LITHIC TECHNOLOGY AND MATERIAL CULTURE OF HOABINHIAN AND NEOLITHIC SETTLEMENT IN THE LUBANG KELAWAR BATU TAMBAH CAVE

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ABSTRACT

Lubang Kelawar Batu Cave is a site located in Hulu Kelantan, which was once a stopover for the prehistoric society. The importance of Lubang Kelawar Batu Tambah Cave was recognized after the discovery of cave paintings on the walls, the discovery of lithic tools, and ecofact at the surface of the soil based on the results from earlier surveys. This study was conducted to examine the environment and material culture of the Hoabinhian and Neolithic settlement in the Lubang Kelawar Batu Tambah Cave. The method used in this study is more focused on archaeological excavation methods based on grid systems. This study will focus on the environment and culture of the people who had lived in the aforementioned cave and made it as a stopover and shelter based on archeological findings, such as artifacts consisting of lithic tools, earthenware, and ecofacts (such as snail shells and animal bones and cave paintings). The lithic tools found at the site were an anvil, hammer stones, chopper tools, handaxe, grinding stone, Sumatralith, chisels, borer, and waste flake; whereas cave paintings were mostly motivated zoomorphic, anthropomorphic, and flora. As a result of these findings, it can be identified that the site was once a stopover and shelter for the Hoabinhians and Neolithic communities. Therefore, this study is considered as an important means in contributing to the understanding of the settlement and the community's activities at the time.

Key words: Lubang Kelawar Batu Tambah Cave, stone tools, lithic tools, rock art.
1. INTRODUCTION

The geographical make in Malaysia is unique, which consists of limestone and hilly terraces filled with natural caves. These natural caves had once become shelters for prehistoric communities. They used caves to shelter themselves from wild animal threat, as well as from heat and rain. As it is well known, many findings of prehistoric sites in Malaysia are mostly evident in cave areas, such as the Cha Cave, Lembing Cave in Kelantan, and the Niah Cave in Sarawak. The Prehistoric Age is an era that had yet to establish a writing system, which resulted in a lack of recording or documentation of its daily activities or cultural heritage. Although the Prehistoric Age still had no writing system, they translated their ideas or activities through rock art. Through archaeological research and excavations performed on potential sites, there has been a discovery of certain artifacts such as stone tools in the form of handaxe, adze, and chisels. Further to this, there is also the discovery of the euphoria, such as shells, animal bones, and rock art. Through this discovery and several scientific tests, it is possible to identify the society that represented the era and the prehistoric sites in which they lived.

2. LITERATURE REVIEW OF ARCHAEOLOGICAL STUDIES IN HULU KELANTAN

The caves found in Hulu Kelantan are linked to Lembah Nenggeri, which is the main link between the central part of Kelantan and its surrounding states [1]. Archaeological research and excavations in the State of Kelantan began in 1935 by H.D Noone, who conducted an experimental excavation at the Cha Cave [2]. There was a discovery of two burial sites and eight complete earthenware forms. Other artifacts found were earthenware splinter, stone axe, whetstone, neck stone axe, rectangular axes, and cutting axe [2]. Apart from the Cha Cave, the Menteri Cave has also been identified as a cemetery where eight earthenware bowls were found together with human skeletons. Moreover, in 1939, Tweedie conducted research at the Madu Cave and Musang Cave. There were many artifacts found in the Madu Cave, such as the Hoabinhian Era stone tools also known as ‘sumatralith’ and Neolithic Era stone tools which consisted of axe, adze, and hammer stone discoveries that had hematite effects [2].

The results of the archaeological research and excavations undertaken by Sieveking in the Cha Cave indicated the occurrence of migration from the mainland of the South-East Asia to the Southern region, which further supported the migration theory conveyed by Heine Geldern. However, Adi Taha denied the theory when he had performed an excavation at the Cha Cave in 1979. The study of soil compositions was also carried out and proved the establishment of cultural evolution, which was marked from the Hoabinhian Era to the Neolithic Era. Hence, this claim dismissed the opinion expressed by Sieveking, which stated the soil layer between the Hoabinhian society with that of the Neolithic layer was barren of any form of culture. The study conducted by Adi Taha reveals that the barren layer was actually a layer of flood [2]. In addition, Nik Hassan Shuhaimi also holds the opinion that the transition from the Hoabinhian society to Neolithic occurred due to cultural evolution [3].

