C6

CHAPTER 6

THE HOABINHIAN: THE LATE AND POST-PLEISTOCENE CULTURAL SYSTEMS OF SOUTHEAST ASIA

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C6.S1

Introduction

C6.P1 Research on the Hoabinhian has added significantly to our understanding of Late Pleistocene and Holocene Southeast Asian prehistory. Although much has been written about the history of Hoabinhian studies, a discussion of the historical background to the concept is worthwhile in order to understand the current state of research (e.g., Bellwood 1977, 1998; Glover 1977; Gorman 1971; Higham 1989; Matthews 1964; Moser 2012; Reynolds 1990; Shoocongdej 1996; Solheim 1969, 1974).

C6.P2 This chapter is organized in three parts. I first present a review of the current state of knowledge regarding the Hoabinhian in the context of Southeast Asian prehistory. Second, I provide information on the variability and distribution of Hoabinhian sites and assemblages. Finally, I discuss the nature and significance of archaeological data from the Late Pleistocene and Post-Pleistocene in Mainland Southeast Asia.

C6.S2

Definition of Terms

C6.P3 Before discussing the Hoabinhian label, I will define the terms to be employed. To examine available information, I will review the archaeological evidence for the Hoabinhian from a holistic perspective. Here, the term "cultural system" is employed purely as a general conceptual framework to help us understand the relationship

between humans and the environment in an empirical setting (Watson et al. 1971). I use the term "cultural system" as an analytical framework to integrate and compare the archaeological evidence from Southeast Asia. I use the term "Hoabinhian" to denote artifacts and assemblages with particular formal characteristics as a convenient way to organize a body of archaeological data within a larger picture.

C6.S3

What Is the Hoabinhian?

C6.P4 The term "Hoabinhian" was first employed by the French geologist Madeleine Colani, a member of the Geological Service of Indochina from 1927. At that time, Colani did not claim to define Hoabinhian as a culture, but rather used the term to describe and report on the archaeological materials that she and Henri Mansuy excavated in Hoa Binh province, northern Vietnam (Matthews 1964:2).

C6.P5 At the first Congress of Prehistorians of the Far East in 1932, she proposed the term "Hoabinhian" to classify these sites as having a common identity, and the term was officially accepted by a special committee to define an archaeological culture. She divided the culture into early, intermediate, and late phases as follows:

C6.P6 Hoabinhian I: flaked implements only, rather large and crude

C6.P7 Hoabinhian II: small implements of finer workmanship, associated with protoneoliths, which are simple artifacts, fashioned from flaked stone or a pebble, with polish confined to the cutting edge

C6.P8 Hoabinhian III: smaller implements, flakes with secondary workings; no protoneoliths (Matthews 1964:1–2)

C6.P9 This classification has been criticized by Matthews (1964) for its lack of a concise definition of types and the difficulties of linking it to archaeological stratigraphy (see discussion in Matthews 1964). It is important to note that diagnostic Hoabinhian tool types such as the "sumatralith" and "short-axe" were not included at this meeting. In recent years however, Vietnamese archaeologists have reexcavated the Hoabinhian sites studied by Colani and confirmed the stratigraphic validity of her three phases (Ha Van Tan 1988).

C6.P10 The term "Hoabinhian" was then widely adopted. Prior to the late 1960s, excavated data from various sites in Southeast Asia had only been classified and compared with the Vietnamese Hoabinhian (van Heekeren 1972) and without the benefit of radiocarbon dating. More recently, European-derived chronological stages, namely Palaeolithic, Mesolithic, and Neolithic, have been applied to Southeast Asian prehistory (Tweedie 1953; van Heekeren 1972). In trying to establish correlations with European archaeological phases, it was noted that artifacts deemed characteristic of the Lower Palaeolithic "chopper-chopping tool tradition" and "polished axes-adzes" thought typical of the Neolithic, are frequently discovered throughout the region. No "microliths,"

diagnostic of Mesolithic culture in Europe, are found in Southeast Asia. Meanwhile, as a comparable stage of development, "Hoabinhian" tools appear morphologically more advanced than Palaeolithic "chopper-chopping" tools. Therefore, the Hoabinhian culture was simply conveniently fitted into this time frame as to become the "Mesolithic" period of Southeast Asia. This construct was further supported by associated faunal remains, which consist of uniformly modern species, and by the fact that there is no evidence of agriculture. Hence the Hoabinhian was viewed as dating to the early Holocene (Matthews 1966:84–86).

C6.P11 In the 1960s and 1970s, a number of archaeologists proposed various new definitions of "Hoabinhian." It was classified as a "culture" (Matthews 1964), an "industry" (van Heekeren 1972), a "tradition" (Dunn 1970), and "technocomplex" (Gorman 1970). Each definition generally shares the same technological traits, chiefly unifacially flaked pebble tools and, particularly, "sumatraliths" and "short-axes." A sumatralith is an ovate pebble with flakes struck from one face only, commonly and originally identified in shell-middens along the east coast of Sumatra and Langsar (Brandt 1976). It was named by van Stein Callenfels and Evans in 1926 (van Stein Callenfels and Evans 1928). A "short-axe" is made from flat and oval pebbles or flakes, flaked only on one face and broken into two halves (van Heekeren and Knuth 1967). In other words, a short-axe is a deliberately broken sumatralith.

C6.P12 In general, using a trait list approach, the Hoabinhian has been traditionally defined by the dominance of unifacial tools made from pebbles or river cobbles and large flakes, especially its sumatraliths and short-axes. However, Hoabinhian assemblages also contain other types of unifacial flaked tools; scrapers, discoid scrapers, choppers, and picks or points, edge-ground stones, large flakes, reused flakes and large amounts of strike debris. Furthermore, at many sites, bone tools and used shell have been found (Ha Van Tan 1976; Matthews 1964; Pookajoorn 1994; van Heekeren and Knuth 1967). Dang Huu Luu (1984) reports that 28 Hoabinhian sites in Vietnam contained bone tools. Unfortunately these bone and shell implements have not received the same attention as the stone tools.

C6.P13 Chester Gorman (1970, 1971, 1972) has compiled much significant archaeological evidence from Thailand, Vietnam, Malaysia, and Indonesia. He suggests that the formal typological approach is not valid for Southeast Asia. He also criticized the use of the term "Mesolithic" because Southeast Asian lithic technology is quite significantly different from that of Europe, as there is no microlithic tradition. Furthermore, he felt that Hoabinhian traits are not representative of material culture of a single group. Instead, he postulated that the regional distribution of Hoabinhian sites reflected common ecological adaptations to the humid tropics of Southeast Asia. Moreover, based on the archaeological data then available and his excavations at Spirit Cave in northern Thailand, Gorman (1970:7–8) proposed six key traits that are present in assemblages traditionally classified Hoabinhian, as follows:

C6.P14 1. a generally unifacial flaked tool tradition made primarily on rounded pebbles and large flakes detached from these pebbles

C6.P15 2. core tools (sumatraliths) made by flaking one side of a pebble and grinding stones, also made on rounded pebbles, usually in association with iron oxide
C6.P16 3. a high incidence of used flakes identified from characteristic edge-damage
C6.P17 4. fairly similar assemblages of food remains including shellfish, fish, and small and medium-sized animals
C6.P18 5. an ecological and cultural preference for the use of rock shelters almost always located near fresh water streams in upland karst topography, but shell middens also indicate at least one other ecological exploited habitat, many more of which have not survived
C6.P19 6. edge-grinding on stone tools and cord marked impressed ceramics occurring individually or in combination in the upper layers of Hoabinhian deposits though perhaps as intrusive elements.

