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## TRACING PREHISTORIC CONNECTIONS-THE TRADITIONAL METHOD ON TOOL MAKING: A COMPARATIVE ARCHAEOLOGICAL ANALYSIS OF MANIPUR AND SELECTED SITES OF SOUTHEAST ASIA DURING THE PLEISTOCENE AND EARLY HOLOCENE EPOCH

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*This comparative study of prehistoric tools and technologies situates Manipur as a crucial cultural corridor linking South and Southeast Asia. It emphasizes broader patterns of prehistoric human migration and environmental adaptation during the Late Pleistocene and Early Holocene periods. By functioning as a geographical and cultural bridge between South and Southeast Asia, Manipur emerges as a significant node in prehistoric human history. Archaeological materials recovered from both cave and open-air sites in Manipur demonstrate strong cultural affinities with prehistoric assemblages from mainland and island Southeast Asia. The present study undertakes a detailed examination of these similarities and differences through comparisons with selected Southeast Asian sites. While notable parallels exist, the prehistoric assemblages of Manipur also exhibit distinctive regional characteristics reflecting localized adaptations. Furthermore, prehistoric migration routes along the Salween, Irrawaddy, and Chindwin river systems appear to have played a vital role in the transmission of cultural traditions from East and Southeast Asia into Manipur. These interactions, particularly influences from China and Southeast Asia, significantly contributed to the development of the unique features observed in Manipur's Neolithic cultural landscape.*

**Keywords:** Manipur, Southeast Asia, Prehistoric lithic tools, Cultural parallels, Holocene, Pleistocene, Archaeology

**Prehistory**, also known as “*pre-literary history*,” is the period of human history when there were no written records from 3.3 million years ago till the inception of writing (Mccall et al,1973, p.733). In 1833, Paul Tournal, the French archaeologist, introduced the term '*periodic anti-historique*' to describe the phase of human history

predating written records (Chippindale, 1988, p.303). Prehistory as a discipline became prominent with the academic publication of Charles Darwin's seminal work "**On the Origin of Species**" and "**Descent of Man**" in 1859 and 1871 respectively. The work extensively documented the evolution of humans and other species through the process of natural selection or survival of the fittest (Renfrew & Bahn, 2016, p.26). This elusive vast span of time of the presence of early human ancestor receives scrutiny through prehistoric archaeology and its interconnected fields such as geology, biology, anthropology, and palaeontology (Childe, 2017, p.7-8). **Archaeology** is the study of the human past through systematic survey, exploration and excavation of the material remains. It deciphers ancient human behaviours through surviving artifacts, industry, and assemblage (Singh, 2009, p.34). Prehistoric Archaeology spanned from 3.3 million years ago at **Lomekwi** in East Africa till the invention of writing (Fagan & Durrani, 2019, p.34). With the absence of written records from this era, the main source for the reconstruction of prehistoric society consists of lithic artifacts and material remnants which stand the test of time. These material remnants or relics predominantly take the form of **stone tools, animal calcified remains, human fossils, biofacts, and Eco facts.**

### PREHISTORIC CULTURAL CONNECTION OF MANIPUR WITH THAT OF SOUTHEAST ASIA

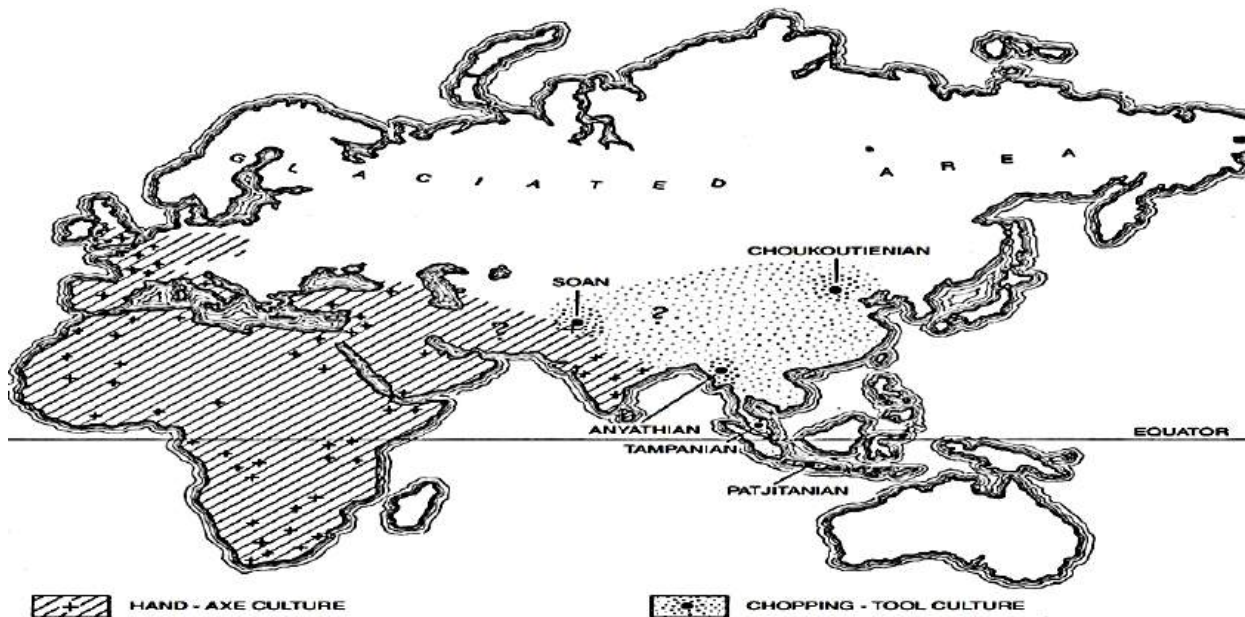
To study and understand the prehistoric culture of Manipur calls for an in-depth comparison with those regions having similar **cultural affinities** in terms of lithic tools and technologies left by the early humans and its ancestors. The prehistoric archaeology of larger Southeast Asia region is crucial to unravelled significant insights into the cultural development in Manipur based on evolution of **lithic tool typo-technologies**, and trajectories for early human **migrations** through **human mtDNA** genetic analysis. The Mongoloid and Austro-Asiatic features in the contemporary population in Manipur can be traced to the prehistoric times in the region.

In the context of global prehistoric archaeological research, **Northeastern India** which geographically connects to **East Asia, South Asia, and Southeast Asia** as it lies in the tri-junction of these three important broad regions must have played an important role as a cultural bridge between the three above-mentioned broad areas of Asian landmass (Hazarika, 2013, p. 1). Manipur, which is located geographically at the crossed road between South Asia and Southeast Asia have occupied a unique position on the global prehistoric map in understanding the nature of interaction and exchange of cultures of the prehistoric humans and its early hominid ancestors across the regions. The present work will delve further into comparative analysis of Manipur and Southeast Asia prehistoric archaeological sites during the Pleistocene and early Holocene epoch where similarity and differences will be highlighted across various selected sites of the Southeast Asia region with that of Manipur.

