Asian Archaeology (2023) 7:203–219
https://doi.org/10.1007/s41826-023-00075-3

REVIEW

The history of prehistoric archaeology in Myanmar: a brief review

Xuan Wei[1] · Tingting Liang[1] · Myet Thwe Soe[1] · Xiaoying Chen[1] · Yinghua Li[1,2,3]

Received: 29 May 2022 / Accepted: 30 August 2023 / Published online: 18 September 2023

Abstract
Myanmar's (also called Burma) critical location at the juncture between South and East Asia plays a significant role in shaping the region's cultural trajectory, particularly in terms of long-range population migrations and cultural interactions within the framework of southern China and Southeast Asia. This paper summarizes the history and practices of prehistoric archaeological research in Myanmar by collecting, sorting, and analyzing global publications from the last 150 years. We outline five significant periods in the development of research on prehistoric archaeology in Myanmar: the roots in the 1870 to 1930s; the beginnings, between the 1930 and 1950s; stagnation in the 1950s through 1970s; recovery in the 1970s through 1990s; and continuous development since the 1990s. Finally, we briefly discuss the features and hotspots of prehistoric archaeological research in Myanmar, as well as current constraints and future directions for the field.

Keywords Mainland Southeast Asia · Myanmar · Prehistory · Chronology · Hunter-gatherer · Agriculture

1 Introduction

High mountains and oceans combine to create a complex climatic and geomorphological environment in Myanmar (also called Burma), which is situated on the western edge of mainland Southeast Asia (MSEA, for short), on the southern side of the Alpine-Himalayan belt, and connects the Himalayas to the Andaman Sea (Tun 2015). Myanmar borders with China, Laos, Thailand, India, Bangladesh, and the Bay of Bengal, forming a crossroads for multiple cultures. Its unique geographic location is critical for investigating many significant topics in archaeology on both global and regional scales. Particularly, Myanmar is thought to be an important node in modern humans' coastal migration from Africa to the Asian continent (Li et al. 2015), a crossroads of multiple populations and cultures during the transition from hunter-gatherer (e.g., Hoabinhian groups) to sedentary agricultural societies (Cai et al. 2011; Matsumura et al. 2019; Matsumura et al. 2015; Wang et al. 2011), as well as an intersection point for bronze metallurgical techniques as they spread from the northern Eurasian steppes to MSEA (Pryce 2019; Pryce et al. 2018a). Recently, Myanmar also turned out to be important in discussing possible linkages between Myanmar and the Dian 滇 Culture of Yunnan 云南 Province, China (Moore 2010, 2019), for exploring the rise of complex society and the early Maritime Silk Road (Bellina et al. 2018, 2019; Bennett 2013; Dussubieux et al. 2020; Murphy and Stark 2016), as well as for identifying the interaction networks linking MSEA, India, and China (Carter 2016; Dussubieux and Pryce 2016; Gupta 2018; Matsumura and Oxenham 2014). Overall, from a macro-regional perspective, Myanmar plays a significant role in archaeological research and deserves high concern.

Over the past decades, several researchers have written reviews of the history and practices of Myanmar's archaeology, in a relatively generalized way (Goh 2017; Higham 2001; Thaw 1976): these have focused on some special years (Lwin 2018; Satt 2020), spotlighted certain prehistoric cultures and chronological sequences (Aung-Thwin 1982, 2001; Glover 2001; Tun 2015), or placed Myanmar in the context of a discussion on a particular topic concerning MSEA as a whole (Forestier et al. 2022; Halcrow et al. 2019; Tan 2019a). This paper, therefore, aims to

✉ Yinghua Li
lyhfrance2005@yahoo.fr

[1] School of History, Wuhan University, Luojiashan, Wuchang, Wuhan 430072, Hubei Province, China

[2] Archaeological Institute for Yangtze Civilization, Wuhan University, Luojiashan, Wuchang, Wuhan 430072, Hubei Province, China

[3] CNRS UMR 7041 ArScAn–AnTET, Université Paris X, Maison de l'Archéologie et de l'Ethnologie, 21 allée de l'Université, Nanterre 92023, France

review the history of prehistoric archaeological research in Myanmar, as well as the main prehistoric discoveries (Fig. 1; Table 1), with particular attention to developments since the 1990s by collecting, sorting, and analyzing as many publications as possible in order to lay a solid

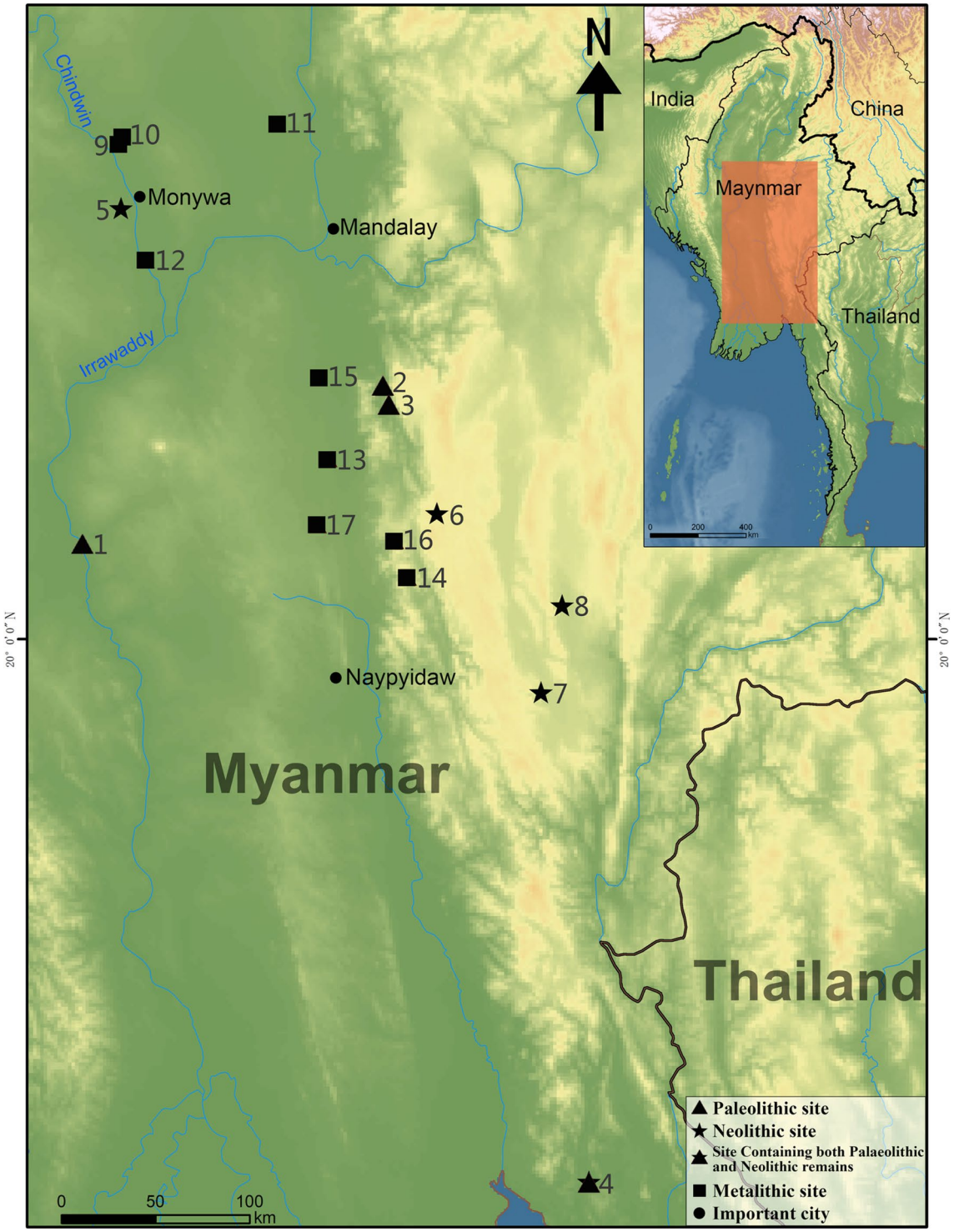

Fig. 1 Map showing the locations of the main prehistoric sites in Myanmar: (1) Yenangyaung; (2) Gu Myaung; (3) Padalin; (4) Waiponla; (5) Moegyobyin; (6) Myin Ma Hti; (7) Moebye; (8) Buddhaw Zinaw; (9) Oakaie; (10) Nyaung'gan; 11. Halin; 12. Ywa Htin; 13. Ywa Gon Gyi; 14. Htan Ta Pin; 15. Hnaw Khan; 16. Myo Hla; 17. Ohh Min

Table 1 A listing of the main scholarship and discoveries of prehistoric sites in Myanmar

Time	Scholars	Sites	Distribution	Ages	Remains	Notes	References
1869	W. Theobald, J. Evans	/	Upper Myanmar	Paleolithic	Stone artifacts	The earliest information on stone tools	Evans 1870; Theobald 1873
1894	F. Noetling	Yenangyaung	Upper Myanmar	Paleolithic	12 stone artifacts, animal bones	Attracted the attention of foreign archaeologists	Noetling 1894, 1897
1932–1936	T. O. Morris	/	Irrawaddy River	Paleolithic	27 stone artifacts	Defined the Paleolithic Anyathian culture	Morris 1932, 1935, 1936a, b, 1937
1938–1939	H. L. Movius, H. de Terra				650 stone artifacts		Movius 1943, 1948a, b
2008–2009	Win Kyaing				More than 700 stone artifacts		Kyaing 2010a, b; Kyaing et al. 2008; Kyaing et al. 2009
1969	Aung Thaw	Padalin Cave	West of Shan Plateau	Upper Paleolithic to early Neolithic, corresponding to Hoabinhian culture in Southeast Asia	422 stone artifacts, animal bones, charcoal pieces, red ocher, potsherds, rock painting	One of the most crucial prehistoric sites; first site with absolute dating	Thaw 1969a, b, 1971a, b
2009	Ye Myat Aung						Aung et al. 2009
2013	Yee Yee Aung						Aung 2013
1975	Myint Aung	Mu Valley	Irrawaddy River	Late or Upper Pleistocene	> 100 stone artifacts, including bifacial specimens		Aung 2012
1981	Ba Maw	Nwe Gwe Hill	Upper Myanmar	Late Pleistocene	Early human maxilla fragments, animal fossils, stone artifacts		Maw 1995a, b
1995		Moegyobyin and neighboring sites	Chindwin Basin, Sagaing Division	Mesolithic and Neolithic ages	Stone artifacts, potsherds, pieces of bead, animal teeth and bone; human-sized stone slabs without inscriptions	A successive continuous cultural sequence belonging to early humans inhabiting a single locality	Maw 1998; Maw et al. 1998
2004	Aung Kyaing						Kyaing 2005; Kyaing et al. 2005
2008	Win Kyaing						Kyaing et al. 2008, 2009
1997–1998	Tin Thein	Waiponla	Shan State	12,000–6000 BP	10 stone artifacts and animal bones		Thein 2000; Thein et al. 2001
		Moebye, Buddhaw Zinaw		6000–4000 BP	Stone artifacts and animal bones		Mg et al. 1998; Thein 1997, 1998
		Myin Ma Hti					Thein and Bhumiveda 2011
2019	Pyiet Phyo Kyaw				Bone fragments, bone tools, stone pieces, and wasters of stone rings	First discovery of bone-based technology	Kyaw et al. 2020

