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## **The Early Paleolithic Go Da Site and the Bifacial Lithic Industries of Southeast Asia**

*The lithic industry of the stratified site Go Da in Central Vietnam is described, and its place among the contemporaneous Early Paleolithic sites of East and Southeast Asia is determined. Results of a morphological technological analysis of the Go Da assemblage are provided. Go Da is attributed to the An Khe-type sites situated in the eponymous area of Vietnam. Cores and tools were made from pebbles, less often from flakes. Primary reduction focused on simple pebble cores with natural striking-platforms, whereas radial cores were less common. Predominant among the tools are picks, scrapers of various modifications, choppers, and chopping tools, as well as denticulate and notched tools; also, bifaces occur. These tools belong to a single homogeneous industry, showing common features in primary reduction, preparation, and design of key artifacts. On the basis of analysis of the stratigraphic sequence of Go Da and the absolute date of  $806 \pm 22$  ka BP, generated by the potassium-argon analysis of tektites, it is proposed that the site is older than other dated locations with the An Khe industry. Apparently, it resulted from a convergent evolution of the pebble-flake industry introduced by the first wave of *Homo erectus* from Africa. Go Da and other An Khe sites likely belong to a vast habitation zone of Southeast Asian hominins with technologically and typologically similar industries dating to the boundary between the Lower and the Middle Pleistocene.*

**Keywords:** Vietnam, Early Paleolithic, An Khe industry, handaxes, bifacial tools.

### **Introduction**

Bifacial industries that emerged in Southeast Asia ca 1 million years ago resulted from convergent development of lithic industries in a particular natural and climatic zone. In this region, many archaeological cultures and lithic industries have been identified,

characterized by detachment of flakes from pebble, radial, orthogonal, etc. cores, which flakes were used for the manufacture of tools, and by the great number of pebble chopping tools. Notably, the lithic industry of East and Southeast Asia underwent significant changes over 1.5 million years. The Early Paleolithic bifacial industry of central Vietnam is a result of these

changes. In 2015–2019, the Joint Russian-Vietnamese expedition discovered 28 Early Paleolithic sites with a pebble-flake industry and bifacial handaxes in the in the An Khe Region of Gia Lai Province (Fig. 1). The toolkit and the primary reduction technique of the An Khe lithic industry are described and analyzed in detail in various publications elsewhere (Derevianko, 2018; Derevianko, Gladyshev, Nguyen Ziang Hai et al., 2017a, b; Derevianko, Kandyba, Gladyshev et al., 2019; Derevianko, Gladyshev, Kandyba et al., 2020). Two dates ( $806 \pm 22$  and  $782 \pm 20$  ka BP) were generated on tektites found in association with bifaces and pebble tools in the An Khe cultural layer through the  $40\text{K}/38\text{Ar}$ -method (Derevianko, Kandyba, Nguyen Khac Su et al., 2018). The overwhelming majority of sites with this lithic industry are located on the left bank of the Ba River. The cores and tools were made from pebbles and boulders of quartzite hydrothermalite—a fine-grained quartz rock formed by vein quartz (identification by N.A. Kulik). The

fine and medium water-wear of the pebble-boulder substrate of the modern alluvium in the river close to the site leaves no doubt about the local origin of the pebbles. Moreover, the outcrops of non-rounded quartz in the form of blocks were found on the slope of Dat—the mountain in the immediate vicinity of Roc Tung locality, where sites with the An Khe industry are concentrated. In 2020, the additional survey upstream and downstream of the river from the concentration of the main archaeological sites showed that the number of sites with archaeological finds sharply decreases with distance from the sources of raw materials. The artifacts found were quite few, scattered over a large area and forming no accumulations (Gladyshev et al., 2020). In general, the An Khe industry represents a typical pebble-flake technology of the Early Paleolithic, which is characterized by ordinary parallel primary reduction. The toolkit includes side-scrapers of various modifications, choppers, chopping tools, notched-denticulate tools, and core-shaped scrapers. Noteworthy is the presence of bifacially worked tools such as handaxes, picks, and implements with tips fashioned through flaking and retouching. Despite the fact that part of the archaeological material was discovered in an exposed state owing to the destruction of the cultural layer by agricultural works, the surviving stratified sites showed a similar stratigraphy and were confined to the same geomorphological position. All the sites were located on one high hilly plain, which is a denudation structural plateau with remnant hills and a thin layer of loose sediments. Archaeological materials found *in situ* were located directly on top of the ancient weathering crust, in the pebble-boulder-gravel horizon, and were overlain by a layer of loose sediments of varying thickness. Go Da is the only site with differently-originated deposits in this area. Archaeological materials from this site have hardly been described before.



Fig. 1. Location of the Go Da site.

### Study materials

The Go Da site ( $13^{\circ}58'306''$  N,  $108^{\circ}9'136''$  E) is situated 2 km to the northwest of the main bridge over the Ba River, in the city of An Khe. The site is located at an altitude ca 440 m above sea level and ca 50 m above the river edge. The archaeological excavation area was located 900 m westwards of the river, on a hilly plateau composed of bedrocks (Fig. 2, A). The site was partially destroyed, owing to the open-cut mining of granite in the southeastern part of the hill. The 41 m long section