### PALAEOLITHIC CULTURAL CORRELATIONS: A COMPARATIVE OVERVIEW FROM SELECTED SITES IN SOUTH EAST ASIA

The **Movius line theory** propounded by Hallam L Movius an American archaeologist divides the globe by an imaginary line characterise using Acheulian hand axe on the one side and the use of Chopper-chopping tool on the other side. The European, African, and South Asian lithic assemblages mainly consist of Acheulian type hand axe and the northwestern Indian subcontinent, the South East Asian, East Asian sides mainly utilised Chopper-chopping tools (Dennell et al, 2012). Also, the palaeolithic tool assemblages from Manipur which consist of flake and blade tools demonstrates cultural affinities with Islands Southeast Asia such as the **Patjitanian culture** of Java, the **Tampanian Culture** of Malaysia, **Tabon cave** in Philippines and **Niah Cave** of Borneo (Singh, 1997, p.103). The Prehistoric Archaeological records prior to **Terminal Pleistocene/Early Holocene** are very scanty in

the context of mainland Southeast Asia (Schepartzetal, 2000). Similarly, it is also the case of Northeastern India including Manipur.



**Figure 1: Distribution of hand-axe culture and chopping-tool culture during the Middle Pleistocene (After Movius, 1949: 409)**

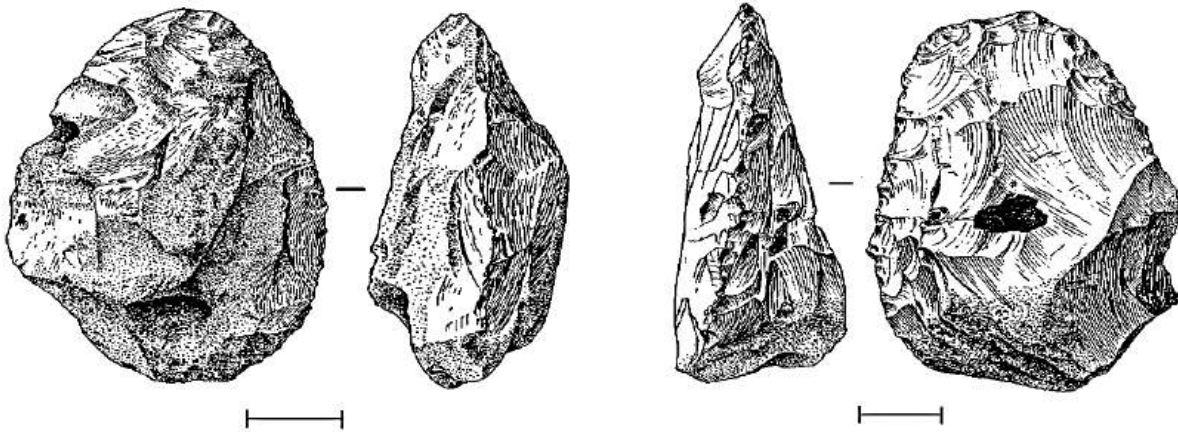
From earlier scholarly works undertaken by O.K. Singh, the **Palaeolithic Culture**, and its lithic tool assemblages from **Songbu** and **Khangkhui Cave sites** and **Nongpok Keithelmanbi, Singtom, and Machi Open air sites** of Manipur have **cultural affinities** with **Southeast Asian prehistoric Sites**. In mainland Southeast Asia cultural affinities could be established with the **Late Choukoutien Culture** in China based on core and flake tool tradition. Shared flake tool tradition was observed from **Late Pleistocene** in Vietnam **Nui Do, Nguom Rock Shelter**. In Thailand, **Lang Rongrien Rock Shelter** shows general similarities with Manipur's flake tool industry. In the neighbourhood of Manipur, the **Anyathian Culture** of Myanmar have shared pebble-chopping tool complex. However, flake tool had secondary trimming unlike palaeoliths from Manipur (Singh, 1997).

The palaeolithic culture of island and mainland Southeast Asian region are broadly classified into core tool tradition and flake tool traditions respectively (Glover, 1973). A broad-spectrum comparative approach to the study of palaeolithic cultural complexes in Island and mainland Southeast Asia with that of palaeolithic artifacts recovered from different sites in Manipur are undertaken in the present work.

**Comparison of the Patjitanian lithic tool assemblage with that of Singtom and Songbu sites lithic assemblage of Manipur**

The initial discovery of the Pacitan tools (erstwhile Patjitanian) occurred in 1935 in and around the Basoka River, south of Punung by renowned prehistoric scholar G.H.R. Von Koenigswald and M.W.F. Tweedie (Heekeren, 1957, p. 21). Some of the tools were dated to the Middle Pleistocene epoch. Subsequent archaeological investigations expanded the scope of findings to additional terraces and sites, notably in the Tabuhan area and the Gedeh and Sunglon rivers (Ibid.). The Pacitan or Patjitanian culture is part of the chopper/chopping-tool culture, which is distinguished from the hand-axe culture of the west by the absence of

fully bifacial Acheulean-type hand-axes and the Levallois technique of flake detachment (Smith, 2014). This culture from Java is a middle Pleistocene chopper-chopping tool tradition characterised by use of coarse flakes in the shape of cleavers discovered from south central Java. The main lithic tool implements of the Patjitanian (now called Pajitan) consist of single-edged choppers and chopping tools that occurs in association with the use of primitive flakes which are typo-technologically unprepared flakes with high angle striking platforms (Ibid.).



**Figure 2: Pacitan proto-handaxe from Baksoka River Valley Site (After Adam Brumm et al, 2012. P. 39)**

The lithic tool assemblages of the Patjitanian sites in Java includes pointed, bifacial implements that were considered as crude handaxes. Its lithic tool technology diverges significantly from the Acheulian traditions which are seen in Africa, Europe, and South Asia. The chopper chopping tool complex predominates the palaeolithic sites in Southeast Asia and East Asia regions. The Pajitanian or Pacitan cultural complex for instance in Indonesia yields chopper chopping tool complex. The tools are fashioned by unifacial flaking and the original pebble cortex remains untouched with only a single side which the working edge. This tool technology is crude and rudimentary as compared to the acheulian tools. The general trends in Southeast Asia is that there is generally a slower evolution of tool technology as compared to Western Europe lithic assemblages (Moviuss, 1948).

In Manipur, a renowned scholar O.K. Singh noted that the Pajitanian handaxes can be compared typo-technologically with Singtomhandaxes (Singh, 1997). There is structural similarity in their general morphology. Recent discoveries had suggested that the Pajitanian handaxes lack longitudinal flaking techniques and differ only marginally from European bifaces, unlike the finely crafted and more advanced Singtom hand axes. Whereas the hand axes from prehistoric site of Singtom in Manipur shows much advanced manufacturing technique. The tool exhibits a twisted “S” profile which is produced from controlled flaking of the core. The Pajitanian handaxe are cruder and more rudimentary. It exhibits limited refinement of the core and the tool lacks symmetry.