C6.P20 Although Gorman added subsistence economy and settlement patterns as key traits, he still maintained the lithic typology as the major element. He redefined the Hoabinhian as a "technocomplex," following David Clarke's (Clarke 1968:357) definition of that concept. During the late 1960s and early 1970s, the search for the origins of agriculture encouraged Gorman to address this particular question (Gorman 1970). Based on faunal and plant remains from Spirit Cave, he described the Hoabinhian exploitative pattern as broad spectrum hunting, fishing, and gathering, which might demonstrate the transition from hunter-gathering to the early adoption of plant domestication. However, his "origins of agriculture" model (Gorman 1970, 1977) mainly relied on empirical data from China and Thailand.

C6.P21 Consequently, Gorman did not provide an adequate definition and discussion on the processes of plant domestication. Although Gorman used an ecological approach, he had neither explicitly discussed nor demonstrated the diversity and complexity of tropical environments, nor explained why broad-spectrum or generalized exploitation was employed by the Hoabinhian hunter-gatherers. But, as one of the early ecological perspectives, Gorman's "technocomplex" key traits have often been used as the standard for identifying Hoabinhian sites, especially in Thailand (Pookajorn 1988).

C6.P22 Trait lists are usually only a framework for helping archaeologists organize their body of data and observe variability between intra/inter-regional assemblages. The lists typically do not provide specific archaeological implications of socioeconomic changes during the Late Pleistocene and Post-Pleistocene, since we cannot relate archaeological remains to their cultural contexts. The trait lists of the "Hoabinhian technocomplex" alone cannot explain the range of similarities and differences in cultural behavior through material remains. Also, some archaeologists, such as Reynolds (1990:16), have criticized Gorman's six criteria, arguing that "none of the features are sufficiently distinct from features of other industries in the region."

C6.P23 To date, there is no conclusive definition of the Hoabinhian and it has remained an ambiguous term. Almost two decades ago, Hutterer (1977:55–56) questioned the value of this term because there appeared to be no distinctive differences in technology and exploitative patterns between Pleistocene and Holocene hunter-gatherers. Additionally,

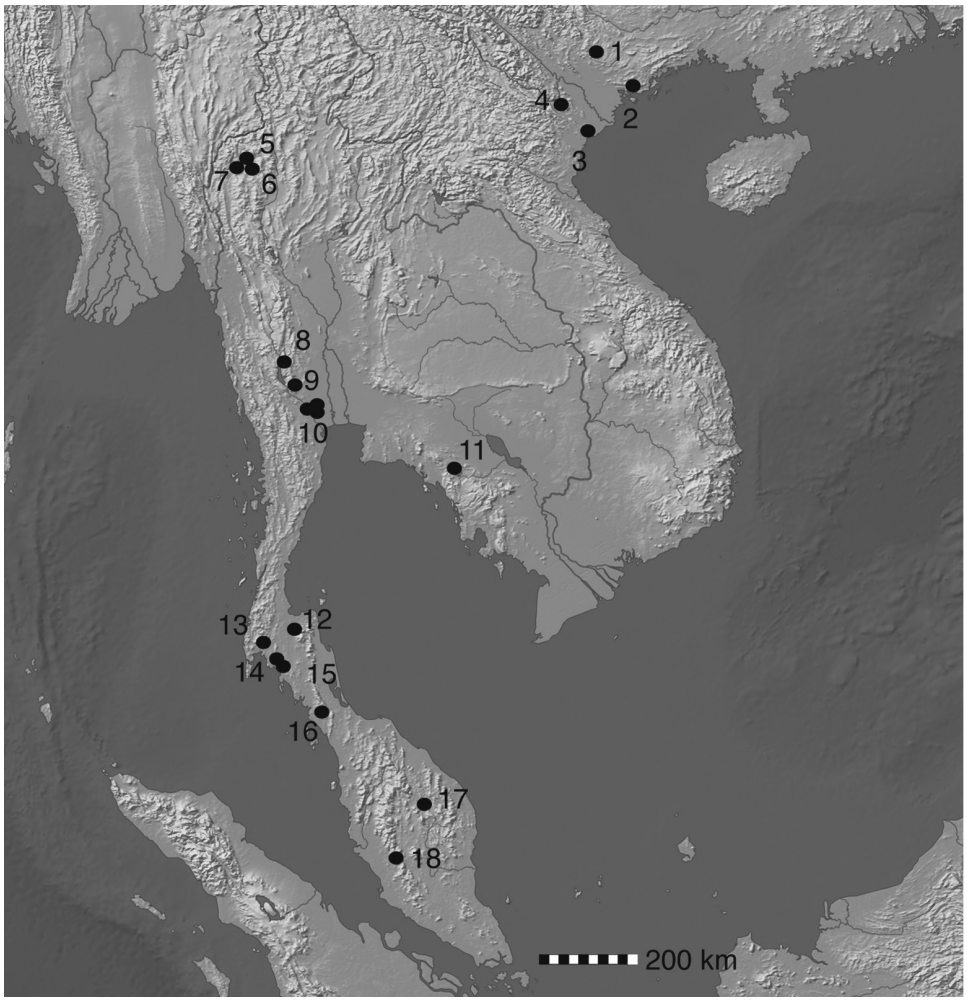
Ian Glover (1977:145) has suggested that, if the term "Hoabinhian" could not be well defined, it should be dropped. However, the term continues to be used by Southeast Asian archaeologists. For example, Vietnamese archaeologists still adhere to most of Colani's definition and classification criteria. For them, the Hoabinhian is defined by the presence of sumatraliths (i.e., unifacial discoids), short-axes, and discoids, which were continuously used in the Neolithic Bac Son culture. Some Thai archaeologists, such as Surin Pookajorn, prefer to retain the term "Hoabinhian" for stone tools and use both "culture" and "technocomplex" definitions interchangeably. Pookajoorn does not clarify differences between these two definitions, nor provide any clear explanation in the way they are used (Brosius 1991:275–277; Pookajorn 1984, 1988). On the other hand, Bronson and Charoenwongsa (1988:9–15) suggest the term is misleading. Nevertheless, they still use it to refer to the "Hoabinhian industry" without providing any explicit distinction. Moreover, they propose a chronological sequence for Thai prehistory that includes a "prepottery" Hoabinhian and a "Hoabinhian with pottery" (Charoenwongsa and Bronson 1988:10). Finally, researchers Bellwood (1985) and Reynolds (1993:6–7) suggest tentative phases for the stone age sequence of Southeast Asia that are primarily based on lithics (i.e., flake or pebble industries). Reynolds also retains the term "Hoabinhian" but uses it in a more narrow sense, specifically defined as a pebble tool industry of the Early Holocene (Reynolds 1990:15).

C6.S4

Hoabinhian as Cultural History

C6.P24 The time frame for the Hoabinhian "cultural history" is the early post-Pleistocene period, called the Mesolithic in many areas of the world, and referred to as the Hoabinhian period of Southeast Asia in the pioneering investigations in northern Vietnam (Colani 1927, cited in Matthews 1966; van Heekeren and Knuth 1967). When Hoabinhian sites were first identified, radiometric dating was not available, hence the term had been created on the basis of lithic typology, from which a basic chronology for the region was subsequently inferred.