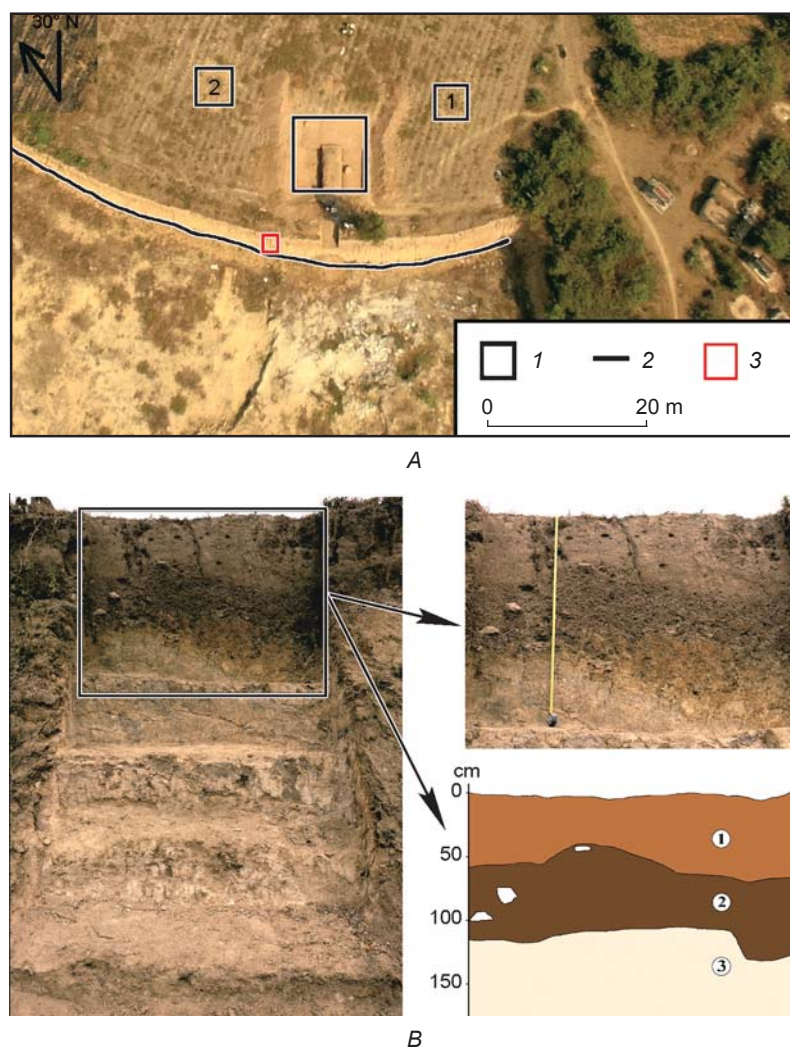


Fig. 2. Locations of excavation areas and quarry (A), stratigraphic column (B) at Go Da.  
1 – excavation area and test pits 1 and 2; 2 – quarry boundary; 3 – established stratigraphic section.

was established along the wall of the quarry, oriented from west to east, declining in the western direction. The stratigraphic column shows a weathering crust up to 1.5 m thick (layer 3) overlying the granite stratum (Fig. 2, B). It is overlain by slopewash sediments, consisting of coarse sandy loam, angular grus, and debris (layer 2). In some places, in particular in the central part of the section, an accumulation of coarse-grained material is observed. Certain areas of the slopewash sediments had been affected by erosion processes. The artifacts were located in the top of the weathering crust and in the lower part of the slopewash sediments 30–50 cm thick. The sediments are overlaid by polygenetic deposits of multi-colored loams (20–30 cm thick), heavily disturbed in the course of agricultural activities (layer 1). An excavation area and several test pits were established at the unaffected part

of the site, which was a slope—slightly declining in the northwestern direction—of the hill, strongly denuded by anthropogenic impact; the bulk of the lithic artifacts were found here.

The excavation area of 2014–2016 totaled 110 m<sup>2</sup> and yielded 103 artifacts. The sections of the excavation areas and test pits are generally similar to the stratigraphic sequences in the quarry described above.

Primary reduction technique is illustrated by 71 artifacts, including 25 split pebbles, which are usually large and retain negative scars from several test removals. The collection comprises four hammerstones—rounded granite pebbles with wear traces.

In total, 22 cores were identified. Simple parallel pebble cores predominate. The single-platform unifacial cores can be subdivided into two groups. The first group includes artifacts with signs of reduction