Table 1 (continued)

Time	Scholars	Sites	Distribution	Ages	Remains	Notes	References
1998–1999	Pauk Pauk, Elizabeth Moore	Nyaung'gan	Northwest Mandalay, Chindwin River	Bronze Age	43 burials, with ceramic vessels, bronze tools, stone artifacts, freshwater shells, and animal bones	A representative burial site and the beginnings of urbanism within the most arid region of the country	Han 1999; Moore and Pauk 2001
2001–2006	Pauk Pauk, J.-P. Pautreau,	Ywa Htin, Ywa Gon Gyi, Htan Ta Pin, Hnaw Khan, Myo Hla, Ohh Min, etc.	Middle Mandalay, Samon Valley	Neolithic to early Iron Age	Burials, human skeleton, ceramic vessels, bronze tools, iron tools, stone tools, ornaments		Pautreau et al. 2001, 2004a, b, 2005, 2006a,b, 2007, 2008, 2010; Pautreau and Jarriage 2007; Pautreau and Maitay 2009, 2010; Pautreau and Mornais 2003
2013	Ben Marwick	Gu Myaung	Shan Plateau	Luminescence ages: 25 ka	Stone artifacts, animal bones		Schaarschmidt et al. 2019
2014–2016	T. O. Pryce	Oakaie	Central Myanmar, Sagaing	9th to 6th c. BC, with a 4th to 3rd c. BC outlier	Many single and multiple burials, funerary offerings include bivalve shells, pottery, stone beads and bracelets, bone bracelets, shell beads, spindle whorls, a cowrie shell, and a dog burial		Pryce et al. 2015, 2018b
2008–2010, 2017–2018	Franco-Myanmar research team	Halin		Proto-historic through Prehistoric periods	Burials, skeletal remains, animal bones, polished stone tools, stone rings, bronze tool, potteries, charcoal, potsherds, bone and stone beads	The first World Cultural Heritage site in Myanmar	Kyaw 2011; Satt 2020

foundation for future prehistoric archaeological research on East Asia and MSEA in a macroscopic perspective.

2 Spatiotemporal framework for prehistory in Myanmar

The word prehistory generally refers to the earliest stages of human culture before the invention of writing, and discussions are often based on the Danish archaeologist C. J. Tomson's Three Age System: the Stone Age, Bronze Age, and Iron Age (Daniel 1975). Definitions for what is considered as prehistoric vary in different areas due to the varying developmental trajectories of human history. Many archaeologists have found that the accepted Three Age System does not entirely conform to prehistory in Myanmar (Aung-Thwin 1982; Higham 2001; Hudson 2005). Because of the persistence of archaic stone tools in Myanmar from the Paleolithic to the Iron Age and beyond, the degree of social complexity and technical and economic variety are more crucial indicators for the division of prehistoric periods in the region (Higham 2001). Many academics confine the latest prehistoric period in Myanmar to that preceding the formation of early cities—that is, the pre-Pyu period, around 200 BCE, when different areas of Myanmar began to urbanize sequentially and entered what is considered the protohistoric period (Hudson 2005). Here, the prehistoric period in Myanmar refers to the period before the emergence of the Pyu state and includes developments equivalent to the Stone, Bronze, and Early Iron Ages.

3 Chronological development of prehistoric archaeology in Myanmar

We collected almost 300 publications about the study of prehistoric archaeological research in Myanmar by searching libraries and the Internet, including papers in Burmese, English, French, Chinese, and Japanese. Five distinctive development periods can be recognized by sorting and analyzing these materials.

3.1 Roots (1869–1929)

Like other Southeast Asian nations, foreign scientists conducted the early studies on prehistoric archaeology in Myanmar, occasionally uncovering stone implements during geological surveys. While working for the Geological Survey of India, W. Theobald became interested in Myanmar's prehistory when he gathered several stone tools during a survey in "Upper Burma" (the central and northern regions of present-day Myanmar). These stone tools were distinct from those discovered in India and Europe, and he reported on them in the *Proceedings of the Asiatic Society of Bengal* in 1869 (Theobald 1873). Following that, J. Evans, who was actively involved in prehistoric research on Southeast Asia, conducted preliminary research on these stone artifacts (Evans 1870). However, their findings and research did not pique the curiosity of Western geologists and archaeologists.

F. Noetling, another member of the Geological Survey of India, was one of the few Western researchers interested in prehistory. He published reports on Upper Miocene or early Pliocene deposits from the Yenangyaung in the Irrawaddy (Ayeyarwady) Valley in 1894 and 1897 in which he described what are now thought to be the earliest stone tools ever discovered in Myanmar (Noetling 1894, 1897). In the early 1900s, Noetling's discovery piqued people's interest in the issue, and controversy became almost inevitable. Many scholars—including R. D. Oldham, E. H. Pascoe, and others—questioned whether these (or similar) implements were necessarily associated with Noetling's stratum, the "Red Bed" (i.e., the Upper Miocene or Lower Pliocene strata). Although Noetling claimed that they were found in situ, he did not provide convincing proof (Oldham 1895; Pascoe 1912; Swinhoe 1902, 1903). While some agreed with Noetling (Das Gupta 1923; Mitra 1923), others remained neutral and waited for further investigations (Brown 1931). Although there was no consensus, these discussions provided a theoretical and practical foundation for the next period of prehistoric archaeological survey and study in Myanmar, which substantially fostered the birth of the field in Myanmar.

Myanmar has had a professional institution dedicated to archaeology since the nineteenth century, when the Indian Archaeological Department, Burma Circle, mainly managed it (Aung-Thwin 1982). The Archaeological Survey of Burma was established in 1902 to take charge of archaeological investigations and research in the country; however, their focus was on historical periods associated with ancient architecture and inscriptions, among other artifacts, while prehistoric finds still came mainly as occasional discoveries made by geologists during their surveys.

The *Report of the Superintendent, Archaeological Survey, Burma*, was published annually by the Archaeological Survey of Burma and contained the major archaeological reports for the year. The report was one of the essential sources of archaeological results from Myanmar at the time, but it contained few studies on prehistory (Aung-Thwin 1982). The *Journal of the Burma Research Society* was another local journal that published research papers on prehistory, but most foreign scholars could not access it because it was published in Burmese (Goh 2017). Thus, advancements made in prehistoric research in Myanmar were poorly understood by foreign scholars.

In this period, archaeological work in Myanmar was undertaken by British colonists. Although there were already

professional organizations and annual reports by the end of the nineteenth century, they often only focused on above-ground architecture and cultural relics. The discovery of stone artifacts in Upper Burma, particularly the Irrawaddy Valley, marks the start of prehistoric archaeological research in Myanmar, and the true study of prehistoric Myanmar began in the next phase.

3.2 Beginnings (1930–1948)

In the first half of the twentieth century, many Western scholars were involved in archaeological activities in Southeast Asia. However, unlike its neighboring countries, Myanmar received scant attention from Western archaeologists and was considered a barren field for prehistoric research. This opinion did not change until the work by T. O. Morris in the 1930s.

T. O. Morris, recognized as the "Father of Myanmar Archaeology," undertook the first systematic prehistoric survey and research in the Irrawaddy Valley in the early 1930s (Glover 2001). Armed with fresh data, Morris revealed that many chipped implements, similar to those discussed by Noetling, could be discovered far distant from the "Red Bed" of Yenangyaung, where Noetling found them. As a result, Morris concluded that Noetling's implements may have belonged to the Pleistocene bed before being redeposited and associated with Pliocene beds (Morris 1932, 1935, 1936a, b, 1937). Morris also sought to study Myanmar's past using geologic knowledge and made a significant effort to establish the whole sequence of material culture in terms of river terraces. Unfortunately, the correlations between artifact types and various faunal and floral assemblages were too weak for robust interpretation (Aung 2018; Aung et al. 2015).

With several notable discoveries of hominins and Paleolithic sites in East and Southeast Asian countries—such as the discovery of Java Man in 1894 and Peking Man in 1929—academics began to focus on Myanmar. The region was thought of as a pivotal point for early hominins' migrations from Africa to mainland East Asia and island Southeast Asia (Terra et al. 1943). French archaeologists discovered and defined the Hoabinhian culture in northern Vietnam in the 1920s. Myanmar, with a similar latitude and environment as Vietnam, was also considered in the spatiotemporal framework of the Hoabinhian culture (Aung 2018). Morris' findings in the Irrawaddy Valley also appear to have sparked Western academics' interest in traveling to Myanmar to explore ancient history (Glover 2001).

In 1938 and 1939, the American Southeast Asiatic Expedition, which consisted of a team of archaeology, geology, and paleontology scholars led by H. L. Movius and H. de Terra, investigated the Irrawaddy Valley and its surroundings. It was the most critical and far-reaching prehistoric survey in Myanmar in the first half of the twentieth century. The resulting report, *Research on Early Man in Burma* (Terra et al. 1943), is the most important and convincing monograph on Burmese prehistory to date, particularly for foreign researchers without access to most materials published in Burmese (Aung 2018; Aung-Thwin 2001).

Movius and his team gathered approximately 650 stone tools and animal fossils from a total of 12 sites in the Central Plains and Shan Plateau. Many choppers and chopping-tools were found, while typical Acheulian hand-axes were lacking. Because the typology of these implements is remarkably uniform throughout the entire sequence in the Irrawaddy Valley, to Movius would argue that they appear to have diverged dramatically from Europe's traditional Paleolithic industry and have developed distinct regional characteristics that share formal and chronological similarities with those from Zhoukoudian, China, and Kota Tampam, Malaysia. As a result of Movius' claim that these distinctive implements represented lithic complexes of the Paleolithic in Burma, they were given a new name: the Anyathian culture, named after Anyatha, the "Upper Burman" in colloquial Burmese (Terra et al. 1943). Movius then separated the Anyathian culture into five successive phases based on the stratigraphic sequences of terraces (T) of the Irrawaddy Valley. Three phases belong to the Early Anyathian, whereas two phases belong to the Late Anyathian: these corresponded to T 1–4, in which the Early Anyathian 1 and 2 phases belong to T1. The Post-Anyathian, found in T5, belongs to the Neolithic. In a chronological sense, the Early Anyathian roughly covers the time-span of the Lower and Middle Paleolithic periods of the Old World, while the Late Anyathian may be considered the equivalent of the Upper Paleolithic period (Fig. 2) (Movius 1943, 1948b). The archeological activities of Morris, Movius, and their colleagues in the Irrawaddy Valley during this period have been extensively recognized, and their results, which provide the most fundamental chronological framework for the study of the Paleolithic in Myanmar, have been applied by succeeding academics, as well.