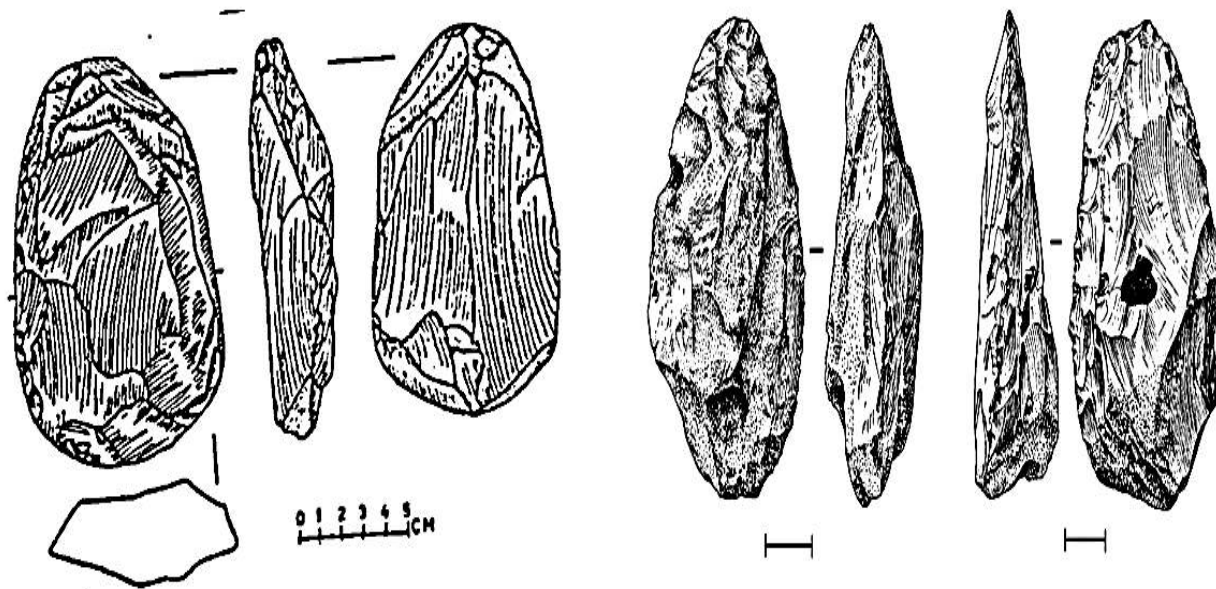


Figure 3:

Comparison of the Sangiran (Indonesia), Singtom (Manipur), and Songbu (Assam) prehistoric sites (right)

The prehistoric lithic tool assemblages from Pajitanian, Singtom and Songbu sites exhibits significant typo-tool technological similarity and differences. The Pacitanian flake tools such as scrapers, points, and perforators exhibit careful core preparation before detachment from the core. This feature is also evident in the Songbu Cave flake assemblages. Flakes from both the sites of Pajitanian, Java and Songbu, Manipur shared plain platforms and some tools featured faceted butts. However, the prehistoric sites of Singtom and its flake tools shows retouching of the tools signifying more advancement in tool technology. The presence of retouched blade tools in the context of prehistoric site of Singtom shows habitation by Upper Palaeolithic humans.

Apart from the similarities in tool technology there are also differences in tool typology in both the sites from Java and Manipur. Cultural and environmental adaptation also plays an important role. The Pajitanian tool industry predominantly relies on Chopper-chopping tools. There is limited occurrence of bifaces such as handaxe and flake tools in the Pajitanian sites of Java. These tool typo-technology reflects a Middle Pleistocene tradition. However, the Singtom and Songbupalaeolithic sites in Manipur exhibits a more diverse tool sets as compared to the Pajitanian tool sets. Handaxe, scraper, borer and blades were reported from the two palaeolithic sites in Manipur. By analysing the typo-tool technology from these two different regions, the Singtom and Songbu site in Manipur can be grouped into more advanced cultural traditions.

It can also be observed that Singtom palaeolithic site in Manipur is technologically advanced while the Pacitan tool complex shows rudimentary technology. Based on its tool tradition the Singtom and Songbu lithic assemblage can be compared to the more advanced palaeolithic sites in South Asia regions.

**Comparison of the Sangiran flake tools and Ngandong bone tools industry of Java with that of Khangkhui Cave site assemblages of Manipur**

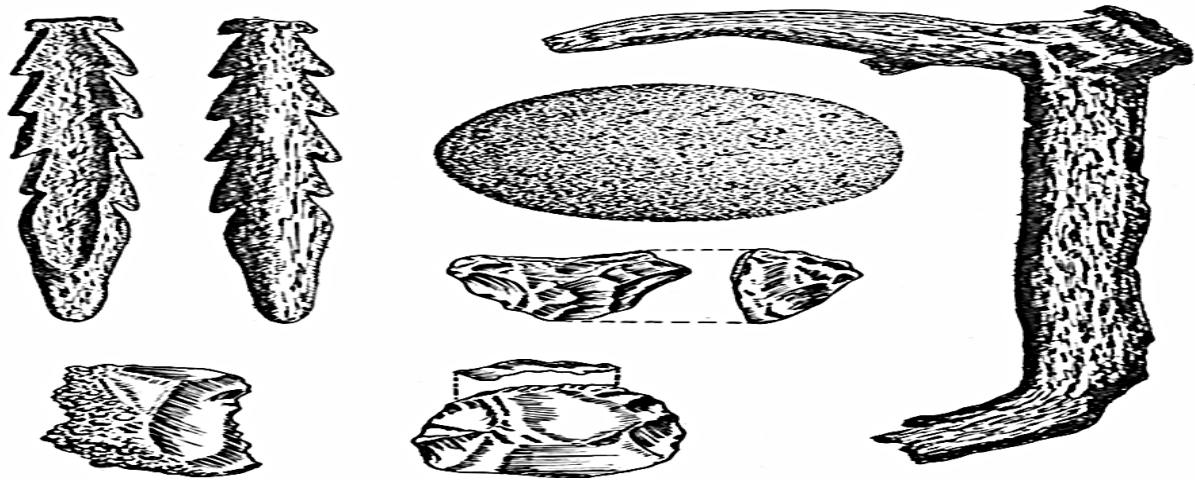


Figure 4: Ngangdong Upper Palaeolithic Bone Tool Industry (After Heekeren, 1957)