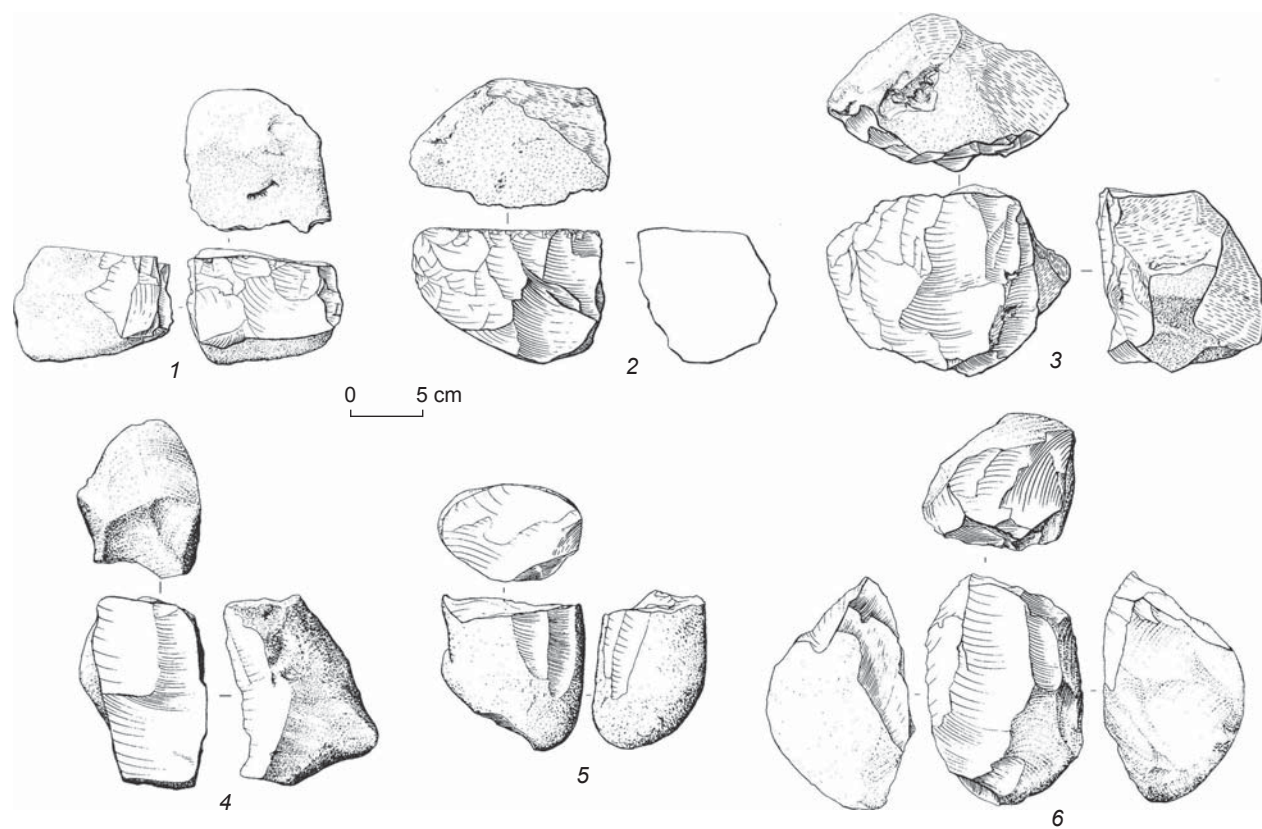


Fig. 3. Pebble single-platform unifacial cores from the Go Da site.

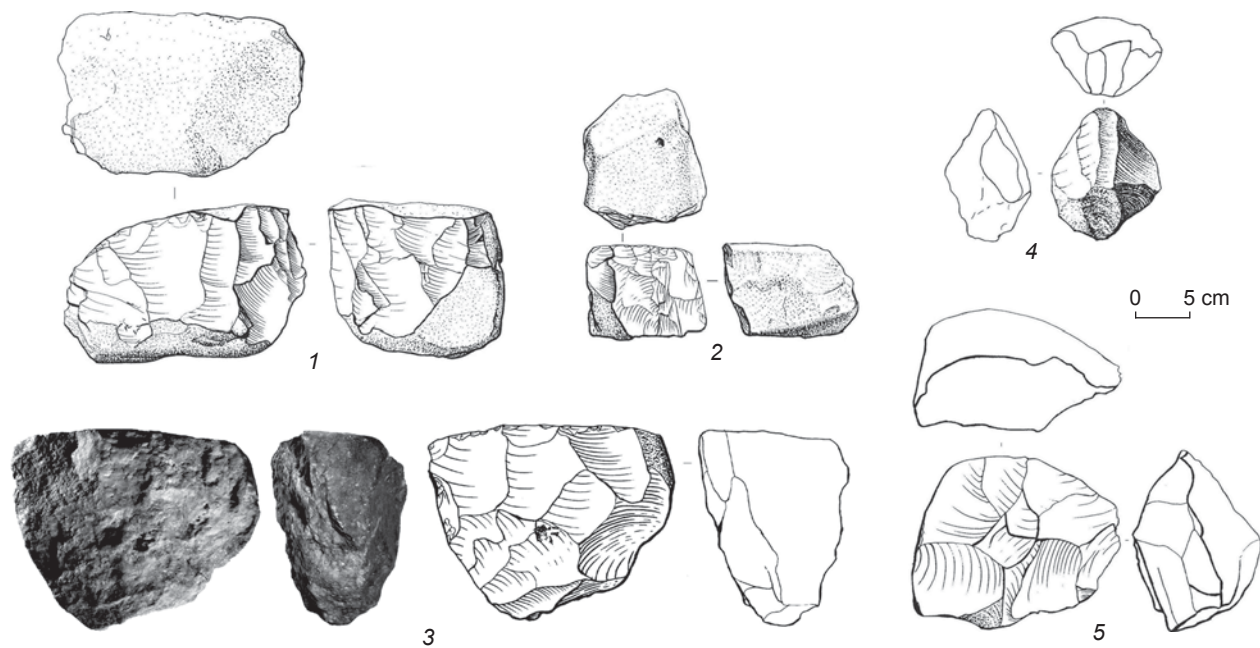


Fig. 4. Pebble single-platform bifacial (1), double-platform unifacial (2), and radial (3–5) cores from the Go Da site.

executed from an unprepared striking-platform, retaining the natural crust (9 spec.). Such cores were made on flat rectangular pebbles, with flaking carried out across the long axis of the blank (Fig. 3, 1–3). There are also longitudinally-oriented cores. One of these bears signs of knapping from the narrow end (Fig. 3, 4). The second group includes two single-platform unifacial cores with striking-platforms prepared by several large removals (Fig. 3, 5, 6). The products of reduction of both groups were large, short or elongated, flakes. Three single-platform bifacial cores were identified. They show traces of reduction, which was carried out across the longitudinal axes of the blanks, without preliminary preparation of the striking-platforms (Fig. 4, 1). The flaking surfaces were located both on adjacent and on opposite sides. Three double-platform unifacial cores were identified. These suggest that the reduction was carried out from adjacent natural striking-platforms located at right angles (Fig. 4, 2).