C6.P25 From the 1970s to the present we have gained absolute dates from many sites in Southeast Asia, spanning from the Late Pleistocene into the Holocene (Solheim 1969; Dunn 1970; Golson 1971; Gorman 1972; Ha Van Tan 1976, 1994; Bellwood 1998; Bronson and White 1992) (Figure 6.1). In northern Vietnam, archaeologists are currently reexcavating previously studied sites and excavating newly discovered sites. Carbon 14 determinations have been obtained from Hang Cho (c. 20,000 BP), Lang Vanh cave (c. 16,470 BP); Xom Trai cave with twenty dates ranging between 17,000–18,000 BP; and Tham Khuong cave with dates ranging between 33,000 BP and 27,000 BP. Based on carbon 14 determinations, Ha Van Tan (1994:2–3) and Yi et al. (2008:78) have confidently stated that the early stage of Hoabinhian, following the Son Vi culture, should be placed in the Late Pleistocene, and that it belongs to the Paleolithic Age.



C6.F1 **FIGURE 6.1** Hoabinhian sites mentioned in text. 1. Bac Son;, 2. Cai Beo; 3. Da But; 4. Hoa Binh; 5. Spirit Cave; 6. Pha Chan, Banyan Valley Cave; 7. Tham Lod, Ban Rai; 8. Ong Bah; 9. Sai Yok; 10. Khao Talu, Heap, Sai Yok, Lang Kamnan; 11. Lang Spean; 12. Phak Om, Buang Baeb, Khao Khi Chan; 13. Khao Hau Ta; 14. Lang Rongien; 15. Moh Khiew; 16. Sakai; 17. Gua Cha; 18 Gua Kechil (drawn by Chonchanok Samrit).

C6.P26 In Thailand, in the 1960s, van Heekeren compared archaeological evidence from Sai Yok cave to early Vietnamese finds, though no absolute dates were available at that time for Sai Yok. Since the 1960s and after van Heekeren's work, the Hoabinhian has been assigned to the "Mesolithic" period of Thai prehistory. Carbon 14 determinations have come from Spirit Cave, Tham Pa Chan cave, and Banyan Valley cave in northwestern Thailand (Gorman 1972; Bronson and White 1992; Reynolds 1992); Ban Tha Si in northern Thailand (Zeitoun et al. 2013); Ongbah cave (Tauber 1973; Sørensen 1988), Khao Talu cave, Heap cave (Pookajorn 1984) in western Thailand; Buang Baeb cave, Pak

Om cave and Khao Khi Chan cave (Fine Arts Department 1986; Srisuchat 1987), Khao Thao Ha (Chaimongkon 1989), Moh Khiew (Pookajorn 1991), Sakai (Pookajorn 1994), and Lang Rongrien rockshelters in southern Thailand (Anderson 1990), Generally, all the dates fall within the Early to Middle Holocene. The exception is Banyan Valley cave, which is dated to as late as AD 1000–1210 (Bronson and White 1992:489). Recently, the Tham Lod rockshelter, northwestern Thailand, finds have extended the dating back to the Late Pleistocene from 26,000 to 12,000 BP (Shoocongdej 2006), whereas the "Hoabinhian" layer (deposits) at Ban Rai rockshelter dates between 10,200 and 7250 BP (Treerayapiwat 2005). In general, the Hoabinhian period in Thailand dates from 26,000 BP to AD 1200 (Bronson and White 1992; Shoocongdej 2006). The published cultural chronologies all apply the formal established typology of sumatralith, discoid, short-axe, and grinding-stone as diagnostic in defining the Hoabinhian cultural boundaries.

C6.P27 Outside of Thailand, Laang Spean cave, the only well-dated and -documented site in Cambodia, is dated from 11,000–5000 BP to 1200+/-70 (Forestier et al. 2015; Mourer 1977; Mourer and Mourer 1971). Sumatraliths are a common find at this site (Figure 6.2).

C6.F2 **FIGURE 6.2** Sumatralith from Laang Spean (Courtesy: Sophady Heng and Hubert Forestier).

In Laos, over 9,000 Hoabinhian stone tools have been found at Tam Hang rock shelter, dated to between 13,000 and 9300 BP (Patole-Edoumba et al. 2015). Unlike other mainland sites, the Hoabinhian dates in Sumatra, Indonesia and Malaysia do not extend back to the Late Pleistocene. Instead most were occupied from the early Post-Pleistocene to the Middle Holocene (Bellwood 1998:162). For example, dates for the Gua Cha site in western Malaysia range from 6300 to 3020 BP.

C6.P28 To summarize, the time frame of the Hoabinhian period in mainland Southeast Asia ranges from circa 26,000 BP to AD 1200 (Bayard 1984; Bronson and White 1992; Forestier et al. 2015; Ha Van Tan 1988; Patole-Edoumba et al. 2015; Shoocongdej 2006; Taha 1985). However, apart from the Vietnamese and Thai sites, most Hoabinhian sites in Cambodia, Laos, and Malaysia are approximately dated from the end of the Pleistocene to the mid-Holocene. It should be noted that C14 samples are mainly taken from either land snails or fresh water mollusks, and only a few from samples of charcoal (e.g., from Spirit Cave, Tham Lod, Ban Rai, Lang Rongrien). Rudimentary local chronologies exist for most sites, but absolute dating is available only from fewer excavated sites in Southeast Asia (Shoocongdej 1996a).

C6.S5 Where Did the Hoabinhian Come From?

C6.P29 The pioneers of Southeast Asian archaeology were naturally intrigued by the question as to the origins of the Hoabinhian. The presumption of a developmental framework based on a technological progression has been applied to Southeast Asian prehistory. Subscribers of this view see the Hoabinhian as a localized development within mainland Southeast Asian Pleistocene populations. Therefore it is helpful to consider the context of these perspectives on origins. In doing so, we must first turn to the nature of the Pleistocene archaeological evidence. The evidence comes from a consideration of changes which have been found to have taken place in lithic technology between the Pleistocene and the early Holocene.

C6.P30 The state of knowledge on Pleistocene archaeology has been systematically reviewed by Hutterer (1985), Marwick (2009) and Reynolds (1993). There is no unequivocal information from secure archaeological contexts concerning technology or other activity for early hominids prior to the presence of *Homo sapiens sapiens.* The hominid fossils have been found in secondary fluvial deposition, and none are associated with archaeological material (Bartsta 1982; Hutterer 1985). The archaeological evidence currently available generally comes from late and post-Pleistocene sites, often characterized by "amorphous" industries (i.e., geometrically unstructured cores and flakes) (Gorman 1970; Glover 1973; Marwick 2013; Shoocongdej 2006; White and Gorman 2004). Pebble tool industries are the major characteristic of Pleistocene assemblages in Southeast Asia. Hutterer (1985:13–16) proposed that the absence of morphological differentiation in lithic industries can be explained by their tropical context in which stone tools were primarily used for manufacturing and maintaining nonlithic tools, such as those made

from wood, whereas pebble tools represent a generalized tool technology. Furthermore, bamboo may have been one of the major resources for tool manufacture in tropical environments. This might explain the absence of a progression to defined types of stone tools and the continuation of more generalized pebble tools. However, there has been no confirmed evidence of organic material recovered to date (see "Technological System").