There were also research and excavations at the Chawas Cave and Peraling Cave Hulu Kelantan in 1994 to 1995, as conducted by the Department of Museums and Antiquities that
was spearheaded by Adi Taha. The excavation results on both sites uncovered various types of stone tools used in the Hoabinhian Era and Neolithic Era, including ecofacts such as food waste and animal bones. The site at Gua Peraling produced much denser fragments of Hoabinhian habitation remains. The reason is that perhaps Gua Peraling is located near to water supply, allowing the Hoabinhian fragments to extend right to the surface layers of the sites [4].

Radiocarbon dating by the Australian National University dated this site from 10,700 BC to 1000 CE. The most interesting finding in Chawas Cave was the Mahayana Buddhism votive tablet made from clay [5]. Votive tablets are small Buddhist icons, usually made from baked or unbaked clay by a press-mold technique. Based on their mineral content and major and trace elements, we can gather information about the origin of the clay. Several research of the same intent has been carried out on the ancient bricks of Bujang Valley temple of which the main objective was to determine the origin of the clay that were used. For example, chemical characteristics of the ancient bricks from Candi Sungai Mas (Site 32/34), Candi Bukit Kechil, Candi Bukit Pendiat (site 17) [6].

3. RESEARCH IN METHOD
The most important fieldwork in obtaining archeological data is to perform excavations. Therefore, a systematic archaeological excavation has been carried out at the Lubang Kelawar Batu Tambah Cave that was led by Associate Prof. Dr. Zuliskandar Ramli. Systematic excavation methods are essential to enable the collection of all necessary evidence. The excavation began with a search for the appropriate datum point, which was to take height readings datum point to be used as reference data when making trenches, depth measurement of artifacts, and determine the position of the excavation area height that is above sea level. Datum points were chosen based on objects that are not easily diverted or modified (such as large or embedded stone in the ground) and were marked using a prismatic compass.

Upon the completion of the search, the grid system was used to open several trenches in the Lubang Kelawar Batu Tambah Cave. Each trench opened with an area of 1 meter x 1 meter long and wide. In addition, the spit system was used, each spit measured at 5cm and data collection was done vertically. At the Lubang Kelawar Batu Tambah Cave, six trenches were opened namely a1, a2, b1, b2 and ai. However, one of the trenches – trench A – opened at the front of the cave gate, and was unable to be measured with the grid system due to its very limited area and with its side covered with cave walls. For that reason, a trench A was opened and excavated with each spit is 5cm. The trench A was excavated over ground state factors, as well as a large number of rock tools found on the surface.

4. GEOMORPHOLOGY OF THE LUBANG KELAWAR BATU TAMBAH CAVE
The Lubang Kelawar Batu Tambah Cave is a limestone cave located in the Hulu Kelantan area. The cave is located about 1 to 2km from the Nenggiri River, which serves as the main connecting road in the central part of Kelantan. Site topography reading is recorded in longitudinal dam 05° 04.71881 North and latitude 101° 54.34971 East; while the elevation reading of the sea level is 66 meters. There is a limestone complex consisting of two caves, Lubang Kelawar Batu Tambah Cave and Kecil Batu Tambah Cave. The naming of Batu Tambah by the villagers was owed to the complexity of this limestone complex separated by other limestone hills. The floods that hit Kelantan in 2015 had resulted in these flooded sites due to their proximity to River Nenggiri. The environment factor near the river has made this cave as a stopover for prehistoric society.
Lithic tools dating from the stone shaped by human beings were used in daily activities at the time of the prehistoric Paleolithic, Neolithic, and Hoabinhian societies. The Paleolithic Age is also known as the Old Stone Age in which today, the people used stone as a mark of their technology (otherwise known as the stone tools technology). There are two types of stone tools produced by the community, which are the pebble tools and the flake tools. The flake tools are flakes of rock used for light work activities but had great importance in the life of prehistoric society. The flake tools found in Southeast Asia are amorphous as there is no specific form [7].

The stone that had been flaked has a significant feature because the lithic tool flaked with a rock or stone patio with smaller stones [8]. In addition, the rocks that were flaked can be distinguished from the result of human work or that they were broken down naturally based on certain features, such as bullets bulging, ripple, and fissure [9]. The actual function of the flake tools is identified based on its shapes and pieces of the surface. Based on this aspect, it is likely that the tool was used to perform light work, such as cutting, sawing, and making sails [10].