Three radial nuclei with one flaking surface (Fig. 4, 3–5), and two amorphous cores were recorded. Notably, all the described core-types are situational variations of the simple parallel pebble-knapping aimed at production of flakes.

The industry of spalls includes 20 specimens. The majority are massive elongated decortication spalls, mostly large (8 spec.) or medium (6 spec.) in size. There are only 4 small chips. The dorsal faces usually

retain the natural pebble crust over 2/3 of the surface. Natural residual striking-platforms have been partially destroyed by knapping. The collection contains two large fragments.

The Go Da lithic industry includes 32 implements. The most numerous are pick-like tools (9 spec.). These are large implements, characterized by a triangular pointed tip and an opposing massive and non-prepared back. Two tools were made on highly fractured quartzite fragments; six items were manufactured on pebbles; one more piece was made on a tablet. The shape of a tool was initially determined by the outline of the original blank; the contour of the tool, triangular in cross-section, was produced by processing two faces (Fig. 5, 3) or one face. Removals of modification spalls were usually directed from the face retaining the natural surface. This led to the formation of numerous fractures. The tips of two tools are damaged (Fig. 5, 1, 2).

Chopping tools are represented by transverse choppers (5 spec.). The tools were fashioned on large massive elongated quartzite pebbles. Four choppers show strongly convex semi-abrupt working edges prepared by removing a series of medium-sized and small spalls (Fig. 5, 4). One chopper was made on a triangular pebble. It shows a straight, almost vertical working edge prepared through direct percussion and modified with small removals (Fig. 6, 7).

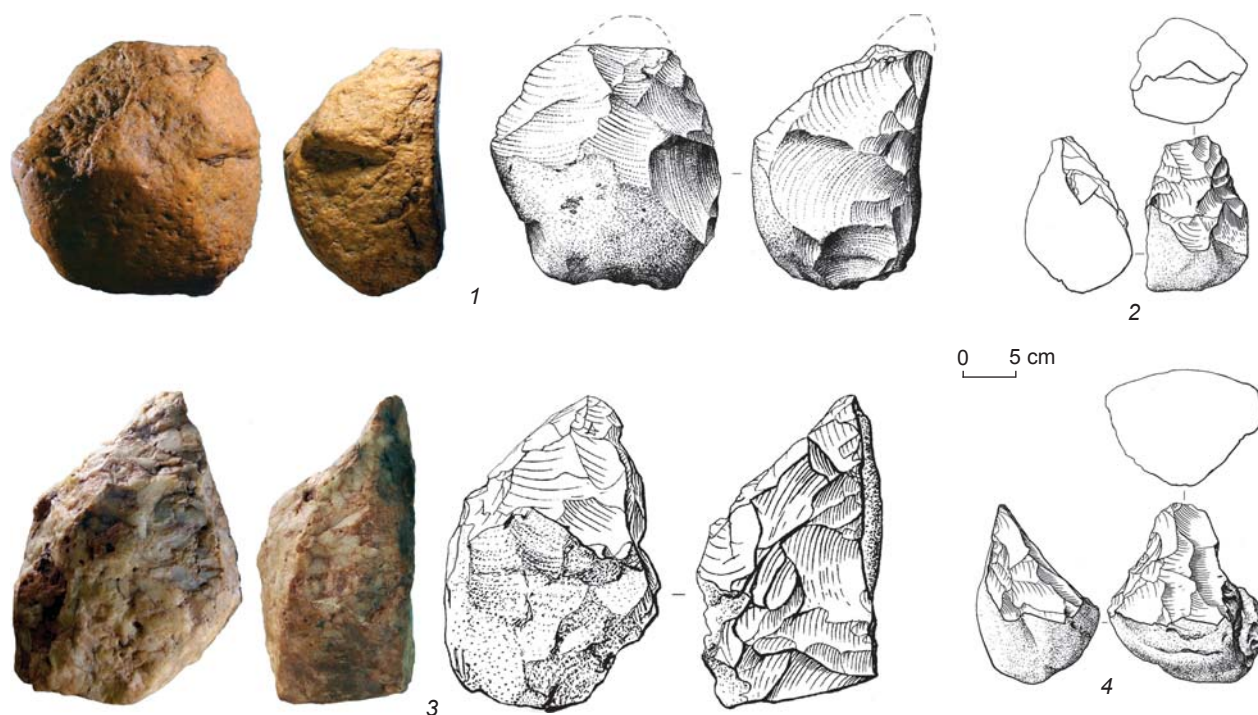


Fig. 5. Pick-like tools (1–3) and chopper (4) from the Go Da site.



