BP), Bori, India (0.7 million years BP), and South India (0.5-0.4 million years BP). In China, the dates are Pingling (0.9 million years BP), Yuanxian (0.9 million years BP), Lantian (0.8-0.6 million years BP), and Baise (0.8 million years BP) (Derevianko et al., 2016, p. 59; Nguyễn, 2017b) (Figure 7).

Figure 7. Distribution of hand ax industries outside of Africa

Source: Derevianko et al. (2016).

4.2. Comparisons between An Khe Paleolithic and other industries in the world

Many flakes, stone cores, anvil stones, and raw stones were discovered at the An Khe Paleolithic excavation sites. The recovered artifacts show that this was a residential stone tool workshop for prehistoric inhabitants (Nguyễn, 2017b). Nguyễn (2017b) also refutes the claim that the ancient people in the Paleolithic period only made stone tools when the need was dire but those made were omnipotent. However, the evidence shows that the stone toolmaking industry in An Khe was of many types. In particular, the prehistoric inhabitants had a choice of stone material and in shaping each type of tool for its use. Thus, the tools in the An Khe Paleolithic sites were used for many different purposes, such as chopping bamboo and wood to make shelters, butchering, or digging to find food, etc.

The hand axes of the An Khe industry differ from those of the Acheulean industry. In An Khe, the processing material is quartzite or siliceous clay. Portions of the natural shell remain on the body of the tool, and the handle is round and large. Large rough flakes have been removed from the entire body of the tool, and there are almost no modified flake scars. The size of the tool is large, and the body is oval in cross section. In the Acheulean industry, hand axes are small and made from sedimentary rocks of siliceous material. The handle is thin and the surface of the stone is completely flaked. The body of the tool is lens-shaped in cross section, and there are many small flake scars modified by regular and well-proportioned knapping. In terms of type, hand axes of the Acheulean industry are very diverse: triangular, almond-shaped, egg-shaped, javelin-shaped, etc. The javelin-shaped tool served the functions of chopping, cutting, or digging in the ground (Figure 8) (Bordes, 1961; Balout, 1967). A comparison of the Acheulean and An

Khe industries shows that the An Khe hand axes are not as standardized as those of the Acheulean industry but have traces of rudimentary workmanship similar to hand axes manufactured in Africa (Nguyễn, 2017b).

Figure 8. Variety of Acheulean hand axes

Source: Balout (1967).

Of the Paleolithic sites in China, such as Dingcun, Hehe, etc., the most typical one is the Baise site (Guangxi Province, China). To date, archaeologists have discovered over 40 sites belonging to the Baise industry (Nguyễn, 2017b). The Baise industry is characterized by its complex of picks, choppers, scrapers, bifaces, and hand axes (Figure 9). These tools were crafted from cobbles of great size and were knapped directly on stone anvils, a feature similar to the An Khe industry (Nguyễn, 2017b). According to research by Chinese archaeologists, the Baise industry belongs to the Early Paleolithic

(Xie et al., 2003; Xie et al., 2007). The age of the Baise industry was determined by the fission track dating technique as $733,000 \pm 39,000$ BP (Gao et al., 1997) and by the potassium-argon technique ($^{40}\text{K}/^{39}\text{Ar}$) as $803,000 \pm 30,000$ BP (Hou et al., 2000). In general, the An Khe and Baise Paleolithic industries have many similarities in terms of manufacturing techniques and tool types. The absolute chronology of these two industries may well be similar.

A study by Yi (2004) shows that bifaces, hand axes, picks, scrapers, chopping tools, etc., were discovered in the stratigraphy of the Chongok-ni site in Korea. This site and its artifacts date back to the late Acheulean industry; the absolute age is 130,000 years BP, in the same period as the Dingcun industry (China).

Figure 9. Baise hand axes

Source: Phan (2017).