3.3 Stagnation (1949–1969)

Prehistoric archaeological research in Myanmar came to a standstill during World War II and the decades that followed the war. Despite gaining independence from the British after World War II, Burma's central government was forced to wage a civil war and prioritize politics. As a result, research on prehistory, which relied on government financing, was a luxury in Myanmar at the time, and "the last item to be earmarked for financial support from Burma's scarce resources was the study of prehistory" (Aung-Thwin 2001). Despite a lull in research during this period, Myanmar's stringent internal restrictions formed a disincentive to systematic looting of essential sites and served as a deterrent to the international trade in illicit antiquities, thus allowing for the

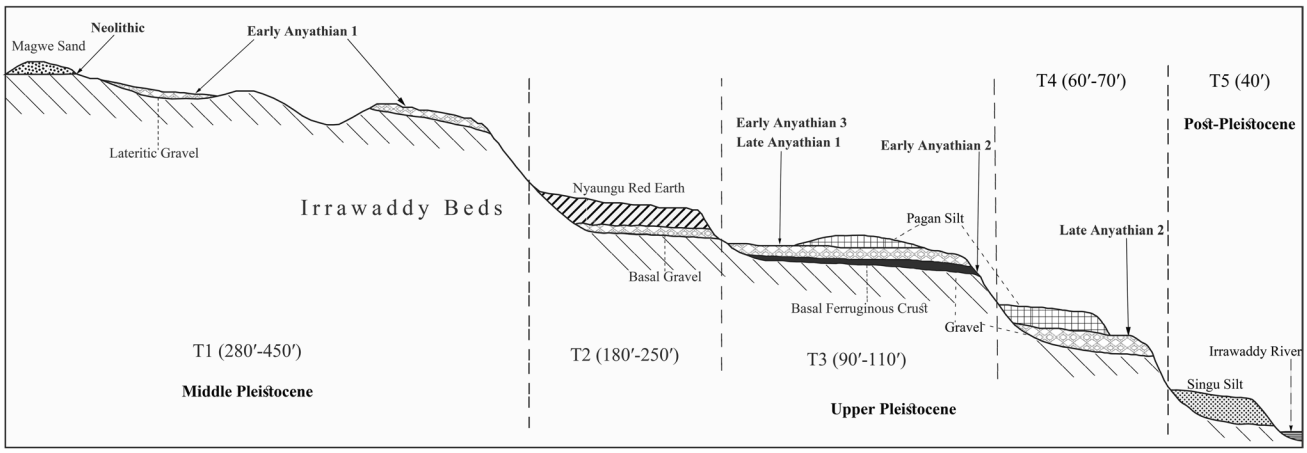

Fig. 2 Generalized cross-section of the Irrawaddy Valley showing the archaeological horizons in relation to the five terraces (T1-5). (redrawn according to Movius 1943: Fig. 56)

effective conservation of countless ancient sites and artifacts in Myanmar (Higham 2001).

3.4 Recovery (1970–1990)

Myanmar's archaeological activities began to revive gradually in the late 1960s, especially during the period 1961–1981, when Aung Thaw was a director of the Archaeological Survey of Burma and he carried out several archaeological excavations at important sites (Goh 2017). Although most of the work initiatives were focused on protecting historical cities and architecture, they did help to support the general resurgence of archaeological activities in Myanmar.

More crucially, Aung Thaw's efforts resulted in the first systematic survey and excavation of a prehistoric site in Myanmar and the beginning of a process of prehistoric research headed by native Burmese researchers. The Padalin (or Padahlin/ Badahlin) Cave, located on the western side of Shan State, was first excavated in 1969 by a team led by Aung Thaw. This was an interdisciplinary team composed of research workers drawn from the Archaeological Department, the Burma Historical Commission, and the departments of Anthropology, Geology, and Zoology of the Rangoon Arts and Science University, together with representatives from the Party headquarters. The cave was first discovered by a geologist, Khin Maung Kyaw, sometime in 1960 and brought to the attention of the Party headquarters, and then excavated (Thaw 1969a, 1971a). It is one of the most critical and prominent prehistoric sites in Myanmar, and its cave paintings have drawn special attention (Fig. 3).

The excavations at Padalin Cave unearthed over 1,600 stone artifacts, apart from unworked nodules and fragments made mainly of pebbles. The lithics were crudely made, without marks of secondary flaking or retouch, and resembled Paleolithic tools. Most may be regarded as unfinished implements; however, the techniques of grinding and perforation had begun to be employed. The occurrence of a large number of pebbles, innumerable flakes, and cores, as well as different stages and types of stone tools, indicate that the cave was not simply a habitation site but a tool-making workshop. The site also contained hundreds of bone fragments and animal teeth, many charcoal pieces, and a few cord-impressed pottery sherds. A smooth surface on a piece of red ocher also indicates that the ocher was ground down to obtain pigment powder, which, in all probability, was used in painting the figures on the rock wall (Thaw 1971a). Many experts argue, however, that there is still a lack of clear linkage between the archaeological deposits and the rock paintings (Aung 2018).

Aung Thaw believed that Padalin was an Early Neolithic site, roughly contemporaneous with the Hoabinhian culture in Southeast Asia and the Bacsonian cultures in India. Furthermore, radiocarbon dating revealed a consistent transition from the late Paleolithic to the early Neolithic (13,400–6570 cal. BP) (Thaw 1971a). No precise information is available about the calibrated dates. However, Mya Maung examined the faunal remains from Padalin and concluded that these animals were all wild, with no evidence of domestication (Maung 1971). Sein Htun also looked at the modes of subsistence from an anthropological standpoint and concluded that Padalin inhabitants were still subsisting with a "foraging strategy" (Htun 1971).

The Padalin Cave site was continuously used by ancient people for a long time, based on the numerous unearthed remains. It was also the first systematic excavation and study of a prehistoric site conducted by a native researcher in Myanmar and the first collaboration of scientists from several disciplines, including geology, anthropology, and biology, as well as the first application of absolute dating techniques at a prehistoric site in the country. The excavation

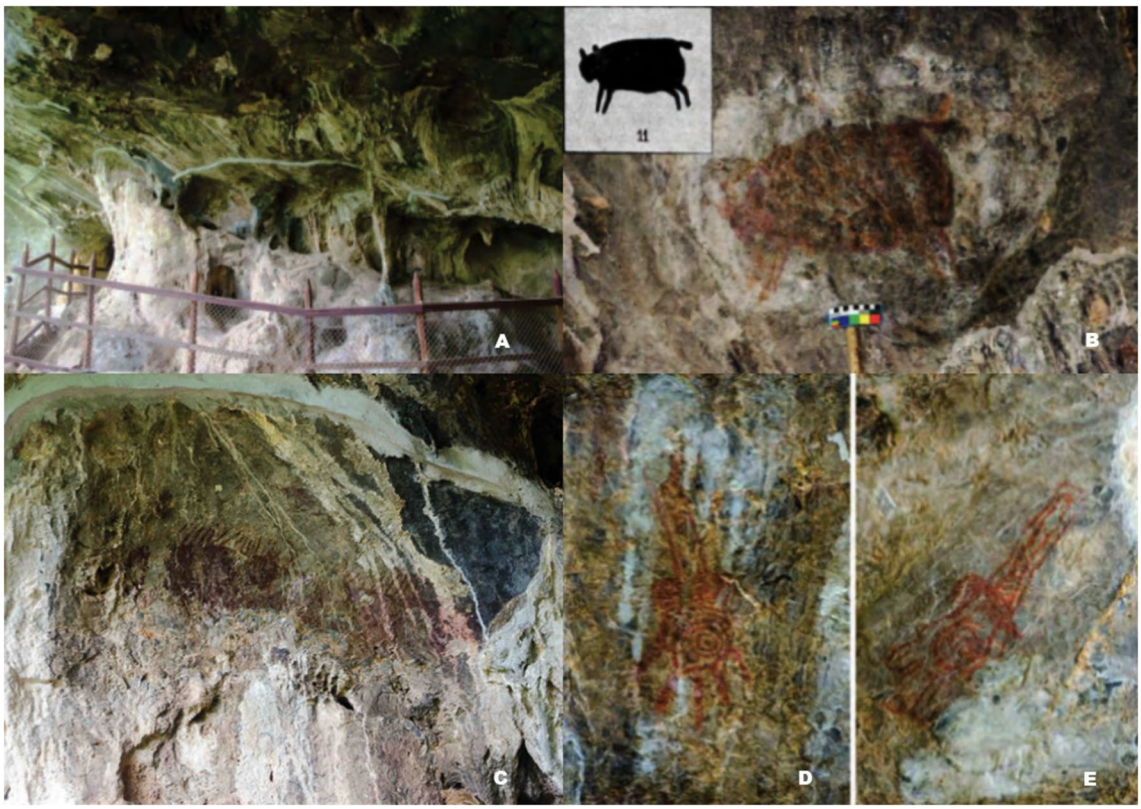

Fig. 3 Rock art in Padalin Cave. **A** Cave 1 A of Padalin Cave, which contains most of the rock art; **B**-**C** Painted figures of animals; **D**-**E** Stylized human hands. Image sources: **A**, **B**, **D**, **E** Tan 2014; **C** Tan and Hoerman 2019

of this site was significant not only for understanding the development of prehistoric cultures in Myanmar but also for understanding the culture of all East and Southeast Asia during the transition from the Paleolithic to the Neolithic from a more macroscopic perspective (Nitta 1987).

Myint Aung, a colleague of Aung Thaw, was also another pioneer archaeologist in early Myanmar. In 1972, Myint Aung found a new Neolithic site at Lepanchibaw and conducted a preliminary study of it (Aung 1972). More than 100 scrapers and bifacial artifacts were then discovered in Mu Valley in 1975; these stone artifacts reflect a more advanced lithic industry than the Anyathian culture (Aung 2012).

Ba Maw, one of the few scientists interested in prehistory (particularly the Paleolithic) at the time, discovered a shattered human mandible fossil at Nwe Gwe Hill in 1981 and believed that it belonged to *Homo erectus.* He estimated the date of this fossil to be 200,000 years ago, based on animal fossils and stone artifacts associated with it (Maw 1995a, b). It is the oldest site in Myanmar with early human fossils and has endless possibilities for in-depth study. However, the site has not yet been scientifically dated. In-depth research on the fossils of humans and animals has not yet been conducted either (Aung 2018). Ba Maw later discovered stone artifacts and fossil mammals at Moegyobyin, which he thought belonged to the Anyathian culture (Maw 1998; Maw et al. 1998). Than Tun Aung published a study of these stone artifacts in 2002 (Aung 2002a, b).