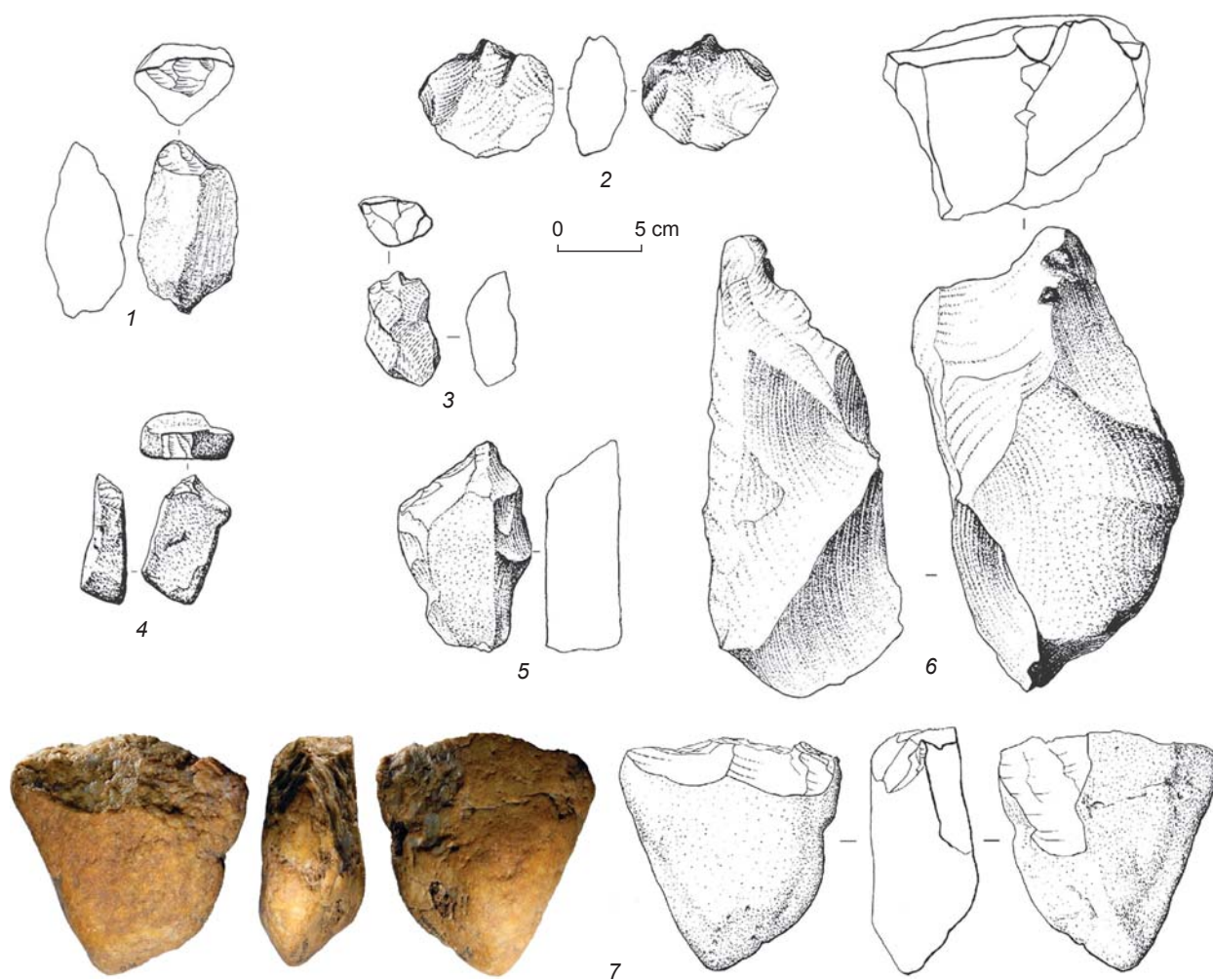


Fig. 6. Spouted tools (1–6) and chopper (7) from the Go Da site.

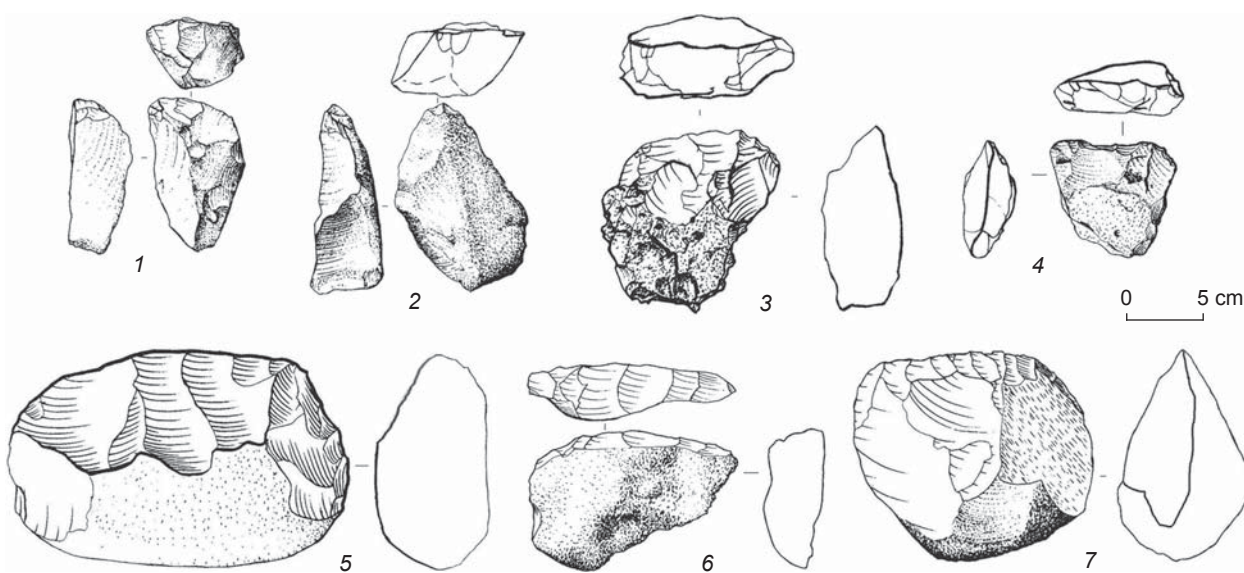


Fig. 7. Spouted tools (1, 2) and side-scrapers (3–7) from the Go Da site.