C6.P31 Ha Van Tan (1994:6) and Anderson (1990:67–73) argued that during the transition from the Late Pleistocene to the Early Holocene, the Hoabinhian represents a major change in technology from flake to core tool industries. Ha Van Tan suggested that these changes were brought about by climatic and ecological factors. Anderson further suggested a new population as well as environmental changes. These ideas will require further investigation.

C6.P32 The available evidence from mainland Southeast Asia is that the Hoabinhian was preceded by the "chopper-chopping" tool tradition of middle Pleistocene assemblages. Based on excavations from Sai Yok cave, western Thailand, van Heekeren and Knuth (1967:10) compared the Sai Yok assemblages to Movius's Palaeolithic framework and suggested that the Hoabinhian developed from the "chopping-tool tradition" of the lower Paleolithic. In fact, in Thailand there are only two dated sites, in the Lampang and Phrae provinces, that have been found to extend back in time to an earlier Pleistocene period (Pope 1986; Sørensen 1988). Paleomagnetic techniques have dated these sites to approximately 0.73 mya. However, as the pebble tools were collected from old river terrace deposits, the context is insecure for dating purposes. The dating of both sites has remained controversial (Bowdler 1990; Bronson and Charoenwongsa 1988; Marwick 2009; Zeitoun et al. 2013). Other "chopper-chopping tools" have come from elsewhere in Thailand, but most of these finds come from the surface of secondary river terrace deposits and none can be correlated to human fossils and a securely dated stratigraphy (Fine Arts Department 1986, 1987; Malaipan 1972; van Heekeren 1962). On the other hand, isolated teeth of *Homo erectus* have been found in Thailand and Vietnam, though with no cultural association (Ciochon and Olson, 1986; Marwick 2009; Pham Huy Thong 1976).

C6.P33 Well-dated sites from the Late Pleistocene in Thailand are only reported from Lang Rongrien rockshelter (Anderson 1988, 1990, 1997), Moh Khiew cave in Krabi province and Sakai cave in Trang province, southern Thailand (Pookajorn 1991, 1994); Lang Kamnan cave in western Thailand (Shoocongdej 1991a, 1991b, 1996b) and Tham Lod rockshelter in northwestern Thailand (Shoocongdej 2006) (Figure 6.3). In the absence of technological differences in Thailand, absolute dating is the main criterion used to distinguish between "Late Pleistocene" and Hoabinhian assemblages. Lang Rongrien is located 12 km inland from the coast. Its lower level dates from approximately 38,000 to 27,000 BP, and contains hearths, charred bones, choppers, core bifaces, hand adzes, pebble scrapers, unused pebbles, core tools, end scrapers, unused flakes, used and retouched flakes, bone, and antler (Anderson 1990:54–59). The upper level dates to 44,000 BP. This date is older than the lower level because it was formed through the collapse of the rock shelter roof. It comprises a few flakes, charcoal concentrations, and broken fossil bones. Then the middle or Hoabinhian level dates from 8300 to 7700 BP

C6.F3 **FIGURE 6.3** Tham Lod rockshelter (Courtesy: Highland Archaeology in Pang Mapha Project).

and contains bifacial flakes, used flakes, core tools, discoid bifaces, short-axes, hammer stones, grinding stones, polished stone fragments, cores, unused flakes, mangrove mussels, snail shells, numerous deer bones as well as the bones of cattle, chickens, and rats (Anderson 1990:36–53).

C6.P34 Surin Pookajorn and colleagues excavated Moh Khiew cave in phase 2 of their "Hoabinhian Research Project in Thailand." This site is located approximately 8 km south of Lang Rongrien. The lower level dates from circa 25,800 BP to 25,500 BP and contained skeletal remains of an adult female, unifacial and bifacial tools, a large number of waste flakes, bone tools, animal bones, and shellfish (Pookajorn 1994:2–5). The next cultural level dates from 10,530 to 9770 BP and incorporates three skeletons, one buried in a flexed position in association with unifacial cobble and bifacial tools, similar to those from the Hoabinhian sites in Vietnam (Dang Huu Luu 1984; Pookajorn 1994:5), where the artifacts included a similar assemblage (Pookajorn 1994:5–8).

C6.P35 I conducted research at Lang Kamnan cave, located in the Lower Khwae Noi river area in western Thailand (Shoocongdej 1991a, 1991b, 1996a, 1996b). Based on radiometric determinations, geological evidence, and archaeological remains, three major cultural periods have been identified: I—Late Pleistocene, II—Early Holocene, and III—Middle Holocene (Shoocongdej 1996b:198–228). The earliest period at Lang Kamnan cave dates from 12,127 to 10,992 cal. BP. The material culture consists of lithic assemblages, mostly of cobbles including waste cores and flakes and choppers and scrapers made on cores. Small to medium-sized mammals such as flying squirrel, porcupine, bamboo rat, and

deer, and remains of freshwater shellfish and land snail were recovered. The middle period dates from 8956–8180 to 9197–8506 BP. The Holocene archaeological record is similar to that of the Late Pleistocene. Faunal remains of small to medium-sized animals and shellfish have been found. The lithic assemblages are also broadly similar to the other Hoabinhian sites in Thailand (Pookajorn 1984).

Recently I excavated Tham Lod rock shelter in highland Pang Mapha, northwestern Thailand (Shoocongdej 2006). The site has materials dating to the Late Pleistocene and Early and Late Holocene periods. The Late Pleistocene and Early Holocene lithic assemblages comprise waste cores and flakes, used cores including sumatraliths, short axes and flakes, resharpened flakes, hammer stones and many amorphous tools that were found together (Figure 6.4 and 6.5). The faunal remains are particularly varied as they include wild cattle (*Bos javanicus*), other *Bovidae*, wild pig (*Sus scrofa*), deer (*Cervus unicolor*, *Muntiacus muntjak*), serow (*Capricornis sumatraensis*), monkey; macaque