The prehistoric archaeological research in Myanmar during this period has been described as "very much in its infancy, if not still in the womb" (Aung-Thwin 2001); however, this period still marks a recovery and many developments over the prior stage, as local scholars began to organize systematic archaeological surveys and excavations on their own. Many critical prehistoric sites, such as the Padalin Cave, were excavated, and research continued. Multidisciplinary co-operation also gradually became an integral approach to prehistoric research in Myanmar. The mystery of prehistoric Myanmar began to be unveiled progressively, but even today there remains much space for expansion in terms of method and theory, excavation techniques, and follow-up studies on key topics.

3.5 Development (1991–Present)

Prehistoric archaeological research in Myanmar advanced dramatically after the 1990s, with a significant increase in the number of prehistoric site surveys and excavations, particularly in the Shan State plateau. For example, during the

period 1997–1998, a geological survey team of the Taunggyi University of Shan State led by Tin Thein investigated Moebye (Thein 1998), Buddhaw Zinaw (Thein 1997), Waiponla (Thein 2000; Thein et al. 2001), Myin Ma Hti (Thein and Bhumiveda 2011), and other karst caves of the Shan plateau and discovered stone artifacts and faunal remains. Thein has argued that the age of these sites (except Waiponla) might be around 6000–4000 BP based on the excavated remains (Thein and Bhumiveda 2011). Hla Gyi Mg Mg excavated the caves explored by Thein shortly afterward, but few stone tools and animal bones were unearthed (Mg et al. 1998). Pyiet Phyo Kyaw excavated Myin Ma Hti Cave again in 2019 and uncovered many stone pieces and some bone tools. Kyaw's analysis concluded that the cave could also have been the site of a stone tool workshop and, at the same time, might be the first discovery of bone-based technology in Myanmar's prehistoric archaeological sequence (Kyaw et al. 2020).

Aung Kyaing engaged in another survey and excavation at the Moegyobyin site at the beginning of the twenty-first century (Kyaing 2005; Kyaing et al. 2005). Following that, Moe Nwe Nwe, a Ph.D. candidate at Yangon University, conducted a comprehensive study of the artifacts excavated from Moegyobyin, including an analysis of the cultural characteristics and human survival strategies, as well as the relationship between culture and environment, by combining typological and technological methods (Moe 2014, 2018). Following more profound research in the Irrawaddy River basin, Win Kyaing, the Pyay Archaeology Field School principal, presented fresh interpretations of the Anyathian culture and its distribution (Kyaing 2010a, b; Kyaing et al. 2008, 2009).

Aside from surveys and excavations performed by local researchers, a growing number of Western experts have tried to collaborate with Burmese counterparts to solve some of the topics that are a common concern for the international academic community, such as the Bronze and Iron Age culture features, their dissemination routes, and so on (Higham 2001). A joint archaeological team led by Pauk Pauk, a researcher at the Department of Archaeology, Ministry of Culture, and Elizabeth Moore, a professor at the University of London, excavated the Nyaung'gan/Nyaung Gon site in northwestern Mandalay in 1998. It is an important Bronze Age burial site for studying the transition from late prehistoric culture to urbanization. The site's location is especially notable, as it is situated on a crater and next to the rich copper resources on the Chindwin River's opposite bank. The area's low rainfall and access to navigable waterways also link it to other sites in the central zone, Pyu and Pagan. Ceramics, stone rings, and bronze were the three primary types of items discovered at the site. In addition, a reconnaissance of the surrounding region suggested potential smelting and stone ring manufacturing locations (Moore and Pauk 2001). The site's unique geographic location is critical for research into Myanmar's cultural links with China, Thailand, and the surrounding territories, as well as commerce and transmission of bronze smelting technology (Glover 2001). The location of Nyaung'gan, which is in the country's arid zone, also poses the interesting question of subsistence agriculture, particularly if rice was involved (Higham 2001). Following this line of thinking, Nancy Tayles' team at the University of Otago, New Zealand, studied human bones from the site to learn more about the people's food habits and health state and compared them to those unearthed from elsewhere in Southeast Asia at the same time (Tayles et al. 2001).

Charles Higham has pointed out, however, that Pauk and Moore did not remove all the human bones during the excavation, and those found in situ were not well preserved and were severely degraded, making further research impossible. This is an irreversible loss for archaeological research. The value of data extraction integrity in the excavation and the balance between archaeological study, heritage protection, and site tourism may be among the challenges that must be addressed in Myanmar (Higham 2001).

Since 2001, a Franco-Myanmar research team has conducted a series of archaeological excavations in the Samon River basin. The team is composed of scholars from the Department of Archaeology of Myanmar and France's National Center for Scientific Research (CNRS), led by Pauk Pauk and J.-P. Pautreau. Pautreau has made significant contributions to our understanding of Myanmar's prehistory, mainly through his research on the wealth of Late Bronze and Early Iron Age burial sites in the Samon Valley, including Ywa Htin, Ywa Gon Gyi, Htan Ta Pin, Hnaw Khan, Myo Hla, Ohh Min, and Nyaung'gan (Coupey et al. 2010, 2011; Pautreau et al. 2001, 2004a, b, 2005, 2006a, b, 2007, 2008, 2010; Pautreau and Jarriage 2007; Pautreau and Maitay 2009, 2010; Pautreau and Mornais 2003). The Samon River basin exploration has been undertaken by an interdisciplinary team of experts from various fields, and each type of remains excavated in these sites has been subjected to specialized research, including but not limited to pottery, human bone, bronze, and stone tools (Bellina 2007; Coupey 2008; Maitay 2008; Pautreau and Maitay 2010; Rambault 2007). The study of the Ywa Htin and Oakaie sites is the most comprehensive and detailed (Bentley et al. 2018; Georjon et al. 2021; Pautreau and Jarriage 2007; Pradier et al. 2019; Pryce et al. 2015, 2018b). Although their research results are primarily published in French, they are among the most important fruits of Metal Age research in Myanmar. The metallurgical data derived from Pautreau's research sites have furthered the understanding of Myanmar's role in the story of the origin and development of metallurgy in Southeast and East Asia (Goh 2017).

Excavation at the Halin site is another important activity of Pautreau's team. Halin, together with Beikthano and Sri Ksetra, was listed as Myanmar's first World Cultural Heritage site in 2014. Although it is widely acknowledged that Halin was an ancient Pyu city, later archaeological excavations extended its period from the Proto-historic Period to the Prehistoric Period (Aung 1970), and this plays a vital role in filling the gap of evolution from prehistory to urbanization and clarifying the cultural characteristics of the Metal Age. Halin thus became one of Myanmar's most attractive archaeological sites, not only for local archaeologists but also for international researchers. The aims of the excavation at Halin by Pautreau's team are to establish the Bronze and Iron Age development sequence of Myanmar using scientific methods and by comparing Halin with other excavated sites and comprehensive research on Bronze and Iron Age cultures between the Irrawaddy and Chindwin Rivers, in the Sagaing Region (Satt 2020).

T. O. Pryce, Pautreau's successor at CNRS, has engaged in close co-operation with Kyaw Aung Aung, a researcher from the Ministry of Religious Affairs and Culture of Myanmar (formerly the Myanmar Ministry of Culture). Their research has also focused on the Bronze and Early Iron Ages, and the cultural characteristics of Myanmar's Metal Age have grown clearer due to their efforts (Bentley et al. 2018; Coupey et al. 2013; Dussubieux and Pryce 2016; Georjon et al. 2021; Pradier et al. 2019; Pryce et al. 2011, 2014, 2015, 2018a, b). A group of scholars led by Bob Hudson of the University of Sydney have also engaged with Burmese archaeology in recent years, focusing on the Bronze and Iron Ages before the Pyu culture (Hudson 2001, 2005, 2006).

Researchers from Myanmar have learned new research methods and techniques through collaboration and exchange with Western scholars and were the first to use these new methods and techniques in key sites in the country. This includes the first application of luminescence dating methods, at Padalin and Gu Myaung Caves, suggesting human occupation of the two sites by 30 ka and 25 ka, respectively (Schaarschmidt et al. 2019).

There are, however, no professional periodicals of prehistoric archaeological research in Myanmar. Most papers on this subject are distributed around the nation and overseas in various multidisciplinary journals. The *Myanmar Historical Research Journal*, a bilingual journal published by the Burma Historical Commission, is an important historical journal that has published many significant results from prehistoric research in Myanmar (Aung 2000; Maw 1995b, 1998; Maw et al. 1998; Ni Ni Myint 1998; Thaung et al. 1998; Thein et al. 2001). Of particular note is the 2001 special issue of *Asian Perspectives*, the first comprehensive study of the history, development, and conditions of the discipline of archaeology in Myanmar. The volume features contributions from established archaeologists and historians specializing in Myanmar and/or Southeast Asian studies. It is also an essential source for studying archaeology in Myanmar before the twenty-first century (Aung-Thwin 2001; Aung-Thwin and Stark 2001; Glover 2001; Higham 2001; Hudson et al. 2001; Miksic 2001; Moore and Pauk 2001).

The International Conference on Southeast Asian Archaeology has been held every 3 years since 2010 by the Regional Centre for Archaeology and Fine Arts (SPAFA) of the Southeast Asian Ministers of Education Organization (SEAMEO). The conference introduces and reviews archaeological work and developments in Southeast Asia during the three years between conferences. The meeting papers are published in *Advancing Southeast Asian Archaeology*, a window to current archaeological work in Southeast Asia (Tan 2018, 2020), but there is scant research on Myanmar in particular. Often, there is only an official report, *Archaeological Development in Myanmar*, on the primary field work, progress, and goals of archaeology in Myanmar, but most of the material focuses on historical archaeology (Lwin 2018; Satt 2020).

In terms of education, Myanmar archaeology has advanced substantially. Yangon University, Myanmar's most important archaeological academic base, plays a vital role in teaching and developing talent for the archaeological profession. Mandalay University, Yadanarbon University, Dagon University, and the Pyay Archaeology Field School also offer archaeology courses (Tan 2019b). Objectively speaking, Myanmar has numerous archaeological educational institutions compared to other Southeast Asian countries, and Myanmar's offerings provide support to developing talents for the future development of the field. However, there is still a considerable gap between theory and practice, especially in prehistoric studies, in part because these institutions often strongly emphasize historical studies, such as research on the Pyu and Bagan. There is also a scarcity of adequately trained employees who are up to date on the latest topics, challenges, and techniques. The costs of such training must also be mentioned, because once trained, more costs must be anticipated as scientific testing of excavated data incurs even more expenses to meet the standards required by scholars in the field of prehistoric research today (Aung-Thwin 2001; Goh 2017; Miksic 2001).

In general, the current phase of prehistoric archaeological study in Myanmar has made an historical advance compared to previous periods. The face of Stone Age industries is better understood, and Bronze and Iron Age research has begun to pique the interest of researchers both at home and abroad, as these topics are quickly becoming a hotspot in international academic communities. Interdisciplinary and inter-regional collaboration has become one of the distinguishing features of prehistoric archaeological research in Myanmar today, and the population of Myanmar's native academics is growing due to their collaboration with

international colleagues, which in turn is advancing the study of prehistory.