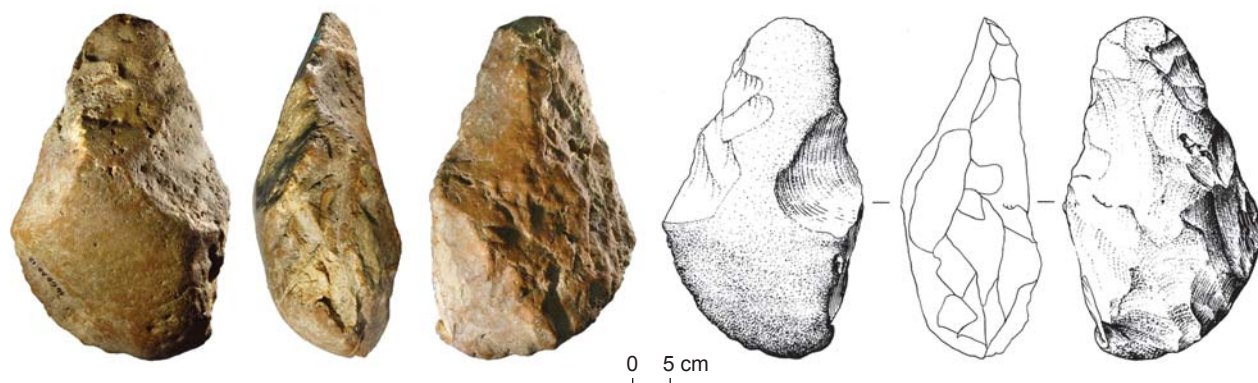


Fig. 8. Biface from the Go Da site.

The collection of spouted tools is quite large (10 spec.). Four items were made on elongated quartzite fragments. The working element was prepared on a natural sharp edge of the implement, which was modified with fine flaking (Fig. 6, 1–4). Two tools were made on pebbles: one on a large and massive one (Fig. 6, 6), the other on a small angular pebble (Fig. 6, 5). The large spouted tool shows the working element prepared through few large removals and partly modified with retouch; the small tool shows a spout fashioned on the natural sharp edge and finished with small removals. Four other spouted tools were fashioned on large elongated spalls. The working element was prepared on a natural protruding edge at the distal end through small removals from the dorsal face (Fig. 7, 1, 2).

In the Go Da lithic industry, eight transverse scrapers were identified. Three of these were made on large fragments (Fig. 7, 3, 4), and four on large pebbles (Fig. 7, 5, 7). The secondary working techniques were continuous direct percussion and large-faceted retouch. One more side-scraper, which was made on a large primary spall, is noteworthy; its working edge was formed at the distal end by a continuous abrupt large-faceted retouch (Fig. 7, 6).

There is one partial biface with a triangular shape in plan view (Fig. 8). The natural shape of the original blank was taken into account in the tool's preparation. One side of the tool is completely covered with negative scars from centripetal removals; the other retains a natural pebble crust on 2/3 of the surface.

### Study results

The cultural horizon at Go Da, as noted elsewhere (Derevianko, 2018, 2019; Derevianko, Kandyba,

Nguyen Khac Su et al., 2018), was formed mainly as a result of deflation of the granite bedrock and an insignificant shift of coarse material from the most elevated areas. The horizon was formed in the course of slope wash and erosion processes, apparently in a cooler climate than the modern one. Archaeological material was found in the bottom part of the layer and the top of the weathering crust. Laterite lens formations are confined to the top of the horizon and are partially included in the overlying polygenetic deposits, which also contain deluvial, aeolian, and clayey facies, suggesting multiple redeposition. At Roc Tung and other sites on the left bank of the Ba, cultural horizons are embodied in laterites overlying and partially included in the weathering crust on the granite bedrock. The assumption about an older age for the Go Da site, in comparison with other localities of the An Khe lithic industry, is confirmed by the fact that the tektite whose age was determined as  $806 \pm 22$  thousand years old was located in the top of the slope wash sediments, while more than 300 tektites were in the cultural layer of the sites on the left bank of the Ba. This suggests that ancient hominins arrived at Go Da prior to the formation of the Australasian tektite placer field (ca 790 ka BP), which covered all of Southeast Asia and part of Australia (Schneider, Kent, Mello, 1992). Hominins settled in this area during a period when the climate was cooler and more arid than the modern one, and the ground surface was subjected to intense weathering and erosion. The area was still populated by early hominin groups when a significant change in the environment occurred: the climate became warmer and more humid; and the formation of loose sediments in the form of laterites began.

The Go Da lithic industry demonstrates all the features characteristic for the An Khe industry at

other archaeological sites. A significant number of split pebbles testify to the intense testing of stone raw materials at the site. The occurrence of four hammerstones suggests that Go Da was a permanent camp. Primary reduction is illustrated mainly by simple parallel flaking, with an insignificant share of radial flaking. In the toolkit, the most representative are groups of pick-like and spouted tools. The categories of choppers and side-scrapers are also numerous; while the typology and morphology of these tools are similar, the main difference is observed in size and initial blanks. These characteristics of the scrapers are inherent in the entire group of sites with the An Khe industry (Derevianko, Gladyshev, Kandyba et al., 2020). The salient feature of the analyzed collection is the presence of a partial biface. Noteworthy is the roundness of the negative scars and edges of this tool; this feature is common for all the artifacts in the Go Da collection, but is not typical of lithics from other An Khe sites. This industry differs from other sites in the absence of unifacial implements, core-like scrapers, and chopping tools. Nevertheless, taking into account the geomorphological position and stratigraphic observations, Go Da should be associated with the earliest episode of the hominin settling in the Ba valley.