In the Prehistoric Age, the lithic tools were made using a river rock, just one side of the surface flaked (unifas) consisting of anvil stone and pebbles. During the Paleolithic Age and the Early Age of the Hoabinhian, the lithic tools were large and rough in terms of its make and shape. While in the Middle Ages, the Hoabinhian lithic tool produced is smaller and subtle in its manufacture. This further progressed during the last days of the Hobinhian, with the lithic tools declined in size and showcased the advanced craftsmanship in producing tools. The development of technology is seen based on the transition of the tools manufactured over time – from simpler and rougher tools to smaller and more detailed ones [1].

In the eastern part of Peninsular Malaysia, the pebble stone tools found are oval, while bone tools were only found at Bukit Chuping, Perlis [11]. For example, archaeological excavations in the Cha Caves of 1979 have discovered lithic tools and burial sites of the Hoabinhian community [2]. In addition, there was a discovery of a skeleton with its head laid on a rock board and another was covered with rocks around its chest [12]. Every prehistoric archaeological site found in Malaysia has its own unique tool created by the prehistoric society that once inhabited the site. The people who resided in limestone caves and employed

Figure 1 The front view of the Lubang Kelawar Batu Tambah Cave

Figure 2 The back view of the Lubang Kelawar Batu Tambah Cave

Source: ATMA UKM Collection

5. LITHIC TOOL TECHNOLOGY AT PREHISTORIC ERA

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lithic tools flaked on the surface or both surfaces are known as 'Sumatralith' [13]. It is also believed that they used lithic tools as whiskers and lubricants.

6. LITHIC TOOLS TECHNOLOGY DISCOVERED AT LUBANG KELAWAR BATU TAMBAH CAVE

In April 2018, an archaeological research and excavation was conducted at the Lubang Kelawar Batu Tambah Cave. As a result of the excavations made, there was a discovery of artifacts such as stone tools, earthenware, and ecofact like shells and animal bones as well as rock art. One of the trenches – namely trench A – was opened at the entrance gate of the Lubang Kelawar Batu Tambah Cave. This trench was opened without any grid system due to its sheltered condition with a cave wall; nevertheless, each spit was measured at 5cm deep.

![Figure 3 Anvil stone](image1)

![Figure 4 Hammer Stone](image2)

Source of ATMA UKM Collection

Stone tools or lithic tools are identified with distinctive features, such as having sharp sides, while some of them have a use effect [14]. Usually, the anvil stone is a tool with the shape of a flat quartz piece. It also has damage effect on the surface as it was often used as a liner to make stone tools. Anvil stones are categorized as lithic equipment since they were used to produce lithic tools. Figure 3 is an example of the anvil stone found in a trench A at Lubang Kelawar Batu Tambah.

![Figure 5 Chopper Tools](image3)

![Figure 6 Handaxe](image4)

Source: ATMA UKM Collection

In addition, the hammer stone (Figure 4), as well as the chopper tool, (Figure 5) and handaxe (Figure 6) are also categorized as lithic equipment. Hammer stones are usually characterized by having impact effect or use effect on various parts and have the appropriate size as a handheld device, with a round or oval shape. The hammer stone often served the purpose of forming core stones [15]. In addition, the chopper tool was usually made from pebbles and has a use effect on its side. Whereas the hand axe axis has sharp sides and was created in various shapes and sizes. At times, the hand axe would also be used as a tool for cutting and chopping.
Chisel (Figure 7) was one of the lithic tools created during prehistoric times and is said to be a tool of the Neolithic culture. Usually, the chisel is rectangular shaped or cylindrical in which the eyes are tapered and sharp. Chisels are believed to have been used for carpentry work, particularly in making canoes. Chisels were also used to remove wood fibers. Scraper (Figure 8) has various shapes and sizes, such as side scraper, end scraper, convex scraper, and round scraper. Scrapers were usually made of flakes and were considered as unifacial tools. Scrapers were also used for hide working and woodworking, namely in the whittling of wooden or bamboo twigs.

In addition, the borer (Figure 9) is also a stone tool created by the prehistoric society. A borer is usually made of flakes by making a deep notch on its side and carving it into sharp tip parts. The borer is also believed to have been created in the Neolithic Age and was used to punch holes. Meanwhile, the grinding stone (Figure 10) is a pebble stone tool. The grinding stone is characterized by having a scratchy effect or a use effect on its surface. Whereas the stone tool is known as the Sumatralith (Figure 11) and is characterized by pebble stones, which are flaked on either side of its surface. This artifact called 'sumatralith' usually was often present in the Hoabinhian culture [16]. While the waste flakes (Figure 12) were the debris that remained from the process of making lithic tools [10].