C6.F4

C6.P36

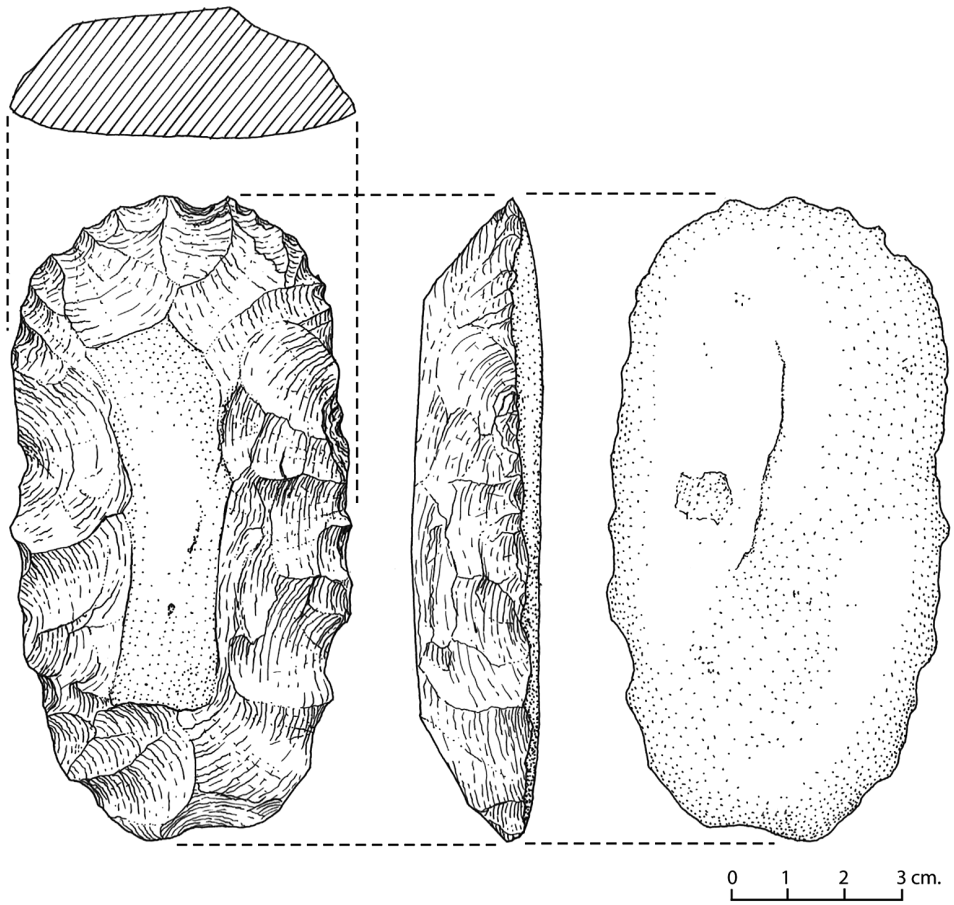


FIGURE 6.4 Sumatralith tool type from Tham Lod rockshelter (Courtesy: Highland Archaeology Project).

C6.F5 **FIGURE 6.5** Hoabinhian assemblages from Tham Lod rockshelter (Courtesy: Highland Archaeology Project).

(*Macaca nemestrina*), langur (*Trachaypithyhecus cristata*), porcupines (*Hystricidae*), rhinoceros, rodents, turtles, birds, and fish (Ampansri 2004, 2005).

C6.P37 The aforementioned evidence from all four caves and rockshelters indicates that the Hoabinhian occupation layers were preceded by a late Pleistocene occupation layer. The next goal for further investigation is to determine whether these assemblages represent continuous development of the same local groups or not.

C6.P38 In Vietnam, Colani had suggested that the Hoabinhian is a late Paleolithic culture contemporary with the Magdalenian culture of France (Ha Van Tan 1991:4). Ha Van Tan argues that the Hoabinhian originated from the Son Vi lithic tradition in Vinh Phu province which went back beyond the Pleistocene–Holocene boundary. This culture is also characterized by a pebble industry (i.e., end and side choppers, scrapers), with the only difference from the Hoabinhian being the absence of sumatraliths. The late Pleistocene lithic assemblages from Nguom rock shelter include pebble and flake tools, which continued into the Hoabinhian layer (Ha Van Tan 1985:81–82), but he concluded that the Hoabinhian is morphologically more advanced than and thus characterized by more skillful workmanship than the indigenous Sonvian culture. He also agrees with Colani that the earliest stage of the Hoabinhian belongs to the Palaeolithic age. Over 120 Son Vi and Hoabinhian sites combining both traditions have been reported from alluvial

terrace and cave sites (Ha Van Tan et al. 1999). The Son Vi is dated from circa 23,000 to 13,000 BP. But Ha Van Tan disputes the clear distinctions of artifacts and assemblages between Sonvian and Hoabinhian made by Reynolds, though he has reported that sumatraliths occur in the late Sonvian phase of some sites. He also concludes that the Sonvian and Hoabinhian coexisted for some period of time within the Late Pleistocene (Ha Van Tan 1994:5).

C6.P39 In Malaysia, Kota Tampan in Perak state is the oldest site, reliably dated to the Middle Pleistocene by Walker and Sieveking (1962) on the basis of its geological stratigraphy. Zuraina Majid (1988, 1990) has reexcavated the site and reinterpreted it as a late Pleistocene "workshop." It has now been dated, by the decay of U238, to 31,000 BP (Majid and Tjia 1990:28) . Excavations have yielded quartzite chunks and large pebbles, anvils, pebble tools, hammer stones, flake tools, unworked flakes, and debitage. No bones or other organic material were reported. Niah cave in Sarawak is also well dated and stratified, its earliest cultural layer dating to the Late Pleistocene, between circa 41,500 and 21,410 BP (Majid 1982:134). Results from the most recent excavation by Barker (Barker et al. 2007) extends dating to 44,750 ± 650 uncal. BP. Faunal remains include "banteng" (*Bos javanicus*), Sumatran rhinoceros (*Dicerorhinus sumatrensis*), Malaysia tapir (*Tapirus indicus*), sambar deer (*Rusa unicolor*), barking deer (*Muntiacus* sp(p).), bearded pig (*Sus barbatus*), leaf monkey (*Presbytis* sp(p).), tree squirrels (*Sundasciurus*), leopard cat (*Prionailurus bengalensis*), bear cat (*Arctictis binturong*), and masked palm civet (*Paguma larvata*) (Piper and Rabett 2009, 2014). Lithics consist mostly of amorphous flakes and a quartz pebble fire striker. The upper layers (Phase II–III) date from about 20,000 to 14,930 +/- 460 BP and are marked by the appearance of chopper-chopping tools, amorphous flakes and similar faunal assemblages. The archaeological evidence thus clearly shows cultural continuity from the Late Pleistocene to the Middle Holocene (Majid 1982; Barker 2005; Barker et al. 2002, 2009).

C6.P40 More excavations in the main chamber of Gua Gunung Runtuh in Perak, by Majid (1994), yielded stone tools from the lower levels, dating to 13,600 BP similar to those found in Kota Tampan; ovate unifacials, hammer stones, and flakes. The levels above, dating to 10,120 BP contained an almost complete human skeleton associated with similar tools (Figure 6.6). Majid (1994:164–167), noted that there were no typological differences in the artifacts and little change in faunal assemblages throughout the occupation from the Late Pleistocene into the Holocene. The faunal remains include monkeys, pigs, monitor lizards, and freshwater shellfish. In general most of the cave or/and rockshelter sites in Malaysia do not seem to have been occupied beyond the Hoabinhian layers of the middle Holocene period.

C6.S6 Hoabinhian Cultural Systems

C6.P41 As demonstrated in the earlier sections of this chapter, the concept of the Hoabinhian can be regarded as highly problematic. But rather than attempt a new

C6.F6 **FIGURE 6.6** Unifacial tool from Gua Gunung Runtuh in Perak, Malaysia, dated to 10,000 years ago (Courtesy: Mokhtar Saidin).

definition, I will reexamine the archaeological evidence from well-dated sites in order to reconsider issues of subsistence, settlement, technology, and possible social systems in late Pleistocene to early Holocene Southeast Asia. It has become clear that the information currently available does not provide an adequate basis for reconstructing Hoabinhian cultural systems across the existing chronologies. Thus, the term "culture" used here can be conceptualized as a system consisting of a number of subsystems related to its environments including subsistence, settlement, technology, and social systems. I use the cultural system to organize the body of archaeological data.