New data on the occupation of the Ba basin by ancient hominins were collected during the archaeological survey in the Phu Thien area, 50 km to the southwest of An Khe, in March 2020. The sites of Kinh Peng-1, -2, Chu Rung, and Phu Thien-1, -15 were located on the left bank of the Ayun River, both in exposed and in stratified context. The materials of this complex of sites show similarities with the An Khe industry in their geomorphological position, raw materials, and the presence of such types of artifacts as simple parallel cores, choppers, transverse side-scrapers, pick-like tools, and bifacial implements (Gladyshev et al., 2020). No large-scale excavations have been carried out at the above sites. According to preliminary geomorphological observations, the complex of sites in the Phu Thien area, discovered in 2020, is located on the Lower Quaternary terrace of Ayun, the age of which is determined as in the range from 1500 to 780 ka BP. The geomorphology of these sites, along with the techno-typological characteristics of the archaeological collection, makes it possible to attribute the Phu Thien materials to the Early Paleolithic An Khe industry. However,

the absence of tektites and laterite formations at the stratified localities in the Ayun valley may indicate an older age of their lithic industry as compared to the Go Da collection.

Discovery of new localities with bifacial tools in Southeast Asia is not uncommon for this region; in the first half of the 20th century, the Pacitanian lithic industry was found on the islands of Indonesia. The lithics of the Pacitanian industry constitute a kind of typological series, which includes choppers, chopping tools, and bifacially worked tools designated as handaxes (Movius, 1944, 1949). H. Movius noted that in this industry, as also in An Khe, bifaces are certainly a typological marker, although their proportion is small. Leaving the discussion about the Movius line aside, we note that the researcher was right in identifying the difference between the lithic industries of Southeast and East Asia, and the Paleolithic complexes of the rest of Eurasia and Africa (Movius, 1956, 1958).

As was shown in earlier publications, the An Khe lithic industry, in terms of techno-typological characteristics and absolute age (ca 800 ka BP), bears the greatest similarity to archaeological materials found on the Baise plateau in China (Derevianko, 2018; Derevianko, Kandyba, Nguyen Khac Su et al., 2018). These parallels are also recognized by Chinese researchers (Lin, Xie, 2019). The bifacially worked tools, various choppers, and chopping tools were found in the stratified context, their age was established by tektites (Hou Yamei et al., 2000; Lycett, Norton, 2010); these tools determine the unique outlook of the Early Paleolithic of Southeast and East Asia (Xie, Bodin, 2007). However, though some researchers attribute this lithic industry to the Acheulean (Zhang, Huang, Wang, 2010), the Baise archaeological materials differ from the classic Acheulean forms in techno-morphological characteristics. In addition, there is a large time gap between these technocomplexes (Derevianko, 2019).

The known area of dispersal of the Early Paleolithic industries has recently expanded owing to the discovery of more than 60 localities in the Nenjiang River valley (Guangdong province, China) (Xie, Lin, Li, 2019). Lithic industry was recorded both in exposed and in stratified context; the age of the most ancient peopling period was determined as in the range of 600–800 ka BP, on the basis of geomorphological features of Modaoshan and the techno-typological characteristics of artifacts (Ibid.).



## Discussion

The issue of the peopling of Eurasia has been and remains the key one in archaeological science. Many researchers, including G.H.R. von Koenigswald (Koenigswald, von, 1936; Koenigswald, von, Gosh, 1973), H.R. van Heekeren (1955, 1972), R.P. Soejono (1961), G.J. Bartstra (1978, 1982, 1984, 1992) were engaged in the search for traces of Paleolithic humans in Southeast Asia. Studying the archaeological complexes of Indonesia, they tried to identify the presence or absence of the Acheulean traditions on the basis of the analysis of forms of the bifacially worked tools and the typological series of lithic industries. Later, attempts to carry out the same analysis of the exposed artifacts from the islands of Indonesia (Sumatra (Baturaija), Java (Patjitan, Sangiran), and Sulawesi (Kanbengian)) were undertaken by other researchers (Forestier, 2007; Keates, Bartstra, 2001; Sémah et al., 2014). Despite the fact that the age of the Sangiran assemblages, according to preliminary estimates, is 800 ka BP (Mishra et al., 2010), and the absolute age of the choppers and spalls, some of which were identified as “cleavers”, from the Ngebung-2 Sangiran stratified site, is 860–880 ka BP (Simanjuntak, Sémah, Gaillard, 2010), researchers continued to associate the Patjitan and Sangiran collections with the Acheulean wave of human migration to Southeast Asia. At the same time, some experts admitted that the artifacts from Indonesia differ considerably from the obvious Acheulean

items (bifaces, cleavers, and pick-like tools) in their specifically Asian (Indonesian) appearance of rather archaic morphology (Simanjuntak, Forestier, 2008, 2009; Brumm, Moore, 2012).