7. THE DISCOVERY OF ARTIFACTS AND THEIR RELATION TO THE PREHISTORIC SETTLEMENTS IN THE LUBANG KELAWAR BATU TAMBAH CAVE

While initial surveys and excavations were conducted at the Lubang Kelawar Batu Tambah Cave, there were many discoveries of artifacts, ecofact, and rock art. The artifacts found included lithic tools, earthenware and charcoal; while the ecofact consisted of the remnants of prehistoric food, such as shells and animal bones. The rock art found is also one of the strongest evidence of the presence of a prehistoric society in the cave. Every discovery of
artifacts, ecofact, and rock art are proof that the prehistoric society had used the Lubang Kelawar Batu Tambah Cave as a sanctuary at a certain time in the past.

The finding of lithic tools can be classified into three general classifications, which are equipment, tools, and debris. Zuraina has been reclining equipment making tools consisting of anvil stone, core stone and hammer stone. The lithic equipment is often referred to the tools used in producing stone tools [17]. Further to this, the tools can be divided into pebble tools and flake tools, as well as puddles. While the residual work can be classified into three lumps, flake, and refuse. The lithic tools classification on the site is very important in understanding existing lithic technologies that were employed by prehistoric society at the time.

The Hoabinhian Cultural Society was synonymous with animal hunting, harvesting, and nomadic living. They would often go out to hunt animals and collect forest produce for food supplies. Therefore, they would often choose caves as a temporary stopover or shelter. In addition, the Hoabinhian community had also used caves as a sanctuary while awaiting monsoon change. The cave was often the choice of the Hoabinhian community as a shelter due to its sheltering feature that could shield them from heat and rain and from the threat of wild animals. The Hoabinhian community would also choose caves that could serve them as shelters while they were out hunting.

The discovery of equipment in making lithic tools on the site was a collection of anvil stones, core stones, and hammer stones. There is a use effect on the anvil stone and the hammer stone, which proves that the Hoabinhian community had created lithic tools in the cave. It is also believed that a hand axe was used to cut meat of hunted animals, which corresponds to the discovery of animal bones at the site. In addition, flakes were also one of the tools used by the Hoabinhian community in Malaysia. The fact that the cave is adjacent to the river had rendered it a choice for the prehistoric society, as there would be a nearby water supply that could also provide them with raw materials to make stone tools in the river.

![Figure 13 Snail Shell](http://www.iaeme.com/IJMET/index.asp)

![Figure 14 Earthenware Fragments](http://www.iaeme.com/IJMET/index.asp)

Source: ATMA UKM Collection

The discovery of the hand axe in this site – along with the snail shells – shows that the Hoabinhian community had used a hand axe to cut the tip of the snails to extract their contents. Since there are snail shells (Figure 13) from the sea, it can be concluded that the people who utilized this site not only depended on the ingredients and hunting animals from the hinterlands, but had also explored the coastal areas. It is believed that people who used the Lubang Kelawar Batu Tambah Cave had evolved from the Hoabinhian community to the Neolithic community. This is supported by the uncovering of artifacts, such as earthenware fragments (Figure 14) and charcoal. Although the Neolithic community began living permanently and started planting, they continued to use the cave as a stopover point during hunting. In addition, although the Hoabinhian community had evolved from the Hoabinhian community to the Neolithic society, the Neolithic society was still using lithic tools of the Hoabinhian era.
The discovery of rock art on the site has further reinforced the notion that the Neolithic society had inhabited the cave. There are zoomorphic motifs (Illustration 1) such as monkeys, fish, and deer that are believed to be the animals they had hunted [18]. There are also anthropomorphic motifs (Illustration 2) and floral motifs (Illustration 3). The rock art is believed to have been the means of recording daily activities of the prehistoric society due to the lack of a writing system at the time. The paintings appeared to have been created with monochromatic colors of black charcoal. This suggests that the Hoabinhian and Neolithic communities had created their own technology that was relevant in the period.

8. CONCLUSIONS
Based on the results of the archaeological research and excavations conducted at Lubang Kelawar Batu Tambah Cave, there are many artifacts, ecofact, and rock art. The findings of the various lithic tools and cave paintings that incorporated charcoal shows that people living in this cave had created their own distinctive technologies. The discovery of lithic tools and rock art suggest that the people who lived in the cave were of the Hoabinhian and Neolithic society. In addition, the lithic tools found have a use effect and sharp edges that further proved that they were employed to meet the needs and livelihood of the society at the time. Apart from the discovery of the lithic tools, snail shells, animal bones, and rock art are also proof that the Lubang Kelawar Batu Tambah Cave was once home to prehistoric residence.

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