In India and the Potwar Plateau (Punjab region) of Pakistan, bifaces, picks, scrapers, and stone cores have also been discovered. Flakes in these locations are often large and coarse. Among the above stone collections, it is noteworthy that the cleaver is characteristic of the Soanian Paleolithic industry, belonging to the Middle Pleistocene (Paterson & Drummond, 1962). Cleavers and picks from the above sites differ from those of the An Khe Paleolithic industry (Nguyễn, 2017b). Research by Simanjuntak (2008) shows that hand axes in those sites have characteristics typical of the Acheulean industry. Their estimated date is about 0.8 million years BP. However, the main feature of those sites is still the chopper-chopping tools industry.

In summary, from the Middle East to South Asia and Southeast Asia, the absence of Acheulean sites dating from 700,000 to 800,000 years BP is acknowledged. This dispels the notion that the bifacial technique here is modeled after that brought in by the inhabitants of the former continent in a second wave of migration. The only common feature between the bifacial lithic industries of Vietnam and the Acheulean is the presence of bifaces. Research shows that the bifaces and other stone artifacts of the An Khe industry are very different from those of the Acheulean industry. The absence of cleavers or the Levallois technique at the An Khe sites gives every reason to believe that the bifacial technique that appeared in Vietnam and China was due to convergent evolution. In East and Southeast Asia, the bifacial technique evolved from the local tradition of flaking cobblestones, as evidenced by the fact that bifaces were made largely from the

first flakes. The minor flakes are few. They form a technical complex and an instrumental geometry of the Paleolithic (Derevianko et al., 2018, p. 19).

5. CONCLUSION

Movius (1948) found a division between the East and West in the stone toolmaking industry from the dawn of human society. According to him, the Paleolithic inhabitants of the West were able to make and use hand axes with a balanced shape using sedimentary rocks as the raw material. The standard flaking technique shows the high level of toolmaking skill of these prehistoric inhabitants. In contrast to the West, the rough-hewn technique in the East functioned to make choppers and chopping tools. Accordingly, Movius considered this to be a rudimentary technique because the manufacturing activity depends heavily on the shape of the pebble. The East was seen as a conservative, stagnant, and backward area that did not contribute much to the Paleolithic stone toolmaking technique of human society (Movius, 1948, 1949).

During the past seven decades, due to lack of documentation or lack of access to necessary sources, many archaeologists have been convinced by the hypothesis proposed by Movius. However, hundreds of Paleolithic sites have been discovered in East and Southeast Asia since 1949. The discovery of these sites and their study have provided much evidence of advances in the stone tool industry of East and Southeast Asia. Researchers have since analyzed many different aspects of the Movius Line hypothesis. Many seminars and conferences have also been held to discuss similarities and differences, chronology, stone toolmaking industries, etc., between the East and West (Yi et al., 1983; Hou et al., 2000).

With new discoveries about the An Khe Paleolithic industry (Vietnam) and the Baise industry (China), we believe that the biface collections show important achievements in the stone toolmaking techniques of prehistoric man. The owner of this industry is *Homo erectus*. The manufacturing techniques at An Khe have certain differences compared to the Acheulean industry (from 1,000,000 to 120,000 years BP) (Nguyễn, 2019). Nguyễn (2019) also rejected the Movius hypothesis:

From the very beginning, there was no absolute division between the East specialized in chopper/chopping tools and the West specialized in making hand axes. The difference in tool geometry was due to the adaptation of humans to the natural environment, including the difficulty in finding stone materials to make tools and the need to make tools to serve the human activities of hunting and gathering. It would be a serious mistake to consider the hand ax as a tool illustrating a dynamic, cutting-edge region and the chopper/chopping tool as a tool illustrating a conservative, backward region. (Nguyễn, 2019, p. 15)

In conclusion, the excavation and research of the Paleolithic sites in An Khe are expected to continue with the cooperation of specialized agencies, both domestic and international. However, the first and foremost task is for the cultural management departments/sectors at the national and local levels and the Gia Lai Provincial General

Museum to put forward plans to protect, preserve, research, and develop heritage records to build An Khe into a historical-cultural research, training, and tourism center to best promote the value of the archaeological heritage resources here and to contribute to sustainable socioeconomic development in Gia Lai, in particular, and the Central Highlands in general.

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