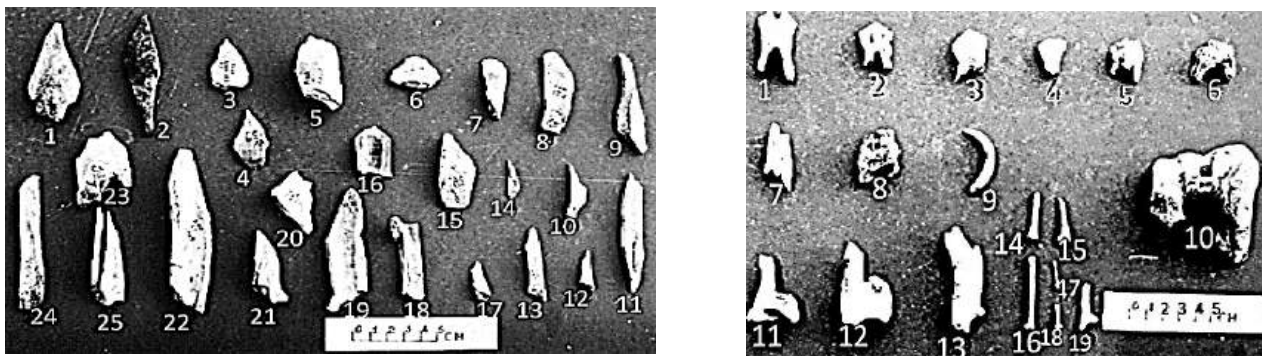


Figure 5: Kangkhui Cave bone tools and faunal remains (O.K. Singh, 1997)

Layers	Cervus	Bovidae		Sus		Fowl	Reptile	Small mammal	
	Phalanges	Upper molar	Incisor	Lower pre-molar	Upper Canine teeth fragment	Fore-limb	Femur (lizard?)	Forelimb (herbivorous mammal)	
1	x	x	1	1(L)	1	1	3	1	2
2	Faunal remains from the second layer are too fragmentary to identify.								
3	3	3	1	x	2(R)+	x	x	x	x

Table1: Types of faunal remains from the Kangkhui Cave No. 3 (O.K. Singh, 2021)

Comparing to the contemporaneous Upper Palaeolithic sites and their associated lithic and bone tool industries in Europe, Africa, and the Middle East, the Sangiran lithic assemblage reflects a simpler, localized flake tradition (Heekeren, 1957). The stone tools of the Sangiran sites in Java lacks refinement in terms of its blade tool industry. Interestingly certain similarities can be drawn with the lithic tools from Kangkhui Cave paleolithic site in Manipur. The Sangiran and Khangkhui assemblages are mainly based on flake tool tradition (Singh, 1997). The unique rhomboidal shape flake tool and adze excavated from Khangkhui is not reported from Sangiran flake culture. The polished bone tools industry which is reported from Java are comparable to the bone tool industry of the Kangkhui Cave site in Manipur. However, the barbed spearheads, the sting ray spine tool sets

from the Ngandong site are not reported in Manipur. The similar use of bone tools is an indication of the advance hunting and subsistence economy of the early humans residing in these regions.

Geographically, the Sangiran and Ngandong site are in Java, Indonesia which is an island region whereas the Khangkhui site is in Manipur India which is a hilly region. Chrono-culturally the three sites under discussion can be grouped into Upper/Late Palaeolithic Period during the terminal Pleistocene. These sites show certain similarities in technological advancements and some regional differences. Chert, chalcedony, and jasper were predominant raw material of the Sangiran Flake Industry (Ibid.). In Ngandong site bone tools incorporate antler, stingray spine and chalcedony (Ibid.). While the Khangkhui Cave site showcase a combination of locally available materials which consist of limestone, sandstone, and chert for lithic tools and bone tools were fashioned from Cervus, Bos, wild fowl, etc (Singh, 2021).

Comparison	Sangiran Flake Industry	Ngandong Bone Industry	Khangkhui Cave Industry
<b>Period</b>	Upper Pleistocene	Upper Pleistocene	Upper/Late Pleistocene
<b>Raw Material of the tools</b>	Chert, chalcedony, jasper	Bone, deer antlers, stingray spines, chalcedony flakes	Limestone (96.4%), sandstone (2.2%), chert (1.4%), bones
<b>Tool Typology</b>	Scrapers (end, nosed, core), points, borers, crude blades	Bone knives (polished), spearheads (barbed), grooved bone tools, stone balls	Blades, scrapers, burins, perforators, hand axes, cleavers
<b>Technological Features</b>	Thick flakes, obtuse striking angles, no true blades, bipolar flakes  Flake-based with limited secondary retouch, thick flakes, bipolar technique	Polished edges, barbs, grooves, spearheads, cutting tools  Bone refinement with pressure flaking, polished and grooved bone tools	Pressure flaking, grooving, snapping, fluting scars, perforators  Advanced pressure flaking, splitting, and grooving techniques
<b>Cultural Adaptation and associated faunal remains</b>	Systematic flake production using local siliceous rocks  Ngandong fauna	Bone and antler tools, evidence of maritime resource use  Extinct species (Cervus eldi), stingrays, and terrestrial fauna	Use of both lithic and bone materials, pressure flaking, local resource adaptation  Cervus, Sus, bovine, reptiles, wild fowl

*Table 2: Comparison of Sangiran, Ngandong, and Khanghui lithic and bone tool assemblages.*

**A comparative study of the Tampanian lithic assemblage and Khanghui Cave lithic and bone tool assemblages**

The Kota Tampan site in Western part of Malaysia was excavated by Ann Sieveking in 1954. This site has long been recognized as a pivotal location for decoding early human activity in Southeast Asia region. The site is in Lenggong Valley which is a UNESCO World Heritage Site. The site is famous for its stratified archaeological records spanning 1.8 million years ago which makes it one of the most significant prehistoric sites outside Africa. The lithic assemblage from Kota Tampan represents the technological hallmark for what is popularly known as the Tampanian Culture. The Tampanian Culture is associated with early anatomical modern humans. The lithic tools are found from excavations in Kota Tampan (Collings 1938, Sieveking 1958), reported that the stone tools were found on a former river terrace and had transported to the site (Zurainat, 1988). Ann Sieveking excavation in 1954 have unearthed a collection of 234 identifiable stone artefacts with only 69 artefacts were examined for modern analysis. Her work has provided an understanding of the lithic tool technology of the site. The lithic tools were made from silicified tuff, silicified limestone, and fossil wood. The Tampanian tool typology includes pebble choppers, pebble picks, points, scrapers, cleavers, and hand adzes (Sieveking, 1958).

The site holds the key to the understanding of the early human migration from Sundaland. The Tampanian culture in prehistoric Malaysia and the Khanghui Cave site in Manipur shows similar cultural traits and regional difference. The tool sets of the Tampanian culture from Malaysia consists of pebble chopper, pebble picks, points, scrapers, cleavers, and hand adzes. These tools are fashioned from silicified tuff, limestone, and fossil wood. The tools technologically are rudimentary in form and shape and function. Free hand percussion bipolar percussion technique was employed to craft the tools. The tools were not retouched and minimal trimming is seen on the surface of the tools. The Khanghui tool sets on the other hand consists of points, scrapers, perforators, blunted back blades, and bone tools. The tool is fashioned from limestone, sandstone, and chert. The faunal remains from the site excavation reveals different species of animals such as cervus, sus, bovide, lizard, and wild fowls. These faunal evidence shows plentiful hunting game and diverse diet of the Khanghui Cavemen. The Khanghui cave site is placed in Upper Palaeolithic or Late Palaeolithic Period.