C6.S7 ## Subsistence Systems in Southeast Asia

C6.P42 For the chronological periods in question, a few sites in mainland Southeast Asia have provided faunal and plant remains (Figures 6.7–6.9) (Anderson 1990; Chaimnaee 1994; Conrad et al. 2016, Fine Arts Department 1986; Forestier et al. 2015; Gorman 1971; Ha

C6.F7 **FIGURE 6.7** Spirit Cave (Tham Phii Man): Freshwater crab dactyls (top left), a sambar deer incisor (top right), a tortoise carapace (bottom left), and roundleaf bat mandibles (bottom right) (Courtesy: Cyler Conrad).

Van Tan 1992; Higham 1977; Hoang Xuan Chinh 1991; Kijngam 1990; Schwarts et al. 1994; Majid 1994; Patole-Edoumba et al. 2015; Piper and Rabett 2009, 2014; Pookajorn 1984, 1994; Shoocongdej 1991a, 1996b, 2000, 2006; Taha 1985; van Heekeren and Knuth 1967; Yi et al. 2008; Zeitoun et al. 2013). Small to medium-sized animals, shellfish, and both terrestrial and freshwater gastropods are found in most Hoabinhian sites. The published reports provide species information regarding identification and population which indicate major differences between the exploited resources from coastal sites and inland sites. The former yield marine shellfish, terrestrial snails, freshwater shellfish, and animals. Inland sites contain a variety of terrestrial fauna as well as freshwater shellfish and snails.

C6.P43 Plant remains have been retrieved from a few excavated sites in Thailand, wherein most grow wild today in primary and secondary forests in the area (Yen 1977). But there is no evidence so far, of plant cultivation. Reconstruction of the Paleolithic subsistence economy has been strongly influenced by Gorman's interpretation of a broad spectrum economy or generalized exploitative pattern (1971, 1972). Very little

C6.F8 **FIGURE 6.8** Banyan Valley cave (Tham Phaa Chan): A water buffalo patella (left) and two freshwater pearl mussel shells (right). Scale 2 cm. (Courtesy: Cyler Conrad).

is currently known about the variability in flora or fauna remains from region to region as there is no reference collection for comparative study. Most researchers use the published data from Spirit Cave with which to compare their findings (Pookajorn 1984).

C6.P44 Gorman's "indigenous development model" seeks to explain the transition from Hoabinhian hunter-gathering to food production through changes in settlement patterns. He suggests that upland plateau areas were the most probable natural environments for early agriculture based on the available flora and fauna and proximity to useable water resources (Gorman 1971, 1977). This model lacks support as no evidence of domesticated plants has been found in upland or piedmont sites (Penny 1982; Yen 1977). In my opinion, much more information exists in the archaeological record than is currently being accessed. These were the areas most conducive to hunter-gatherers settlements (Higham 2013:58–59).

C6.F9 **FIGURE 6.9** Steep Cliff cave (Tham Boong Hoong): Hog badger phalanges (top left), a muntjac deer phalanx (top right), a wild boar premolar (bottom left), and lizard mandibles (bottom right) (Courtesy: Cyler Conrad).

C6.S8 ## Settlement Systems

C6.P45 The distribution of Hoabinhian hunter-gatherer occupation sites in caves, rockshelters, and along shorelines as described by Gorman (1971) has led to the assumption that this is the accepted settlement pattern on which research has been focused. The greatest concentration of known Hoabinhian sites are the cave sites found in the limestone mountains along the western border of Thailand and Malaysia and northern Vietnam. It is generally assumed that the cave sites were occupied seasonally during either the wet or the dry season according to the presence of snails, indicating the wet season, or freshwater mussels, suggesting dry season usage.

C6.P46 In terms of site occupations, the Hoabinhian cave/rockshelter assemblages that are found below a "Neolithic" occupation layer infrequently include a burial (Tham Lod, Ban Rai, Ban Tha Si, Mon Khiew, Gua Cha, Hang Dang, Hang Cho, Tham Hang, and Laang Spean), whereas the "Neolithic" cave usage is almost always a burial site.

C6.P47 To date, only a small number of shell midden sites have been excavated in the region. These include Khao Tao Ha and Phi Hoa To in Thailand (Chaimongkon 1989). Other

possible sites exist in southern Thailand, but it is debated whether they came about as a result of human activity or natural processes (Chaimongkon 1989; Prishanchit 1988). In Vietnam, coastal shell middens were occupied by the Da But "Neolithic" populations and functioned as both habitation and burial sites (Ha Van Tan 1988). Whether shell middens indicate seasonal camps or permanent settlement is unclear.

C6.P48 Very few workshop sites have been excavated and documented. Examples include Tham Lod (Shoocongdej 1982), Chiang Kan in Loei province, northeast Thailand (Bayard 1980) and Mae Sod in Tak province, western Thailand (Suksom 1986). These sites provide pebble and flake tools, sumatraliths, short-axes, waste cores, and flakes, but as they are situated along river banks, they cannot be dated with any accuracy.

C6.P49 We have yet to understand the overall picture of settlement systems patterns during the Late and Post-Pleistocene. Data are also lacking from small, open-air locations such as kill and butchering sites. We have no information on group size, site functions, and the density of archaeological remains relative to the length and periodicity of occupation. The interpretation of spatial patterns has thus still not received detailed analysis. Regional surveys have only focused on later prehistoric periods in northeast and central Thailand (Kijngam et al. 1980; Higham and Kijngam 1984; Piggot and Natapintu 1988; Wilen 1989; Welch and McNeil 1991; Mudar 1992). Current work on the late and early post-Pleistocene periods is still focused on specific sites along the western border of Thailand and northern Vietnam. The data for this period are consequently very patchy in distribution, and earlier research was not designed to address how prehistoric hunter-gatherers adapted to their natural environment. Earlier research was also not generally concerned with describing settlement patterns in terms of distribution, density, and interrelations (Flannery 1976; Hutterer and Macdonald 1982).

C6.S9 Technological System

C6.P50 The Hoabinhian is often identified by the dominance of sumatraliths and short-axes as well as by the presence of unifacially flaked tools, edge-ground stones, large flakes, and copious debitage. In addition, bone and shell tools occur at a number of these sites. Bone tools are made mostly from mammalian long bones. Freshwater shells, especially species of bivalves, were also used as cutting implements (Matthews 1964). Bone and shell tools are often found in sites of the Da But culture of Vietnam. There is variability in the usage of raw materials throughout the region, but more documentation is needed. There has been an attempt to divide artifacts into standardized and nonstandardized classes (Nishimura 1994:5–8). Sumatraliths, discoids, short-axes, edge-ground axe-adzes, and grinding slabs are classified as standard, while choppers and massive scrapers fall into the nonstandard class.

C6.P51 We still know little about this Pleistocene technology because most artifacts come from insecure contexts. To date, the question as to whether Hoabinhian technology can be differentiated from the technology found throughout Pleistocene Southeast Asia is

debatable and comparative studies of the entire corpus of lithic assemblages and bone and shell artifacts are needed (Anderson 1990; Gorman 1971; Ha Van Tan 1994; Hutterer 1977, 1985). Although Anderson (1990:72) and Ha Van Tan (1994:6) suggest that there is a clear change in lithic technology from a Pleistocene assemblage that consists primarily of flake tools to a Hoabinhian assemblage that includes a significant component of unifacial tools. However a relatively small number of core tools and waste cores are also found in Pleistocene assemblages. Neither are core tools entirely absent from post-Pleistocene lithic assemblages with the exception of Tham Lod. Moreover, there are various types of sumatraliths (discoid scrapers, discs, and choppers) which occur in other industries occurring in most mainland sites (Reynolds 1989:9).