Over the past 30 years, more than 200 sites with artifacts of both surface occurrence and in a stratified context have been discovered in Southeast Asia (Fig. 9). The most abundant and fully dated archaeological material was found in South China (Baise, Nanjiang industries) and Central Vietnam (An Khe and Phu Thien industries). These lithic industries represent the Early Paleolithic bifacial trend of development that originated on a local basis, i.e. convergent development. Archaeological research carried out elsewhere in this vast region adds information on the ancient hominin settlement at the boundary between the Lower and Middle Pleistocene. Artifacts from the site of Sao Din in northern Thailand reveal an undeniable closeness to the South Chinese and Vietnamese collections (Zeitoun et al., 2012). Moreover, the researchers of this site argue not only similar features (bifacial technology), but also the specificity typical of the Early Paleolithic industries of Southeast Asia (Ibid.). In the Philippines, bifacial tools are rare (Huluga site, Ille Cave); these were surface finds (Dizon, Pawlik, 2010). The semi-buried bifaces at Arubo-1 on Luzon Island (Pawlik, 2004) show morphological similarity with the An Khe and Baise bifacial artifacts (Pawlik, 2019). Discovery of the Kalinga stratified site, dated

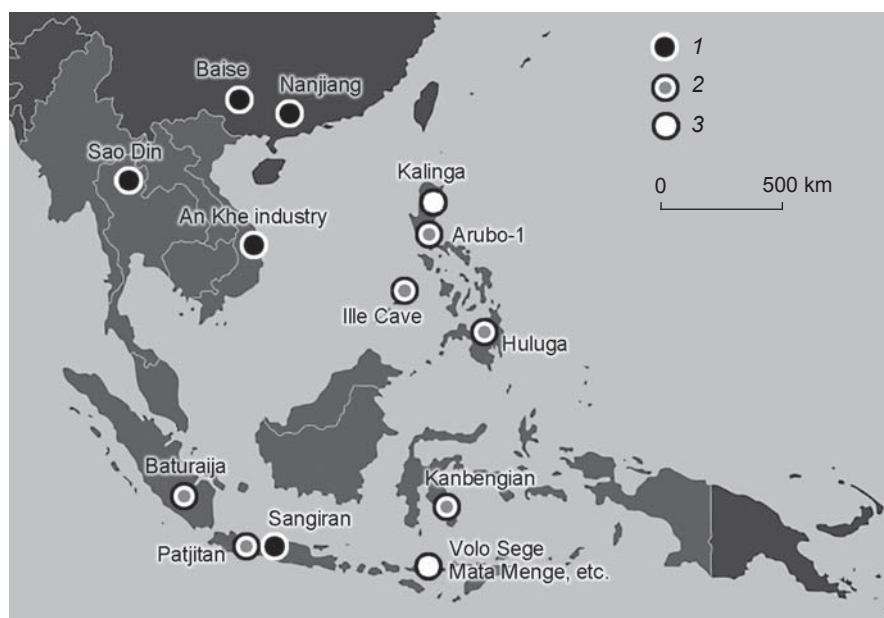


Fig. 9. Location of the Early Paleolithic complexes in Southeast Asia.

1 – with bifacially worked tools found *in situ*; 2 – with bifacially worked tools found on the surface; 3 – without bifacially worked tools.

to more than 700 ka BP, in the north of Luzon Island made it possible to shift back the age of the first peopling of the Philippine archipelago to the Early Middle Pleistocene (Ingicco et al., 2018). The tektite found in the cultural layer and identical in mineral composition to the Australasian (Ibid.) suggests the chronological proximity of the Kalinga lithic industry to the continental Early Paleolithic technocomplexes. Lithic artifacts are represented mainly by small flakes with utilization retouch, the use of which is confirmed by the presence of rhinoceros bones with traces of butchering (Ibid.). As noted by A. Pawlik, the Arubo-1 and Kalinga assemblages show the same reduction strategy and selection of raw material (2019). The absence of bifacial tools in the Kalinga collection is possibly a consequence of the narrow specialization of the site (the place of rhino carcass butchering). No artifacts of this type have been found at the sites of Volo Sege and Mata Menge, dated to ca 1 Ma, in the basin of the Soa River, on Flores Island (Brumm et al., 2010). Noteworthy is the occurrence of a pick-like tool at the site of Volo Sege (Brumm, Moore, 2012) that is morphologically similar to those in the An Khe and Baise industries. All of the above suggests that at the turn of the Lower and Middle Pleistocene, Southeast Asia was a vast habitation zone of ancient hominins with lithic industries that were almost identical in techno-typological characteristics.

### Conclusions

The Early Paleolithic Go Da industry is characterized by pebble-flake reduction. The main raw materials were quartzite pebbles and boulders from the channel alluvium. The primary reduction is dominated by single-platform unifacial cores with natural striking-platforms. Double-platform unifacial cores and radial varieties of cores are extremely rare.

Prevalent among the tools are picks, choppers, spouted tools, and transverse side-scrapers. Particularly noteworthy is a bifacially worked implement that is a triangular biface fragment. In general, the archaeological material from excavation at Go Da is completely identical to the lithics from both the Roc Tung group of sites and other localities from the left bank of the Ba. All these artifacts characterize the material culture of the Early Paleolithic An Khe industry, which arose in central Vietnam ca 800 ka BP.

Despite the rare occurrence of bifaces in the cultural layers of the sites of the An Khe industry (at Go Da,

only one specimen was found), these are a marker suggesting attribution of the An Khe archaeological complexes to the Early Paleolithic bifacial cultures of Southeast Asia. The An Khe bifacial tools were made mainly on large sub-triangular pebbles. Only the upper parts of pebbles were prepared through large and deep removals, while the bases remained intact. Pick-like tools and other points were treated using the same techniques. Notably, these bifaces or handaxes from Vietnam are absolutely not identical to the Acheulean bifaces of Africa and Europe. The only feature linking the bifacial industries of Vietnam with the Acheulean is the presence of bifacially flaked tools. There are no cleavers at An Khe sites; nor is there any evidence of the Levallois technique. There is every reason to believe that the bifacial technique emerged in Vietnam and China owing to convergent evolution.

The discovery of the Early Paleolithic (final Early Pleistocene) bifacial An Khe industry in Vietnam strongly suggests that Southeast Asia in the Early Paleolithic was one of the regions where bifacial industries were formed.

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