On broad spectrum comparison the Kota Tampan palaeolithic site and Khanghui Cave palaeolithic site both utilize primarily locally available materials. The fossil wood is a unique to Kota Tampan and the bone tool in case of the Khanghui site. The tools set employed simple percussion methods in Kota Tampan lithic assemblage whereas advance flaking and grooving methods are observed to fashion the bone tools in the Khanghui bone tool industry. The Khanghui Cave site shows more sophistication and advancement with the use of fire which is not reported in Kota Tampan sites.

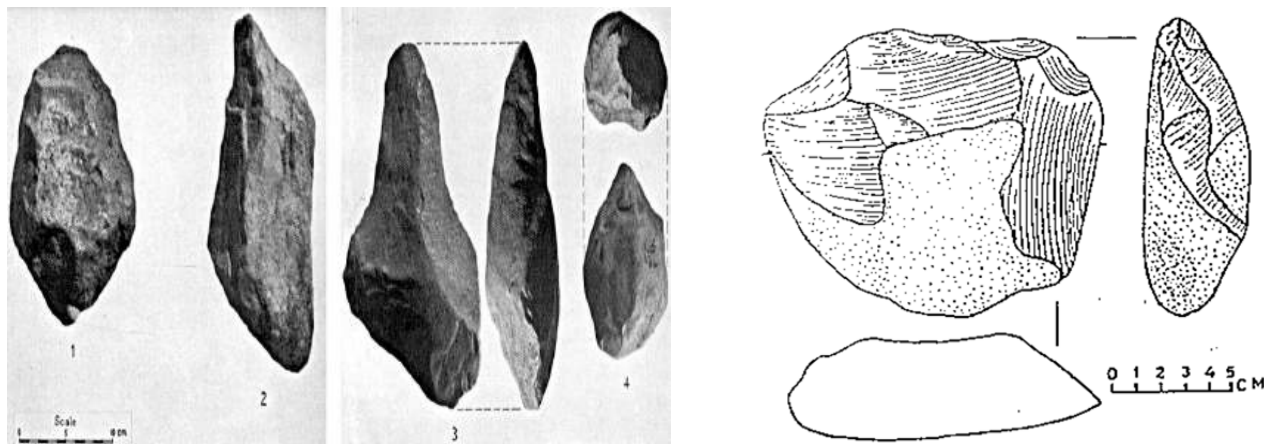
<b>Comparison</b>	<b>Tampanian Culture of Kota Tampan site (Malaysia)</b>	<b>Khanghui Cave site (Manipur)</b>
<b>Tool Types</b>	Pebble choppers, pebble picks, points, scrapers, cleavers, hand adzes	Points, scrapers, perforators, blunted back blades, and bone tools

<b>Raw Material</b>	Silicified tuff, silicified limestone, fossil wood	Limestone, sandstone, chert, and bone artifacts
<b>Techniques of production</b>	Freehand and bipolar percussion techniques  Minimal secondary trimming; many pieces lacked retouch	Grooving-splitting/snapping and pressure flaking  Evidence of retouch and specialized bone tool-making
<b>Faunal Remains</b>		Cervus, sus, bobide, lizard, and wild fowls
<b>Chronological Period</b>	Upper Palaeolithic	Upper Palaeolithic

*Table 3: Comparison of the Kota Tampan Site and Kangkhui Cave site.*

**Comparison of the Anyathian chopper tools from Burma with that of chopper tool from Machi site in Manipur**

In the prehistory of Burma/Myanmar, the Anyathian culture is the earliest known prehistoric phase. Anyathian is derived from the word ‘Anyatha’ which means ‘Upper Burma Man.’ The Anyathian culture presents a distinct assemblage of tools and techniques consisting of chopper tools and fossil woods. The prehistoric Anyathian culture is broadly categorised into the Early Anyathian phase and the Late Anyathian phase. The Anyathian tools and technologies demonstrates a continuity and adaptations throughout the Middle and Late Pleistocene epoch. The raw materials of the tools were composed of locally available materials such as fossil wood and silicified tuff.



**Figure 4.11: Left Early Anyathian Lithic tools; 1 Chopper flake only on one surface, 2 massive pick like implements, 3 massive triangular choppers, 4 chopping tool with alternative flaked edge. (Dennell, 2014); Right Pebble Chopper from Machi (O.K. Singh, 1997)**

The Early Anyathian cultural phase corresponds to the Lower and Middle Palaeolithic periods in comparison to the Palaeolithic cultures of Europe and Africa. In the region of Burma/Myanmar, this early prehistoric phase is characterised using chopper-chopping tool industry. The tools were predominantly composed of fossil wood and includes steep-ended hand adzes, chopping tools, and flake-edge implements crafted from pebbles (Dennell, 2014). Important prehistoric archaeological sites of the Early Anyathian culture includes Magwe, Yenangyaung, and Chauk. The lithic tools were rudimentary in nature and shows crude flaking.

In the Late Anyathian period, the culture was marked by a gradual evolution in tool making techniques while the typology of the tools remains the same as in the Early Anyathian period. The Late Anyathian tools consist of small bifacial choppers, hand adzes, and flake tools. The raw materials for crafting these tools consist primarily of fossil woods and silicified tuff. Important sites of the Late Anyathian Culture include Magwe, Singu, and Pagan. The Late Anyathian phase which is considered the final phase of the Burmese Palaeolithic features more advance flaking techniques. The tools include double-ended scrapers and steep-ended hand adzes (Aung-Thwin, 2001). The prehistoric Anyathian tool culture from Myanmar shows regional similarities with that of Lower and Middle Palaeolithic sites from India, Java, and China. The Chopper-chopping tool tradition of the Anyathian sites in Myanmar resembles that of the Chopper-chopping tool traditions of Pajitanian sites of Java and also the Soanian sites in Northwestern India. Interestingly, Hallam L Movius observed the difference between the Western Acheulian handaxe with that of the Chopper-chopping tool tradition of Southeast Asia and East Asia. He emphasis a unique cultural development in these regions.