4 Discussion

4.1 Chronology

Through combining the literature both in the libraries and on the internet, our review and analysis of published materials revealed five stages in the development of research on prehistoric archaeology in Myanmar, from its origins in the late 1860s, more than 150 years ago, through its beginnings in the 1930s, the near-complete stagnation during World War II and the following decades witnessing its gradual recovery after the 1970s, and then the current period, after the late 1990s, showing a clear trend of international and multidisciplinary cooperation.

Prehistoric archaeological research in Myanmar began with the investigations and discoveries by Western scholars during the colonial period. By the end of the nineteenth century, the discovery of old stone tools from the Irrawaddy River basin raised the research interest of Western scholars, and the field was born. In the 1930 and 1940 s, an increasing number of Western scholars came to Myanmar to conduct prehistoric surveys, as represented by Morris and Movius, who explored the Irrawaddy valley and designated Myanmar's first Paleolithic culture, the Anyathian culture. Their research had a lasting influence on Paleolithic research in Myanmar, as well as in South and Southeast Asia. It is no exaggeration to claim that this was the first pinnacle of Paleolithic research in Myanmar, but a turnaround came abruptly: during World War II and the two decades following the war, prehistoric archaeological research in Myanmar, including historical archaeology, came to an almost complete halt. This was in stark contrast to the post-war scenes of political independence, economic recovery, and cultural development in many other Southeast Asian countries. Not until the 1970s did prehistoric archaeological research in Myanmar begin to recover gradually, led by Aung Thaw, who conducted a series of systematic archaeological surveys and excavations that discovered and studied many essential prehistoric sites. In the 1990s, scholars from Myanmar began to collaborate with foreign researchers to investigate key themes of worldwide academic interest and learn new theories and methodologies. Prehistoric research today is developing in depth, and the potential and prospects are gradually emerging Myanmar.

4.2 Characteristics

Several salient characteristics of prehistoric archaeological research in Myanmar can be highlighted.

The most striking feature of Myanmar's prehistoric studies is the considerable disparity in the degree of research interest between the prehistoric and historic periods. According to a departmental report (Aung 2018; Win 2007), only 8 of the 145 archaeological projects carried out by the then Ministry of Culture's Department of Archaeology between 1903 and 2007 were prehistoric research initiatives. The Department of Archaeology focused its attention on aboveground remains that belonged to the historical period, notably the Pagan and Pyu periods. Not only were the artifacts from the historic era unparalleled in Asia, but the preservation process was also less difficult, less time-consuming, less expensive, probably more cost-effective, and based on a far stronger knowledge base (Aung-Thwin 2001). Prehistoric archaeology, in contrast, was, not unexpectedly, "the last thing to be considered," because of it being a subject strongly reliant on financial support, with high expenditure, and undramatic results that are challenging to study.

In Myanmar, archaeology is an important field to which much attention has been given. Faculties of archaeology are established in at least five universities (more than other Southeast Asian countries, such as Thailand), but overall, the historical lack of local prehistoric archaeologists has hindered the development of archaeology in Myanmar. In addition, the subject of research and teaching in archaeology is still predominantly focused on historical archaeology, with minimal instruction and experience in prehistoric archaeology. After graduation, few students work in archaeology-related institutes.Aung-Thwin and Stark (2001) noted the small number of prehistorians working in Myanmar, observing that most of them were "out of touch with current techniques and approaches and desperately in need of modern equipment and proper finance," a condition that has remained unaltered for more than two decades. The necessity for formal training of Myanmarese archaeologists is still a major problem in the twenty-first century (Aung-Thwin 2001; Goh 2017; Miksic 2001).

The distribution of known prehistoric sites is also clearly unbalanced. Most of the important prehistoric sites were discovered in central Myanmar, including the Shan plateau, Irrawaddy valley, Chindwin valley, and Samon valley. However, other vast lands, including the southern coastal areas, and the northern, northeastern, and eastern regions have lacked research attention and have not seen many discoveries of prehistoric sites. In contrast, many important prehistoric sites have been in bordering regions of Myanmar, such as in the southwest of China and the northwest of Thailand, so it can be expected in theory that more prehistoric sites will be discovered in these regions.

Close collaboration between foreign and Myanmarese scholars has been one of the characteristics of prehistoric archaeological research in Myanmar since the late 1990s. It may also be one of the routes that would allow the field

to break free from the shackles of the lack of local talent and funding, since international cooperation brings more advanced techniques, theories, and methods, and financial resources, and this has spurred the rapid development of prehistoric archaeology over the last decades. The new generation of prehistoric archaeologists is using new techniques, such as dating, imaging, and geographic information technologies, to study new and existing sites in the context of strong international collaboration. More importantly, this collaboration allows Myanmar's prehistoric research to come into the view of the global academic community and allows Myanmar's archaeologists to learn methods and theories and stay current on areas of international academic interest.

4.3 Key issues concerning prehistoric archaeology in Myanmar

Although prehistoric archaeological research in Myanmar has developed rapidly since the 1990s, it is still "in its infancy, if not still in the womb," as Aung-Thwin (2001) reminded us two decades ago, and many issues need to be further explored.

The first topic is modern humans' dispersal, especially before the Holocene. Myanmar has been considered as a route for humans' migrations from continental to insular Southeast Asia or from the west to east (Aung 2017; Li et al. 2015; Lipson et al. 2018; Macaulay et al. 2005; Marwick 2009; Oppenheimer 2009; Schepartz et al. 2000). However, since Movius discovered some stone tools from the Irrawaddy valley, there still have been only very limited discoveries of lithic artifacts, human fossils, and faunal remains, and this to some extent is resulting in the slow development of Myanmar's Paleolithic archaeology. Many prospects remain, however, in areas with limited or no research, and prehistoric remains should be expected to be found in the other vast frontier areas that border China, Thailand, and India. At the same time, more survey and excavation, and more profound interdisciplinary and cross-regional research, need to be conducted to determine the nature and characteristics of the ancient human fossil from Nwe Gwe Hill.

The second topic is the transition from hunter-gatherer societies to sedentary agricultural ones, as well as human groups' relationships and cultural exchange and communication. Broad, macro-regional scale research should be carried out as well as interdisciplinary methods. For example, isotopic analyses can be applied to determine affinities and social diversity in Southeast Asia (e.g., Bentley et al. 2021). Clearly there is great potential for future research on this issue.

The third set of topics is related to the Neolithic, such as the emergence and development of pottery, agriculture, animal/plant domestication, and residential patterning: for each, little evidence has been found to date. Pottery is one of the important artifacts in research of Neolithic archaeology, and its typological, morphological, and aesthetic features are important indicators for determining archaeological cultures and their exchange and communication, but cultural-historical research based on typology (usually of ceramics) and stratigraphy is not well-developed in Myanmar. Also, in Myanmar fieldwork it is often difficult to identify residential structures in a settlement, and so it is still a mystery in what sort of houses the Burmese lived during the Neolithic. Many questions still need to be answered through multidisciplinary cooperation concerning agriculture and animal/plant domestication, although such work has already started, with many international scholars now involved in long-term research (Eda 2021).

The fourth topic concerns the Bronze Age and Iron Age, as well as the emergence of the state and civilization, which is also hotly-discussed among international scholars. One question stands out as the most popular one, and this has to do with Myanmar's metallurgical development and dispersal. Some experts suggest that Myanmar was a probable crossroads for spreading "linear furnace technology" from Sri Lanka to Cambodia, Sarawak, and Japan (Juleff 2009). Future lead isotope research may support or refute this hypothesis, and this also suggests that there is still a lot of research potential and space for metallurgical issues in the future (Pryce et al. 2011, 2014).

Overall, these topics need to be discussed in the context of the whole of Southeast Asia, East Asia, and South Asia, so it is crucial to compare the archaeological evidence from Myanmar with that from surrounding regions: this would lead to more robust interpretations concerning the relationships between ancient cultures and technologies, as well as concerning DNA data. In addition, international cooperation between scholars from Myanmar and other countries and multi-disciplinary research are both essential for advancing the field. At the same time, more analyses based in the cultural-historical paradigm might still be effective in constructing a systematic spatial-temporal framework for local cultures' evolution: this has already proven highly effective and significant in Chinese prehistoric archaeology. Of course, the effectiveness of this paradigm also depends on whether there are enough and appropriate archaeological materials.

5 Conclusion

Interest in prehistoric Myanmar remains limited, both at the local and international levels, especially when compared with historical archaeological research in Myanmar. Prehistoric archaeology has witnessed over 150 years' of development, especially during the current period of

rapid advancement that began in the 1990s. In light of its significant geographic location, Myanmar plays a crucial role in international discussions surrounding many key issues in prehistoric research, including the dispersal of modern humans, the transition from hunting-gathering to agriculture, the diffusion of metallurgy, and so on. China, adjacent to Myanmar, should and can be integrated into research on frontier topics through extensive collaborations with scholars from both Myanmar and other countries of the world.

Through collecting and re-organizing research results about Myanmar's prehistoric archaeology as comprehensively as possible, this paper identifies and summarizes five major periods in the development of prehistoric archaeology as a field in the country, and highlights the main activities and characteristics of research over the last century and a half. In our overview, we also highlight the restrictions on the study of prehistory in Myanmar, as well as areas for development in future research. These may provide a reference for future prehistoric archaeological research and exploration in MSEA. However, due to access restrictions, certain Burmese sources could not be included in this review, and this study mainly focuses on English, French, and Chinese materials while striving to sort out and evaluate them objectively from the perspective of the "other". Because of the dynamic development of academic research, this sorting process has inevitably subjected this paper to some limitations.

Author contributions Xuan Wei: References collecting, data analysis, writing original draft, visualization.
Tingting Liang: References collecting, data analysis.
Myet Thwe Soe: References collecting.
Xiaoying Chen: References collecting.
Yinghua Li: Conceptualization, methodology, draft review and editing, validation, supervision, funding acquisition.

Funding This research was supported by the National Social Science Fund of China (18BKG003).

Data availability All data generated or analyzed during this study are included in this published article.

Code availability Not applicable.

Declarations

Ethics approval Not applicable.

Consent to participate Not applicable.

Consent for publication Not applicable.

Conflict of interest The authors declare that they have no conflicts of interest.

References

Aung, Myint. 1970. The excavations at Halin. *Journal of Burma Research Society* 53 (2): 62–63.

Aung, Myint. 1972. *The Preliminiary Study of the neolithic tools from Lepanchibaw in Nyaung Oo Township*. Yangon: Burma Research Congress.

Aung, Myint. 2000. A review of Padahlin Culture. *Myanmar Historical Research Journal* 6: 1–16.

Aung, Than. 2002a. *The study of Stone implements from Moegyobyin and Monywa District*. Yangon: Ministry of Education National Center for Human Resource Development.

Aung, Than. 2002b. *A study on lithic tools from Moegyobyin and Monywa District*. Yangon: National Centre for Human Resource Development, Ministry of Education.