C6.P52 Previous studies of stone artifacts in Thailand have either concentrated on the pebble tool industry or have dealt with collections from poorly dated surface finds. Contemporary studies of lithics tend to focus on three major problems: classification of tool types, analyses of use-wear in order to infer their functions and, crucially, lithic reduction sequences as an indication of technological sophistication for specific uses.

C6.P53 The majority of the recent studies tends to emphasize the formal typological approach (Pookajorn 1984, 1985; Bronson and Natapintu 1988; Anderson 1990; Ha Van Tan 1994; Nishimura 1994; Reynolds 1990, 1993) and there are a few studies that attempt a detailed investigation of aspects of reduction sequences (Suksom 1986; Ketdhutat 1987; Reynolds 1989, 1992; White and Gorman 2004) and functional aspects through user-wear analyses of core tools (Bannanurag 1989) and flake tools (Pookajorn 1985). These studies limit their analyses to technological and functional aspects of either cores or flakes. Complete assemblages have not received similar attention with the exception of Reynolds (1989, 1992), Shoocongdej (1996b; 2006), Marwick (2008, 2013), Forestier et al. (2015), and Chitkament et al. (2015).

C6.P54 Despite the predominance of lithic artifacts in Hoabinhian technology, it is clear that many fundamental problems remain—for example, the way raw materials were obtained, as well as aspects of manufacture, use, maintenance, discard and changes over time. Also unclear is the process of change, whether deliberate or expedient, and the usage of other raw materials and the overall site function. The relationship of the typology and techniques to the nature of the raw materials needs to be explored in order to understand whether the key characteristics of Hoabinhian tools were achieved by intentional design or were unintended byproducts of a particular reduction sequence. Stone tools are generally assumed to be primarily related to maintenance activities, in particular, for woodworking and the production of bamboo implements (Gorman 1971; Pope 1989). Function can be studied through residue analysis, which may also help to detect the use of plant or animal remains and define stone tool function (Loy et al. 1992). Understanding the functional composition of lithic assemblages relates to a possible understanding of other components of the cultural system. As much attention also needs to be paid to shell and bone technology as stone tools mostly constitute only a small proportion of original technologies (Shott 1986; Nelson 1991).

C6.S10

Social System

C6.P55 I use the term "band" as a conceptual tool to study the social organization of this period. Bands are social groups composed of mobile hunter-gatherers with low population densities, who occupy their sites mainly on a seasonal cycle. Such societies tend to form relatively self-limiting social units, often characterized by an absence of internal social inequality (Fried 1967; Johnson and Earle 1987; Service 1962). Even though no detailed study of settlement patterns has been undertaken, a review of the sites and their distribution suggests that we are dealing with reasonably small, dispersed, and mobile social units. All this is consistent with ethnographic evidence for band organization among contemporary hunter-gatherers as well as with theoretical models of hunter-gatherer organization in tropical environments (Binford 1980; Kelly 1983).

C6.P56 Apart from the density of material remains and settlement data, the archaeological evidence from which to infer the organization of social system is mainly derived from burials. Unfortunately, mortuary data from the Hoabinhian are limited. The few Hoabinhian burials show two types of position; flexed and extended, similar to burials from the "Neolithic" period (Ha Van Tan 1988). Grave goods and food were occasionally associated with the burials. But there is no evidence of differentiation between individuals, perhaps because contextual information from each site is lacking.

C6.P57 A number of burial sites are known from mainland Southeast Asia. Ha Van Tan (1976:135) reports that eight burials were found at Cuc Phuong, three individuals found in Hang Dang and five individuals were found in Moc Long. These burials had been covered in red ocher and associated with lithics and blocks of stone piled around the bodies. Recently, burials have been reported from Mai Da Dieu site, associated with pieces of large and small limestone placed at the base of the burials (Coung Nguyen Lan 1986:12). However there is no information for the context or absolute dating from these sites. Recently, a human skeleton in a flexed position associated with lithic artifacts and molluskan shells from Hang Cho cave in northern Vietnam reveals the biological affinities of Hoabinhian people related to present-day Australo-Melanesian lineage (Matsumura et al. 2008).

C6.P58 In northern Thailand, flexed burials have been reported, such as a female from Tham Lod (Figure 6.10), a male from Ban Rai (Figure 6.11), and a male from Ban Tha Si. At the first two sites, large stones were placed on top of the graves to mark the burial pits. (Pureepatpong 20132016; Shoocongdej 2006; Treerayapiwat 2005; Zeitoun et al. 2013). At Sai Yok, an adult burial was discovered in the upper layer of the preceramic deposit, 1.5 m. below the present surface. Based on relative dating of Holocene animal remains, van Heekeren and Knuth (1967) suggested that this burial belongs to the "Mesolithic" age. The body, in a flexed position, was pillowed on a quartzite boulder and blocks of limestone. A slab of rock limestone had been placed on the upper trunk and red ocher covered the face and chest. This burial was associated with shells and mammalian long bones (van Heekeren and Knuth 1967:63; Jacob 1969:49–50).

C6.F10 **FIGURE 6.10** Late Pleistocene of woman dated to 13640 ± 80 BP from Tham Lod rockshelter (Courtesy: Highland Archaeology in Pang Mapha Project).

AQ: Word missing here? "burial"? "skeleton"?

C6.P59 At Moh Khiew, researchers reported one adult and two child burials from the Hoabinhian layer. The adult was buried in a flexed position with blocks of stone placed over its head and right hand and associated with pebble and flake tools (Pookajorn 1991:8).

C6.P60 In Malaysia, 17 Hoabinhian burials were found at Gua Cha (Taha 1985:62–64). Two adults were buried in a flexed position. The skull of one individual rested on a stone slab and was covered by red ocher. The other adult was covered by two slabs of limestone and one water worn rock of limestone in association with deer or bovid bones.

C6.P61 Burials can provide critical evidence for the nature and scale of social organization through the application of spatial and stylistic analyses designed to infer the size and organization of social groups. To date this has not received as much attention in Southeast Asia compared to the study of prehistoric technologies and subsistence.

C6.S11 Where Did the Hoabinhian Go?

C6.P62 There are two perspectives on post-Hoabinhian developments: internal and external. The former proposes cultural continuity from the Hoabinhian to the "Neolithic,"

C6.F11 **FIGURE 6.11** Early Holocene male skeletal remains dated to 9720 ± 50 BP from Ban Rai rockshelter (Courtesy: Highland Archaeology in Pang Mapha Project).

identified by changes in subsistence, technology, and settlement patterns (Dunn 1975; Dunn and Dunn 1977; Gorman 1971; Ha Van Tan 1976). The external perspective offers the appearance of new technologies; for example, polished stone adze, and subsistence economies that resulted from interaction with new populations (Taha 1985; Bellwood 1993; Headland and Reid 1989).