The pebble chopper tool which is discovered at Machi site in Manipur shares similar typological and technological features with the tools of the Anyathian culture of Burma/Myanmar. On chronological considerations both the sites were grouped into early stone age cultural traditions in Southeast Asia. The tool showcase crude and rudimentary tool form, function and shape. Here the present work compares the tool typology, its manufacturing techniques, and raw materials that fashions the tools from both the sites. In the context of palaeolithic site of Machi in Manipur, there is the use of pebble chopper tool which is unifacial in nature. These tool type can be compared due to its similarities with that of the Early Anyathian chopper tools of Burma/Myanmar. The pebble chopper from Machi is crafted by removing on one side that is unifacial flaking. The pebble cortex remains untouched and retains the original shape of the pebble stone. On the same note, the Early Anyathian pebble chopper focuses on unifacial flaking and the original pebble cortex remains untouched. The pebble stone original shape remains and only the functional working edges is modified. These shows both the sites lithic assemblage is primitive in nature and focuses its activities on chopping tasks. Direct stone hammer technique was employed to fashion the Machi pebble chopper tool. In this process the hammerstone removes the flakes from the pebble core in a single unifacial side. This process is also evident in the Anyathian pebble chopper of the Earlier period. In case of the Late Anyathian period the tools are fashion by advanced bifacial flaking. This tool technology is grouped in the Upper Palaeolithic unlike the Earlier periods pebble chopper tools. In the use of raw material, the Machi pebble chopper used quartzite which is a locally available material.

However, the chronological considerations in the Machi sites remains uncertain. By looking to the tool types form and function, it is relatively grouped in the Lower Palaeolithic Period. In the case of the Anyathian culture it is placed in all three palaeolithic periods.

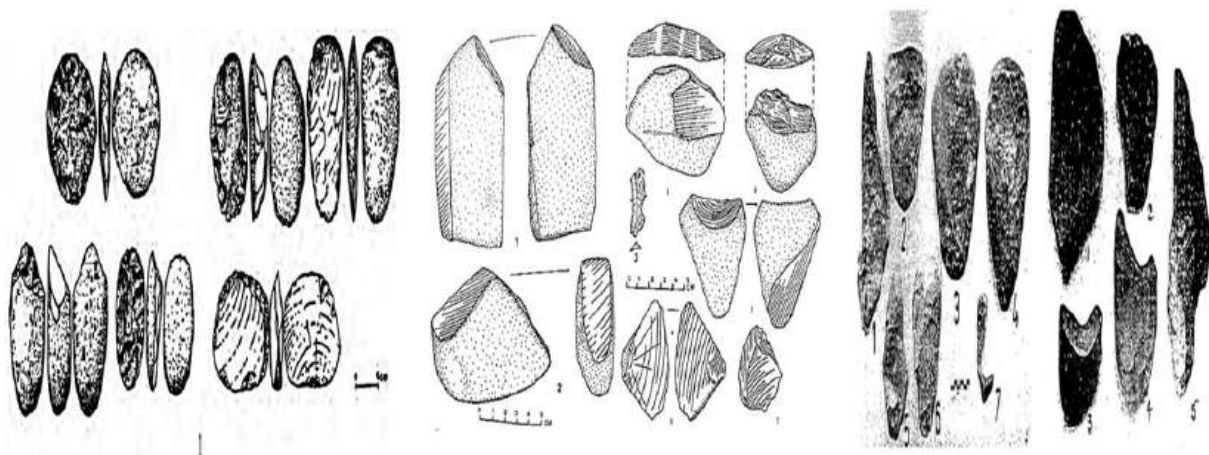
## CORRELATIONS OF THE HOABINHIAN TECHNO-COMPLEX: A COMPARATIVE OVERVIEW FROM HOABIN SITE IN VIETNAM

The Hoabinhian cultural techno-complex was discovered by M. Colani during expeditions to the caves of Hoa Binh province and neighbouring provinces in northern Vietnam from 1926 to 1930 (Solheim, 1969). The term is used to refer to the lithic tool assemblages from the **Terminal Pleistocene to the Early Holocene** of Southeast Asia which is defined by unifacial, centripetal and circumferential cobble reduction and resulting flakes and debitage (Marwick, 2008). However, the term is under debate and the importance of the hoabinhian is not fully understood in the context of India (Hazarika, 2012). It is widely distributed across mainland Southeast Asia showcasing a significant pebble or cobble tool tradition which is characterised by chipped tools such as choppers, scrapers, and grinders. This techno-complex is found in South China, Vietnam, Cambodia, Thailand, Myanmar, Sumatra, Taiwan and is a reminiscent of older chopper-chopping tool complex (Ibid., p. 111).

It has its extension to Manipur and Northeast India lithic tool complexes. In Southern China, such lithic tools are often associated with charred bones, shell middens, etc. However, in Vietnam, Hoabinhian tool complexes are commonly found in cave sites. Notable sites include the **Son Vi Culture** of Vietnam. Typo-technologically, Hoabinhian culture represents a transitional phase between the Palaeolithic and Neolithic periods.

In the context of Manipur, Hoabinhian culture is evidenced by chipped pebble tools and edge-ground tools from sites such as **NongpokKeithelmanbi** and **Tharon Cave site** (Singh, 1997). The NongpokKeithelmanbi sites yielded lithic tools such as chopper, scrapers, and blades made from quartzitic sandstones and chert. They are typo-technologically comparable to the **Son Vi Culture** of Vietnam. The Tharon Cave assemblages which include hand axe and edge ground tools shows cultural affinity with those from Vietnam and Myanmar. Chronologically, in Southeast Asia the **Hoabinhian Techno-complex** spans from **Early-Holocene to Mid-Holocene**, with some sites like Padah-lin cave in Burma dating to 13,400+ years BP. The prehistoric artefacts such as the chipped pebble tools from the site of NongpokKeithelmanbi preceded the cord marked pottery phase in stratigraphy. The site stratigraphy suggests an Early Hoabinhian phase. In Manipur, the Late Hoabinhian phase is located in the Tharon Cave site (Ibid., p.111).

**Comparison of the Hoabinhian cultural techno-complex from Vietnam with that of Manipur Hoabinhian techno-complex.**



*Figure: Hoabinhian techno-complex; Left Hoa Bin Vietnam (Rispoli, 2007); Middle NongpokKeithelmanbi (Singh, 1997); Right Tharon Cave (Singh, 1997)*

The Hoabinhian techno-complex of Vietnam in Southeast Asia and Manipur in South Asia shows basic similarities in the employment of pebble or cobble tools. There are also similarities in the flaking techniques during tool production. Despite its similarities in basic features there is also regional differences. In Southeast Asia specially Vietnam the tools are produced through unifacial and bifacial flaking resulting in the production of sharp edges on one or both sides of the pebble or cobble tool. The lithic assemblages from Vietnam which consists of sumatraliths, short axes, discoidal scrapers, and flake tools retained the original cortex of the pebble or cobble tools. There is no evidence of retouching of the tools and if present there is minimal retouching. The bacsonian axes from the hoabinhian sites of Vietnam shows evidence of grinding the tools. The variation of the tools from the Vietnam hoabinhian site lithic assemblages ranges from pebble or cobble tools and hammerstones to grinding tools and bone tools. These tools are obvious since the adaptations of the hoabinhian inhabitants are in the coastal and inland environments. The prehistoric sites in Vietnam such as Soi Nhu and Trang An shows evidence of mollusk collection and early evidence of ceramic use or pottery.