Aung, Yee Yee. 2013. New discoveries of rock art in Badalin Caves, Myanmar. *Rock Art Research* 30 (2): 253.

Aung, Tin Htut. 2017. Raw material utilization, technology, and typology of palaeolithic tools in Myanmar: were there lithic technological links in the regional context? *Journal of Humanities and Social Sciences* 44: 189–204.

Aung, Tin Htut. 2018. *Lithic technology and typology from hunter-gatherer sites in Myanmar with special reference to central belt and western fringe of Shan plateau*. Okayama: Doctoral Thesis, Okayama University.

Aung, Tin Htut, Benjamin Marwick, and Cyler Conrad. 2015. Palaeolithic zooarchaeology in Myanmar: a review and future prospects. *Journal of Indo-Pacific Archaeology* 39: 50–56.

Aung, Ye Myat, Hla Shwe, Min Aung, and Zin Oo. 2009. *Report on the excavation of Badahlin Stone Age Cultural Evidences from 5-January-2009 to 8-January-2009*. Mandalay: Department of Archaeology, National Museum and Library, Ministry of Culture.

Aung, Myint. 2012. A Bifacial Tool from Mu Valley. In *Revealing Myanmar's past: an anthology of Archaeological Articles*, ed. M. Aung, 1–4. Yangon: Tun Foundation Bank Literary Committee.

Aung-Thwin, Michael. 1982. Burma before Pagan: the status of archaeology today. *Asian Perspectives* 25 (2): 1–21.

Aung-Thwin, Michael. 2001. Origins and development of the field of prehistory in Burma. *Asian Perspectives* 40 (1): 6–34.

Aung-Thwin, Michael A., T. Miriam, and Stark. 2001. Recent developments in the archaeology of Myanma Pyay (Burma): an introduction. *Asian Perspectives* 40 (1): 1–7.

Bellina, B. 2007. Stone ornaments from Ywa Htin. In *Ywa Htin, Iron Age Burials in the Samon Valley, Upper Burma*, ed. J.-P. Pautreau, 71–85. Chiang Mai: Mission Archéologique Française au Myanmar.

Bellina, Bérénice., Aude Favereau, and Laure Dussubieux. 2019. Southeast asian early Maritime Silk Road trading polities' hinterland and the sea-nomads of the isthmus of Kra. *Journal of Anthropological Archaeology* 54: 102–120. https://doi.org/10.1016/j.jaa.2019.02.005.

Bellina, Bérénice., Maung Sun Win, Kalayar Myat Myat. Htwe, Htet Myat Thu, Cristina Castillo, Camille Colonna, Laure Dussubieux, Aude Favereau, Emiri Miyama, and Baptiste Pradier. 2018. Myanmar's earliest Maritime Silk Road port-settlements revealed. *Antiquity* 92 (366): 1–5.

Bennett, Anna. 2013. The importance of iron: its development and complexity in the Southeast Asian Iron Age. In *Unearthing Southeast Asia's Past. Selected Papers From The 12th International Conference Of The European Association Of Southeast Asian Archaeologists*, vol. Volume, 1, ed. Marijke J. Klokke and Veronique Degroot, 107–121. Singapore: NUS Press.

Bentley, R., Baptiste Alexander, Aung Aung Pradier, Kyaw, and T.O. Pryce. 2021. Kinship and migration in prehistoric mainland Southeast Asia: an overview of isotopic evidence. *Archaeological*

Research in Asia 25: 100260. https://doi.org/10.1016/j.ara.2021.100260.

Bentley, R., A. Alexander, B. Willis, Aung Aung Pradier, T.T. Kyaw, A.D. Win, Brandon, and T.O. Pryce. 2018. Social differences in Neolithic/Bronze age Myanmar: Sr-87/Sr-86 in skeletal remains from Oakaie 1 and Nyaung'gan. *Journal of Archaeological Science-Reports* 21: 32–37. https://doi.org/10.1016/j.jasrep.2018.06.030.

Brown, J. Coggin. 1931. Relics of the Stone Age in Burma. *Journal of Burma Research Society* 21 (2): 34–44.

Cai, X., Z. Qin, B. Wen, S. Xu, Y. Wang, Y. Lu, L. Wei, et al. 2011. Human migration through bottlenecks from Southeast Asia into East Asia during last glacial maximum revealed by Y chromosomes. *PLoS ONE* 6 (8): e24282. https://doi.org/10.1371/journal.pone.0024282.

Carter, Alison Kyra. 2016. The production and exchange of glass and stone beads in Southeast Asia from 500 BCE to the early second millennium CE: an assessment of the work of Peter Francis in light of recent research. *Archaeological Research in Asia* 6: 16–29. https://doi.org/10.1016/j.ara.2016.02.004.

Coupey, Anne-Sophie. 2008. Infant and child burials in the Samon valley, Myanmar. In *Archaeology in Southeast Asia, from Homo Erectus to the Living Traditions: Choice of Papers from the 11th International Conference of the European Association of Southeast Asian Archaeologists, Bougon, France*, ed. J.-P. Pautreau, A.-S. Coupey, V. Zeitoun, and E. Rambault, 119–125. Siam Ratana: Chiang Mai.

Coupey, Anne-Sophie., Aung Aung Kyaw, and Pryce Thomas Oliver. 2013. Evolution of bronze and Iron age cultures of Myanmar: the last excavation in Kan Gyi Gon. In *Bioarchaeology in Southeast Asia and the Pacific: newsletter 2013*, ed. Kate Domett, 3–5. Townsville: James Cook University.

Coupey, Anne-Sophie., Jean-Pierre. Pautreau, and Aung Aung Kyaw. 2010. Second fieldwork season at Ywa Gon Gyi burial site (Upper Burma). *Bioarchaeology in Southeast Asia and the Pacific: Newsletter* 6: 17–18.

Coupey, Anne-Sophie., Jean-Pierre. Pautreau, and Aung Aung Kyaw. 2011. *Les Cimetières De L'âge Du Fer Dans La Vallé De La Samon, Kyo Gon, Pyaw Bwe Township, Mandalay Division, Myanmar, Rapport de la mission*. Paris: Mission Archéologique Française au Myanmar.

Daniel, Glyn Edmund. 1975. *A hundred and fifty years of Archaeology*. London: Duckworth.

Das Gupta, H.C. 1923. Indian prehistory. *Journal of the Department of Science* 5: 10–15.

Dussubieux, Laure. 2016. Myanmar's role in Iron Age interaction networks linking Southeast Asia and India: recent glass and copper-base metal exchange research from the Mission Archéologique Française au Myanmar. *Journal of Archaeological Science: Reports* 5: 598–614.

Dussubieux, Laure, Bérénic. Bellina, Win Hsan Oo, Maung Sun Win, and Khinsandar Kyaw. 2020. First elemental analysis of glass from Southern Myanmar: replacing the region in the early Maritime Silk Road. *Archaeological and Anthropological Sciences* 12 (7): 139. https://doi.org/10.1007/s12520-020-01095-1.

Eda, Masaki. 2021. Origin of the domestic chicken from modern biological and zooarchaeological approaches. *Animal Frontiers* 11 (3): 52–61. https://doi.org/10.1093/af/vfab016.

Evans, J. 1870. Stone implements from Burma. *Nature* 6: 104–105. https://doi.org/10.1038/002104a0.

Forestier, Hubert, Yuduan Zhou, Heng Sophady, Yinghua Li, David Codeluppi, Prasit Auetrakulvit, Valéry, and Zeitoun. 2022. The first lithic industry of mainland Southeast Asia: evidence of the earliest hominin in a tropical context. *L'Anthropologie* 126 (1): 102996. https://doi.org/10.1016/j.anthro.2022.102996.

Georjon, Cloé, Aung Aung Kyaw, Daw Tin Tin. Win, et al. 2021. Late Neolithic to Early-Mid Bronze Age semi-precious stone bead production and consumption at Oakaie and Nyaung'gan in central-northern Myanmar. *Archaeological Research in Asia* 25: 100240. https://doi.org/10.1016/j.ara.2020.100240.

Glover, Ian G. 2001. The past, present, and future of prehistoric archaeology in Burma. *Asian Perspectives* 40 (1): 119–126.

Goh, Geok Yian. 2017. The history and practice of archaeology in Myanmar. In *Handbook of East and Southeast Asian Archaeology*, ed. Peter V. Junko Habu, Lape, and John W. Olsen, 111–117. New York: Springer.

Gupta, Sunil. 2018. The archaeological record of Indian Ocean engagements: Bay of Bengal (5000 BC–500 AD). In *The Oxford Handbook of Topics in Archaeology*, ed. Oxford Handbooks Editorial Board, 1–28. Oxford: Oxford University Press.

Halcrow, Siân. E., Rebecca Crozier, Kate M. Domett, Thanik Lertcharnrit, Jennifer S. Newton, Louise G. Shewan, M. Stacey, and Ward. 2019. Ethical issues of bioarchaeology in Southeast Asia. In *Ethical Approaches to Human Remains*, ed. Kirsty Squires, David Errickson, and Nicholas Márquez-Grant, 465–484. Cham, Switzerland: Springer.

Han, Nyunt. 1999. *Archaeological findings at Nyaunggan Bronze age site*. Yangon, Myanmar: Paper presented at the Proceedings of the Workshop on Bronze Age Culture.

Higham, Charles. 2001. Archaeology in Myanmar: past, present, and future. *Asian Perspectives* 40 (1): 127–138. https://doi.org/10.1353/asi.2001.0008.

Htun, Sein. 1971. Padahlin Cave in anthropological point of view. *Takkatho Pyinnyar Padetha Sarsaung* 6 (1): 361–370.

Hudson, Bob. 2001. The Nyaungyan goddesses: some unusual bronze grave goods from upper burma. *TAASA Review* 10 (2): 4–7.

Hudson, Bob. 2005. Thoughts on some chronological markers of Myanmar archaeology in the pre-urban period. *Yangon University Archaeology Journal* 10: 1–6.

Hudson, Bob. 2006. Iron in Myanmar. *Enchanting Myanmar* 5: 6–9.

Hudson, Bob, Nyein Lwin, and Win Maung. 2001. The origins of Bagan: new dates and old inhabitants. *Asian Perspectives* 40 (1): 48–74.

Juleff, Gillian. 2009. Technology and evolution: a root and branch view of asian iron from first-millennium BC Sri Lanka to japanese steel. *World Archaeology* 41 (4): 557–577.

Kyaing, Aung. 2005. *Exploration report around Moegyobyin Site, Lei-she village, mot Htaw Village, Twin Village, Monywe and Kyemon Village in Sagaing Division, Upper Myanmar*. Yangon: Department of Archaeology.

Kyaing, Win. 2010a. The additional finds of Anyathian Stone Age. In *Proceedings of Myanmar Archaeological and Historical Evidences*, ed. Sann Win, 37–92. Yangon: Ministry of Culture.