In case of the hoabinhian site of NongpokKeithelmanbi in Manipur the predominant raw material used for producing the tools are quartzitic sandstone and there is also evidence of the occasional used of chert. Similar to the hoabinhian techno-complex in Vietnam, the lithic tool assemblages from the NongpokKeithelmanbi site of Manipur shows minimal retouching of the tools and the original shape of the pebble or cobble tool cortex is retained. The pebble or cobble tools which consists of chisel edged and round edged varieties are manufactured through controlled unidirectional or bidirectional flaking to produce the working edges. Specific tools such as the chisel edged tools are produced by striking intersecting flakes from opposite ends. The flake tools show clear percussion marks but lacks retouching. The grinding evidence are also observed in some tools.

The Tharon Cave site in Manipur also yields hoabinhian cultural materials. The predominant raw material for manufacturing these tools are sandstones which are readily available from the nearby streams. The primary lithic assemblages from the site consists of chopping tools, handaxes, handadzes, pointed tools, scrapers, and edge-ground knives. The typo-tool technology from the site shows grinding and flaking techniques. The grinding technique is employed to produce sharp edges in tools such as scrapers and knives. On the other hand, the flaking technique both unifacial and bifacial are used in the production of handaxes and pointed implements. The scraper tools are employed for scrapping and digging purposes. Apart from these tools in the hoabinhian Tharon Cave site, grinding tools such as querns and grinders are used to process plant-based foods such as seeds or grain. The presence of these tools indicates a shift of subsistence pattern from hunting and gathering to the practise of agriculture in its rudimentary form.

A comparative approach to the hoabinhian techno-complex from Vietnam and Manipur indicates basic similarities and a distinct regional adaptation within a larger hoabinhian cultural techno-complex in Southeast Asia. The hoabinhian techno-complex in Vietnam shows greater typological variance. The addition of tools such as sumatraliths, and bacsonian axes adds to the diversity. Unifacial and bifacial flaking of the lithic tools to produce the desired edges are observed in the hoabinhian tool assemblage from Vietnam. Whereas the hoabinhian sites of NongpokKeithelmanbi and Tharon Cave sites in Manipur reveals adaptation with locally available raw material such as sandstones in tool production. Technique such as grinding and controlled flaking are employed to

craft the desired tools. The hoabinhian techno-complex in Vietnam exploits both coastal and inland environments. Whereas the hoabinhian techno-complex in Manipur exploits streams and hilly environments. Another notable distinction is the evidence of grinding tools such as quern and grinder at the hoabinhian Tharon Cave site which is not reported from the Vietnamese hoabinhian sites as far.

## CORRELATIONS OF NEOLITHIC CULTURAL SITES IN SOUTH EAST ASIA WITH THAT OF MANIPUR

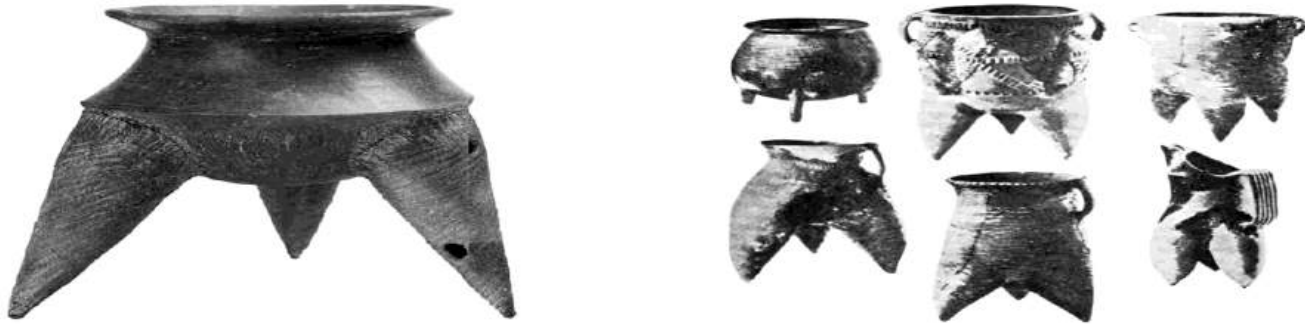
The **Neolithic** or New Stone Age remains of Manipur shows extensive cultural similarities to the Neolithic culture of Southeast Asia region. In Southeast Asia, Tom Harrison (1951), based on C-14 dating and stratigraphy has identified cultural sequences from Borneo (Niah Cave) associating the edge ground tools dated to c. 7000 BCE (Harrison, 1951). The Neolithic round axe which is dated to 4000 BCE was succeeded by the quadrangular adze roughly dated to 1000 BCE. This neolithic people were linked to Mongoloid populations. In the Philippines, stone tools like axes and adzes were reported along with shell ornaments. They are dated between 5600+/- 80 B.P. and 4630+/-250 B.P. The late Neolithic in the region is marked by quadrangular stone tools and cord-marked or carved paddle-impressed pottery, alongside the development of sawing techniques (Fox, 1979).

In the prehistoric archaeological sites of Malaya and Thailand, the **cord marked pottery** is preceded by the Hoabinhian pebble tools especially in the Cave sites of Gua Cha and Tam Para Minor respectively (Peacock, 1959; Dani, 1960)). In the Malayan prehistoric sites, neolithic tools which consists of primarily adzes, and axes have certain similarities with those from the neolithic sites of Manipur. However, the Malayan neolithic tool such as beaked adze remain absent in the context of Manipur. Pottery in Malaya often features cord-marking, though specific forms are less comparable to Manipur's ceramics. However, techniques such as hand modelling and surface finishing, including luting tripod legs, show similarities with that of Manipur. Neolithic artifacts from Thailand such as quadrangular adzes and cord marked pottery were found along with the Hoabinhian phase. Neolithic stone artifacts from Thailand which include shouldered chisels and pedestaled pottery are comparable to Manipur but there is variation like the absence of lance head in the later.