Kyaing, Win. 2010b. The extension of Anyanthian boundary. In *Proceedings of Myanmar Archaeological and Historical Evidences*, ed. Sann Win, 23–36. Yangon: Ministry of Cultur.

Kyaing, Win, Sein Myint, Lin Htun Kyi, Zin Zin Lin, Le Le. Win, Arkar Aye, Aung Min, Min Zaw Htwe. 2009. *Report on the expedition of Palaeolithic Cultural evidence*. Mandalay: Department of Archaeology, National Museum and Library, Ministry of Culture.

Kyaing, Win, Sein Myint, Lin Htun Kyi, Zin Zin Lin, Le Le. Win, Arkar Aye, and Min Zaw Htwe. 2008. *Report on the Expeditioin of Myanmar prehistoric stone Age Cultural evidence*. Mandalay: Department of Archaeology, National Museum and Library, Ministry of Culture.

Kyaing, Aung, Myo Win, and Aye Ko. 2005. *Report on the expedition around Moegyobyin, Laeshae Ywa, Muttaw Ywa, Twin Ywa, Monywae and Kyaehmon Ywa*. Mandalay: Department of Archaeology, Ministry of Culture.

Kyaw, Pyiet Phyo. 2011. Bronze age context of HL29 at Halin. *Journal of Myanmar Academy of Arts and Science* 11 (8): 1–26.

Kyaw, Pyiet, Win Phyo, Thu Ya Naing, Kyaw Swar Aung, Hein Htet Oo, Aung Lwin, Nanda, and Lin Aung. 2020. Archaeofaunal remains and stone implements found in Myin Ma Hti Cave no. 2 (MMH2) located in Aung Pan Township, Shan State of Myanmar. *Anatomy & Biological Anthropology* 33 (2): 37–44.

Li, Y.C., H.W. Wang, J.Y. Tian, L.N. Liu, L.Q. Yang, C.L. Zhu, S.F. Wu, Q.P. Kong, and Y.P. Zhang. 2015. Ancient inland human dispersals from Myanmar into interior East Asia since the late pleistocene. *Scientific Reports* 5 (1): 9473. https://doi.org/10.1038/srep09473.

Lipson, Mark, Olivia Cheronet, Swapan Mallick, Nadin Rohland, Marc Oxenham, Michael Pietrusewsky, Thomas Oliver Pryce, et al. 2018. Ancient genomes document multiple waves of migration in southeast asian prehistory. *Science* 361 (6397): 92–95. https://doi.org/10.1126/science.aat3188.

Lwin, Kyaw Oo. 2018. Archaeological development in Myanmar 2013–2015 (country report). In *Advancing southeast asian archaeology 2016*, ed. Tan Noel Hidalgo, 46–52. Bangkok: SEAMEO SPAFA Regional Centre for Archaeology and Fine Arts.

Macaulay, Vincent, Catherine Hill, Alessandro Achilli, Chiara Rengo, Douglas Clarke, William Meehan, James Blackburn, et al. 2005. Single, rapid coastal settlement of Asia revealed by analysis of complete mitochondrial genomes. *Science* 308 (5724): 1034–1036.

Maitay, Christophe. 2008. Iron Age ceramics of the Samon valley, Myanmar. In *Archaeology in Southeast Asia, from Homo Erectus to the Living Traditions: Choice of Papers from the 11th International Conference of the European Association of Southeast Asian Archaeologists, Bougon, France*, ed. J.-P. Pautreau, A.-S. Coupey, V. Zeitoun, and E. Rambault, 127–132. Siam Ratana: Chiang Mai.

Marwick, Benjamin. 2009. Biogeography of Middle Pleistocene hominins in mainland Southeast Asia: a review of current evidence. *Quaternary International* 202: 51–58. https://doi.org/10.1016/j.quaint.2008.01.012.

Matsumura, H., H.C. Hung, C. Higham, C. Zhang, M. Yamagata, L.C. Nguyen, Z. Li, et al. 2019. Craniometrics reveal two layers of prehistoric human dispersal in eastern Eurasia. *Scientific Reports* 9 (1): 1451. https://doi.org/10.1038/s41598-018-35426-z.

Matsumura, Hirofumi, F. Marc, and Oxenham. 2014. Demographic transitions and migration in prehistoric East/Southeast Asia through the lens of nonmetric dental traits. *American Journal of Physical Anthropology* 155 (1): 45–65. https://doi.org/10.1002/ajpa.22537.

Matsumura, Hirofumi, Marc F.. Oxenham, and Nguyen La Cuong. 2015. Hoabinhians: a key population with which to debate the peopling of Southeast Asia. In *Emergence and Diversity of Modern Human Behavior in Paleolithic Asia*, ed. Yousuke Kaifu, Masami Izuho, Ted Goebel, Hiroyuki Sato, and Akira Ono, 117–132. College Station: Texas A&M Press.

Maung, Mya. 1971. Padahlin Cave in zoological perspective. *Takkatho Pyinnyar Padetha Sarsaung* 6 (1): 371–377.

Maw, Ba. 1995a. The first discovery of the early man's fossilized maxillary bone fragment in Myanmar. *The East Asian Tertiary Quaternary Newsletter* 16: 72–79.

Maw, Ba. 1995b. Research on early man in Myanmar. *Myanmar Historical Research Journal* 1: 1213–1220.

Maw, Ba. 1998. The first discovery in the evolution of anyathian cultures from a single site in Myanmar. *Myanmar Historical Research Journal* 2: 97–105.

Maw, Ba, Than Tun Aung, Pe Nyein, and Tin Nyein. 1998. Artifacts of Anyathian Cultures found in a single site. *Myanmar Historical Research Journal* 2: 7–15.

Mg, Hla Gyi, Htun Aung Mg, Than Kyaw, Hteik, and Kyaw Swe. 1998. *Stone Age Research Expedition to the Cave Sites in Moebye, Pekon and Lewun in Shan State*. Yangon: Department of Archaeology, Ministry of Culture.

Miksic, John N. 2001. Early burmese urbanization: research and conservation. *Asian Perspectives* 40 (1): 88–107.

Mitra, P. 1923. *Prehistoric India: its place in the World's cultures*. Calcutta: Calcutta University.

Moe, Nwe Nwe. 2014. *Material remains of Moegyobyin in Salingyi Township, Sagaing Region*. Yangon: Doctoral Thesis, University of Yangon.

Moe, Nwe Nwe. 2018. Material remains of Moegyobyin site and its environmen. In *Paper presented at the 2nd International Conference on Burma/Myanmar Studies, Mandalay*. Mandalay: University of Mandalay.

Moore, Elizabeth. 2010. Myanmar bronzes and the Dian cultures of Yunnan. *Bulletin of the Indo-Pacific Prehistory Association* 30: 122–132.

Moore, Elizabeth. 2019. Myanmar and Yunnan: cultural exchanges along Southern Silk Route c. 600 BC-400 CE. In *The Southern Silk Route*, ed. Lipi Ghosh, 69–91. London: Routledge.

Moore, Elizabeth, and Pauk Pauk. 2001. Nyaung-gan: a preliminary note on a bronze age cemetery near Mandalay, Myanmar (Burma). *Asian Perspectives* 40 (1): 35–47.

Morris, T.O. 1932. A palaeolith from Upper Burma. *Journal of the Burma Research Society* 22 (1): 19–20.

Morris, T.O. 1935. The prehistoric stone implements of Burma. *Journal of the Burma Research Society* 25 (1): 1–39.

Morris, T.O. 1936a. The Konbyin Terrace of the Irrawaddy at Thayetmyo. *Journal of the Burma Research Society* 26: 163–169.

Morris, T.O. 1936b. A palaeolith from Yenangyaung. *Journal of the Burma Research Society* 26: 119–121.

Morris, T.O. 1937. Prehistoric stone implements from the Konbyinmyint of the Irrawaddy and Paunglaung Rivers. *Journal of the Burma Research Society* 27 (1): 74.

Movius, Hallam Leonard. 1943. *The Stone Age of Burma*. In *Research on Early Man in Burma,* , ed. H. de Terra and H.L. Movius, 341–392. Philadelphia: American Philosophical Society.

Movius, Hallam Leonard. 1948a. The Lower palaeolithic cultures of southern and eastern Asia. *Transactions of the American Philosophical Society* 38 (4): 329–420.

Movius, Hallam Leonard. 1948b. Palaeolithic cultures of the Far East. *Transactions of the American Philosophical Society* 38: 335–411.

Murphy, Stephen A., and Miriam T. Stark. 2016. Introduction: transitions from late prehistory to early historic periods in mainland Southeast Asia, c. early to mid-first millennium CE. *Journal of Southeast Asian Studies* 47 (3): 333–340. https://doi.org/10.1017/s0022463416000229.

Ni Ni Myint, Daw. 1998. Report on recent archaeological finds in Budalin Township: Sagaing Division. *Myanmar Historical Research Journal* 3: 7–9.

Nitta, Eiji. 1987. The situation of the Neolithic culture of Padah-lin Caves in the context of Southeast Asian history. In *Burma and Japan: Basic Studies on their Cultural and Social structure*, edited by Teruko Okudaira, Ryuji Saito, and Than Tun. Tokyo: The Burma Studies Group, pp. 161–168. [Japan].

Noetling, Fritz. 1894. On the occurence of chipped flints in the Upper Miocene of Burma. *Records of the Geological Survey of India* 27: 101–103.

Noetling, Fritz. 1897. On the discovery of chipped flint-flakes in the Pliocene of Burma. *Natural Science* 10 (62): 233–241.

Oldham, R.D. 1895. The alleged miocene man in Burma. *Natural Science* 7 (43): 201–202.

Oppenheimer, Stephen. 2009. The great arc of dispersal of modern humans: Africa to Australia. *Quaternary International* 202 (1–2): 2–13. https://doi.org/10.1016/j.quaint.2008.05.015.

Pascoe, Edwin H. 1912. *The Oil-Fields of Burma*. Calcutta: Geological Survey of India.

Pautreau, Jean-Pierre. 2007. *Ywa Htin: Iron Age Burials in the Samon Valley, Upper Burma*. Paris: Mission archéologique française au Myanmar.

Pautreau, Jean-Pierre, Anne-Sophie Coupey, Christophe Maitay, E. Rambault, and Aung Aung Kyaw. 2007. Nyaung Gon, des tombes d'enfants de l'âge du Fer. *Journée« Civilisations atlantiques et Archéosciences »* 17: 29–32.

Pautreau, Jean-Pierre, Anne-Sophie Coupey, Christophe Maitay, Patricia Mornais, and Aung Aung Kyaw. 2004. Myanmar: decouverte d'une necropole a Myo Hla. *Archeologia* 411: 12.

Pautreau, Jean-Pierre, Patricia Mornais, Anne-Sophie Coupey, Christophe Maitay, and Aung Aung Kyaw. 2004b. Sondages sur les sites protohistoriques de Myo Hla, Yamethin Township (Mandalay, Myanmar). *Journée « Civilisations atlantiques et Archéosciences » 14*: 26–28.