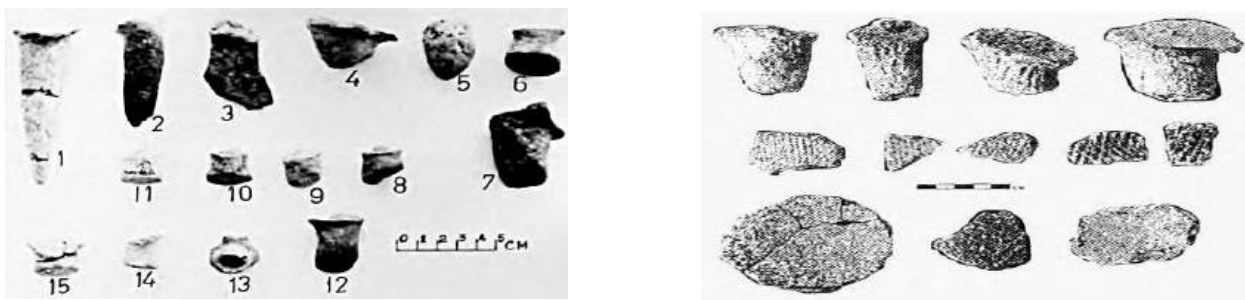
The pottery from Ongbah Cave in Thailand resembles certain decoration with that of pottery from Manipur Neolithic sites. In Myanmar, neolithic edge-ground tools and cord marked pottery coexist with chipped implements of the palaeolithic which is evidence in the Padah-lin Cave. Rectilinear shouldered adzes from Myanmar closely resembles that of Manipur. Additionally, Neolithic tools from China Yunan province aligned typo-technologically with that of Manipur. However, perforated implements and painted pottery are absent in Manipur.

The neolithic cultural traditions in Manipur can be chronologically placed into three distinct chronological sequences: The Corded Ware Culture, the Tripod Ware Culture, and the Geometric Ware Culture. These neolithic cultural tradition in Manipur aligns with the neolithic cultural traditions in Southeast Asia (Singh, 1997). The corded ware phase in neolithic Manipur is scientifically dated to 4460+/-120 BP. It consists of the earliest phase on the neolithic period in Manipur with the cord marked pottery as primary evidence. Similar cultural tradition with cord marked pottery as primary evidence were reported from neolithic sites in Southeast Asia regions. Important sites in Southeast Asia includes Spirit Cave and Sai Yok in Thailand, and Padah-lin Cave in Burma present day Myanmar. However, the corded ware ceramic reported from Manipur neolithic site of Nongpok Keithelmanbi were not associated with the lithic tools as elsewhere in Southeast Asian neolithic sites.

These led scholars such as O.K. Singh to classify as sub neolithic. The Tripod Ware culture of Manipur, dated to around 1450 BCE, is characterized by tripod wares, ring-footed pottery, microliths, spindle whorls, and net sinkers (Ibid.). These artifacts suggest a subsistence strategy combining hunting, fishing, and cultivation. While tripod wares are unique to Manipur in the Indian subcontinent, they bear similarities to Southeast China's Neolithic assemblages.



**Figure: Ban Kao tripod ware from Thailand (Left) and Lung-Shan Tripod ware from China (Right). (After Bahn 2002:112 and Chang 1977:176)**



**Figure: Left, Fragments of tripod ware from Napachik Site, Manipur (O.K. Singh, 1997); Right, Fragments of corded tripod ware from Laimanai Site, Manipur (O.K. Singh, 1997)**

The tripod wares characterize the ceramic industry of the Napachik site of Manipur. The pottery varieties are 748 pieces of plain ware, 893 pieces of cord-marked ware, 4 pieces of ring footed ware, 64 pieces of tripod legs ware, etc. The pottery is handmade, fragmentary, and fired under low temperature. Decoration is done by beating with cord-wrapped paddle. Most of the potsherds are of fine texture and tempered with sand, vegetables, or powdered charcoal. The tripod legs also are mostly reddish brown in colour, a few are grey and dark grey. The legs are solid and made separately. The tripod legs are either long or short. The long legs have conical shape, while the short legs have flat, circular, or tapering body with either a nob or flat slandering top to facilitate in luting. This three-legged pottery has also been found in a burial at Ban Kao, a small inland settlement in Thailand, datable to 2000 BCE. These pots were extensively used as reported from many sites in western Thailand and as far as Malaysia (Bahn, 2002). This type of pottery has been also reported from the late levels of Lungshanoid culture in South China which is different from the classical Lung-shan cultures dominated by several basic forms namely ting tripod with solid legs and tou with cut-out ring feet and kui type jars etc. In the beginning, it is handmade but evidence of potter's wheel has been also noticed towards the end (Chang, 1977). Among the tripod legs of Napachik, there is a solid flat leg that resembles the ring tripod type of the late Neolithic of South China

(Singh, 1997). It could be also interpreted that the region of Manipur possibly worked as the meeting place of the new neolithic impulses from the adjoining region of Southeast Asia.

The final neolithic phase in Manipur is represented by the Phunan Geometric ware culture. It is dated relatively to 1<sup>st</sup> millennium BCE. The ceramic reported from the site were marked with distinct geometric patterns and the sites also reported lithic tools such as fully ground quadrangular tools. The cultural phase in Manipur aligns with the late neolithic cultural phase in Southeast Asia. During this period advanced pottery making and tool manufacturing techniques are evident in Southeast Asia. The relative chronological sequence of the neolithic culture in Manipur are also corroborated with the scientific radiometric dates. The corded ware cultural phase in Nongpok Keithelmanbi site is scientifically dated to 4460±120 BP (approximately 2450 BCE). The tripod ware cultural phase which is reported from Napachik site in Manipur is scientifically dated to 1450 BCE. The last neolithic cultural phase in Manipur represented by the geometric ware is reported from Phunan site. It is relatively dated to the 1<sup>st</sup> millennium BCE.

## CONCLUSION

The Paleo-environmental research undertaken by the Birbal Sahni Institute of Paleo-botany based on pollen proxy data from Loktak Lake site in Manipur also reveals the early practised of agriculture. The site is in near proximity to the Wangoo Napachik site in Manipur yielding neolithic artifacts. This confirms the existence of a neolithic culture in Manipur based on rice cultivation in tune with the Southeast Asian and East Asian neolithic culture based on domestication of wild rice. The recent scientific study of the pottery wares from Napachik and Nongpok Keithelmanbi Neolithic sites in Manipur by IIT, Guwahati, also reveals the potsherds to be made from locally available raw materials and of the same firing temperature to fashion the pots (Singh et al, 2021). These shows contemporaneity of the neolithic artefacts during the neolithic periods.

The future direction of research on prehistoric archaeological studies in Manipur and Northeast India in general needs to adapt on interdisciplinary approach which are necessary for the holistic picture of the early human past in the region. In the present 21<sup>st</sup> century, the genetic analysis especially the human mitochondrial DNA analysis of the contemporary population of Australoid and Mongoloid population in this region can provide clues to the early human settlements in these part of the world during the prehistoric periods. Also, in future the 3D reconstruction of the prehistoric tools and potsherds can provide details on the nature of the tools in much clearer details. Further micro-wear analysis on the lithic tools can give details on subsistence strategies of the early humans and its ancestors. Also, the conservation and preservation of the prehistoric archaeological sites in the region is of immense importance. The State Archaeological Department need more teeth and funding for heritage preservation and conservation efforts in the state. The adherence to Manipur Ancient and Historical Monuments and Archaeological Sites and Remains ACT, 1976 with necessary amendments is imperative for future generations to preserved the age-old cultural heritage and prehistoric archaeological sites of the region.

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