Pautreau, Jean-Pierre, Anne-Sophie Coupey, E. Rambault, Aung Aung Kyaw, and Ni Ni Khet. 2006a. Htan Ta Pin, un cimetière de l'âge du Fer dans la vallée de la Samon. *Journée « Civilisations atlantiques et Archéosciences »* 8: 52–54.

Pautreau, Jean-Pierre., Anne-Sophie. Coupey, Patricia Mornais, and Aung Aung Kyaw. 2006. Tombes des âges du Bronze et du Fer dans le bassin de la Samon. In *Uncovering Southeast Asia's Past: Selected Papers from the 10th International Conference of the European Association of Southeast Asian Archaeologists*, ed. Elisabeth A. Bacus, Ian C. Glover, and Vincent C. Pigott, 128–136. Singapore: NUS Press.

Pautreau, Jean-Pierre., Anne-Sophie. Coupey, Patricia Mornais, Christophe Maitay, Emma Rambault, Florence Pellé, and Aung Aung Kyaw. 2008. Sépultures des âges des Métaux dans la vallée de la Samon, Myanmar. In *Archaeology in Southeast Asia, from Homo Erectus to the Living Traditions: Choice of Papers from the 11th International Conference of the European Association of Southeast Asian Archaeologists, Bougon, France*, ed. J.-P. Pautrea, A.-S. Coupey, V. Zeitoun, and E. Rambault, 111–118. Chiang Mai: Siam Ratana.

Pautreau, Jean-Pierre., and Aung Aung Kyaw. 2010. *Excavations in the Samon Valley: Iron Age Burials in Myanmar*. Paris: Mission archéologique française au Myanmar.

Pautreau, Jean-Pierre, and Christophe Maitay. 2009. Level of Neolithic occupation Ywa Gon Gyi, a in the Samon Valley (Myanmar). *Journée du CReAAH Archéologie, Archéosciences, Histoire, Rennes* 3: 23–25.

Pautreau, Jean-Pierre., and Christophe Maitay. 2010. Level of neolithic occupation and 14 C dating at Ywa Gon Gyi, Samon Valley (Myanmar). *Aséanie* 25 (1): 11–22. https://doi.org/10.3406/asean.2010.2122.

Pautreau, Jean-Pierre., and Patricia Mornais. 2003. Une protohistoire meconnue, le cimetiere de ywa htin. *Archeologia* 404: 48–56.

Pautreau, Jean-Pierre, Patricia Mornais, Anne-Sophie Coupey, Christophe Maitay, and Aung Aung Kyaw. 2005. Vallée de la Samon: Recherches sur les sépultures de l'âge du fer. *Dossiers d'Archéologie* 302: 56–58.

Pautreau, Jean-Pierre, Pauk Pauk, and Kate Domett. 2001. Le cimetière de Hnaw Khan. *Archeologia* 383: 58–65.

Pradier, Baptiste, Aung Aung Kyaw, Tin Tin Win, Anna Willis, Aude Favereau, Frédérique Valentin and Thomas Oliver Pryce. 2019. Pratiques funéraires et dynamique spatiale à Oakaie 1: une nécropole à la transition du Néolithique à l'âge du bronze au Myanmar (Birmanie). *Bulletin De La Societe Prehistorique Francaise* 116 (3): 539–560.

Pryce, Thomas Oliver. 2019. Initiating discourse on the (multi?) directionality of the Mainland Southeast Asian Bronze Age transition. In *Proceedings of the Ninth International Conference on the Beginnings of the Use of Metals and Alloys (BUMA-IX)*, ed. Jea-Young. Choi and Jank-Sik. Park, 160–175. Busan: The Korean Institute of Metals and Materials.

Pryce, Thomas Oliver, Sandrine Baron, and Bérénice Bellina et al. 2014. More questions than answers: the southeast Asian lead isotope project 2009–2012. *Journal of Archaeological Science* 42: 273–294.

Pryce, Thomas Oliver, Michael Brauns, and Nigel Chang et al. 2011. Isotopic and technological variation in prehistoric Southeast Asian primary copper production. *Journal of Archaeological Science* 38 (12): 3309–3322.

Pryce, Thomas Oliver, Kalayar Myat Myat Htwe, and Myrto Georgakopoulou et al. 2018. Metallurgical traditions and metal exchange networks in late prehistoric central Myanmar, c. 1000 BC to c. AD 500. *Archaeological and Anthropological Sciences* 10 (5): 1087–1109.

Pryce, Thomas Oliver, Aung Aung Kyaw, and M. M. Kyaw et al. 2018b. A first absolute chronology for late Neolithic to early Bronze age Myanmar: new AMS C-14 dates from Nyaung'gan and Oakaie. *Antiquity* 92 (363): 690–708. https://doi.org/10.15184/aqy.2018.66.

Pryce, Thomas Oliver, Aung Aung Kyaw, and Lucy Andia et al. 2015. Dating the Myanmar Bronze Age: preliminary 14 C dates from the Oakaie 1 cemetery near Nyaung'gan. *Journal of Indo-Pacific Archaeology* 39: 38–49.

Rambault, Emma. 2007. Bronze axes from the Samon valley. In *Ywa Htin, Iron Age Burials in the Samon Valley, Upper Burma*, ed. Pautreau Jean-Pierre, 54–56. Chiang Mai: Mission Archéologique Française au Myanmar.

Satt, Kyaw Myo. 2020. Archaeological developments in Myanmar (2016–2018). In *Advancing southeast asian archaeology 2019*, edited by Tan Noel Hidalgo. Bangkok: SEAMEO SPAFA Regional Centre for Archaeology and Fine Arts, pp. 28–31.

Schaarschmidt, Maria, Xiao Fu, Bo Li, Benjamin Marwick, Kyaw Khaing, Katerina Douka, and Richard G. Roberts. 2019. pIRIR and IR-RF dating of archaeological deposits at Badahlin and Gu Myaung Caves–first luminescence ages for Myanmar. *Quaternary Geochronology* 49: 262–270.

Schepartz, Lynne A., S. Miller-Antonio, and D.A. Bakken. 2000. Upland resources and the early palaeolithic occupation of southern China, Vietnam, Laos, Thailand and Burma. *World Archaeology* 32 (1): 1–13.

Swinhoe, R.C.J. 1902. Prehistoric man in Burma. *Zoologist* 6: 321–336.

Swinhoe, R.C.J. 1903. Some further notes on chipped flints at Yenangyoung, Upper Burma. *The Zoologist: The Monthly Journal of Natural History* 7 (745): 254–259.

Tan, Noel Hidalgo. 2014. *Painted sites, sacred sites: An examination of religious syncretism in Southeast Asia through rock art site usage*. Doctoral Thesis, Australian National University, Canberra.

Tan, Noel Hidalgo. 2018. *Advancing southeast asian archaeology 2016*. Bangkok: SEAMEO SPAFA Regional Centre for Archaeology and Fine Arts.

Tan, Noel Hidalgo, and Rachel Hoerman. 2019. Mainland Southeast Asia: rock art. In *Encyclopedia of global archaeology*, 6663–6670. Cham, Switzerland: Springer.

Tan, Noel Hidalgo. 2019a. Rock art in mainland Southeast Asia. In *Rock Art in East Asia: a thematic study*, edited by Jean Clottes and Benjamin Smith. Charenton-le-Pont, France: International Council on Monuments and Sites. pp. 126–147.

Tan, Noel Hidalgo. 2019b. Preliminary report: archaeology education in Southeast Asia. *SPAFA Journal* 3: 1–27.

Tan, Noel Hidalgo. 2020. *Advancing southeast asian archaeology 2019*. Bangkok: SEAMEO SPAFA Regional Centre for Archaeology and Fine Arts.

Tayles, Nancy, Kate Domett, and U. Pauk Pauk. 2001. Bronze age Myanmar (Burma): a report on the people from the cemetery of Nyaunggan. *Upper Myanmar Antiquity* 75 (288): 273–278.

De Terra, Helmut, Hallam Leonard Movius, Edwin Harris Colbert, and J. Bequaert. 1943. *Research on Early Man in Burma*. Philadelphia: American Philosophical Society.

Thaung, N.T., Daw Bo San, and Hla Myint. 1998. The record of the first new finding on the occurrence of anthropoid primates? Pilopithecus in Myanmar. *Myanmar Historical Research Journal* 3: 1–6.

Thaw, Aung. 1969a. Exploring Padahlin caves. *Spectrum* 2 (1): 162–166.

Thaw, Aung. 1969b. The neolithic culture of Padahlin Cave. *Journal of the Burma Research Society* 52 (1): 9–33.

Thaw, Aung. 1971a. The neolithic culture of the Padahlin Caves. *Asian Perspectives* 14: 123–133.

Thaw, Aung. 1971b. The Stone Age culture of Padahlin Cave. *Tekkatho Pyinnyar Padethar Sarsaung* 6 (1): 305–350.

Thaw, Aung. 1976. Current archaeological research in Burma. In *Bronze Culture in Asia*, ed. UNESCO Symposium on Bronze Culture, 81–83. Bangkok: UNESCO.

Thein, Tin. 1997. Stone Age dwellers from Buddhawzinaw Cave. *The Mirror Daily Newspaper*, 19 October 1997:5.

Thein, Tin. 1998. Stone Age dwellers from Moebyae Cave. *The Mirror Daily Newspaper*, 29 April 1998:5.

Thein, Tin. 2000. Evidence of Stone Age dwellers from Waiponla Cave. *Myanmar Alin Daily Newspaper*, 25 June 2000: 5.

Thein, Tin, Aung Naing Soe, Soe Thura Tun, Than Htut, Soe Nyunt, Bo Bo, and Than Tun. 2001. Evidences of Stone Age dwellers in Waiponla Cave. *Myanmar Historical Research Journal* 8 (December): 1–6.

Thein, Tin and Bhumiveda. 2011. *Myanmar Stone Age Culture (Myanmar version)*. Yangon: Sarpebeikman Press.

Theobald, W. 1873. On the geology of Pegu. Appendix: stone implements. *Memoirs of the Geological Survey of India 15*: 355–359.

Tun, Win Nain. 2015. *Prehistory to Proto-History of Myanmar: A Perspective of Historical Geography*. Chiang Mai: International Conference on Burma/Myanmar Studies: Burma/Myanmar in Transition: Connectivity, Changes and Challenges: University Academic Service Centre (UNISERV).

Wang, H.W., B. Mitra, T.K. Chaudhuri, M.G. Palanichamy, Q.P. Kong, and Y.P. Zhang. 2011. Mitochondrial DNA evidence supports northeast indian origin of the aboriginal Andamanese in the late paleolithic. *Journal of Genetics and Genomics* 38 (3): 117–122. https://doi.org/10.1016/j.jgg.2011.02.005.

Win, Kyaw Myo. 2007. *The Excavated Sites between 1903 and 2007*. Yangon: Department of Archaeology, Ministry of Culture.