C6.P63 As a result of the discovery of plant remains, cord-marked pottery sherds and edge-ground tools at Spirit Cave, increasing attention has been paid to the idea that the Hoabinhian might also belong to the "Neolithic" period (Higham 2013; Pookajorn 1984). Gorman listed key traits for a Hoabinhian subcultural technocomplex, characterized by edge-ground tools and cord-marked and burnished ceramics, as found in the upper

layers of the Hoabinhian deposit at Spirit Cave (Gorman 1970:8). This layer has been dated between 8800 and 7600 BP (Gorman 1972). These new elements appear to correspond with a number of other excavated sites in Thailand, including Heap, Khao Talu, Lang Kamnan, Ongbah, and Sai Yok caves in Kanchanaburi province, western Thailand; Lang Rongrien and Moh Khiew in Krabi province; Khao Khi Chan, Pak Om, and Buang Beab in Surattani province; and Sakai in Trang province in southern Thailand. Except for Spirit Cave, these sites date to the Middle Holocene, for example, Khao Talu and Heap date from 4215 to 3420 BP.

C6.P64 In Vietnam the record is quite different from Thailand due to the fact that Vietnamese archaeologists have given different names to their cultural phases, causing confusion. According to Ha Van Tan (1976, 1988), the last stage of the Hoabinhian is the Bac Son culture, which is succeeded by the Da But culture. In general, the former is characterized by pebble tools, edge-ground axes, and pottery. There is no evidence of plant remains at the Bac Son site. The Da But culture represents the "Neolithic" of Vietnamese prehistory and dates from 6500 to 5700 BP. It is named after the site at Da But, in Thanh Hoa province. The site is a domestic midden and contained edge-ground axes, bone artifacts, pottery, utilized shells and remains of buffaloes and pig (Ha Van Tan wrote that these are domesticated animals). The Quynh Van and Cai Beo cultures are also recognized as part of the Hoabinhian period in Vietnam. The Quynh Van sites are found in Vinh province and are characterised by kitchen middens, shouldered axes, and cord-marked and incised pottery. It dates from approximately 4785 ± 75 to 4730 ± 75 uncal. BP (Ha Van Tan 1988:136).

C6.P65 The Cai Beo culture is located around Hai Long Bay's inland and coastal areas, and dates to 5646 ± 60 uncal. BP. It contains pebble artifacts, flakes, shouldered axes and adzes, and incised, cord-marked, and basket- impressed pottery.

C6.P66 Current excavations at Laang Spean in western Cambodia identified a Neolithic level with burials above the Hoabinhian level that dated between 11,000–5000 BP (Forestier et al. 2015).

C6.P67 In Malaysia, Adi Taha (1985:71–75) suggests that there is no evidence that the Neolithic evolved locally from the Hoabinhian level at Gua Cha cave, which dates from ,300 to 810 cal. BP. He also suggests that the new types of artifacts (i.e., pottery) might indicate interaction with other groups in coastal Malaysia and southern Thailand.

C6.P68 To sum up, new materials from later traditions, notably pottery and grinding stones, have been recovered above Hoabinhian layers in a significant number of sites and these generally date to the Middle Holocene.

C6.P69 Problems arise because these materials are often found in rockshelters where the deposits have been seriously disturbed by transformation processes that have not received much attention among Southeast Asian archaeologists. It is possible that in most cases, potsherds were moved from the upper layers to a Hoabinhian layer, meaning that the transition from Hoabinhian to Neolithic requires clarification. The lack of clear stratigraphic boundaries means that it is difficult at present, to offer secure interpretations of "post-Hoabinhian" developments.

C6.S12

Discussion and Conclusion

C6.P70 The following problems concerning the Hoabinhian have been demonstrated in the light of available archaeological evidence, and will need to be addressed as research moves forward.

C6.P71 First, only a few excavated sites have been securely dated out of the many and varied sites across the region. Thus, the few local sequences of these sites are used to represent the regional sequences throughout Thailand and Southeast Asia (Bellwood 1998; Higham 1989, 2012; Higham and Thosarat 1998). In addition, relative dating remains the main chronological approach in Thai archaeology and elsewhere in the region, based on formal typological criteria.

C6.P72 Second, fully detailed site reports with complete data sets on stratigraphy, artifacts, and fauna should be made available to all researchers in order to establish a common cultural chronology. Very little radiometric dating and systemic analyses of total assemblages has been done so far, apart from the attention given to lithic assemblages. The same degree of attention needs to be applied to other classes of data from Hoabinhian sites, such as fauna and flora, raw materials, human remains, and the variability of assemblages across the geographical range of these sites.

C6.P73 Spirit Cave is often used to represent the Hoabinhian for the whole region, especially in Thailand. Care should be exercised in using interpretations from Spirit Cave to represent a region where variability is now known to be present in local and regional contexts.

C6.P74 Third, a holistic view of late Pleistocene and Holocene culture should be applied to methods of explaining how cultural systems work within obvious limitations to balance the attention focused on technologies.

C6.P75 Fourth, further investigation is needed into changes in lithic technology through the Pleistocene in terms of raw materials available in seasonal and rainforest environments by comparing entire assemblages and the variations in raw materials. For example, the late Pleistocene sites in the Malay peninsula share similarities with island sites. For example, in Indonesia their lithic technologies are almost uniformly characterized by flake assemblages (Bellwood 1995; Glover 1981), as is also true in the Philippines (Fox 1970; Neri et al. 2015; Mijares 2007; Rabett 2005; Pawlik 2004). In mainland Southeast Asia, it is amorphous pebble tools that persist throughout the Holocene. Focusing on the study of tool types has not, in itself, helped to establish a consistent typological sequence for the region. The factors that would explain the sequencing of this distribution will require qualitative and quantitative studies of entire assemblages (Hutterer 1977).

C6.P76 Fifth, besides cave sites, we need fine-scale chronological control *of excavation* for different settlement patterns including habitation, temporary camp, field and workshop sites, which could indicate the duration of occupation. Regional surveys could address questions of group mobility *strategies* in relation to resource exploitation based on faunal remains and lithic assemblages and could investigate the regional context of sites. This broad-based methodology could provide a more systematic explanation of seasonal settlement changes as part of a changing subsistence economy.

C6.P77 Most chronological frameworks used in Southeast Asia depend on the underlying assumption that change from one "stage" to another occurs in a uniform sequence in time and space (Hutterer 1976). For example, it is assumed that the Hoabinhian preceded the Neolithic, or that polished stone preceded metal implements and that these cultures or technologies could not have coexisted. Archaeological evidence has shown that in some areas, Hoabinhian populations survived into the Late Holocene and coexisted with Neolithic and Metal Age societies. Ethnographic evidence from Southeast Asia indicates that cultures with very different social and subsistence organization may coexist.

C6.P78 Finally, caves and rockshelters can be very complex places to study because the stratigraphy is liable to disturbance from natural and cultural process (Straus 1990). The ways in which site formation occurs in caves and rock shelters will need much more attention in this area. Understanding this is of critical importance to the development of cultural chronologies and the interpretation of site use, as it cannot be assumed that cave deposits lie in order from past to present. Previously dated cave sites may need to be reevaluated from this perspective. This could help to establish clear boundaries for late Pleistocene and early Holocene cultural layers as well for the transition from Hoabinhian to "Neolithic."

C6.S13

Summary

C6.P79 On the one hand, the Hoabinhian shares the same archaeological evidence for subsistence, settlement, and technology with the Late Pleistocene, Middle Holocene, or "Neolithic" cultural contexts. On the other hand, it would appear that there are differences in the archaeological record between regions. This chapter has demonstrated the complexity of the late and post-Pleistocene record. A simple definition of the Hoabinhian concept with regard to tool types or settlement patterns should be reevaluated. Compared to a few decades ago we are now able to interpret, with far more confidence, the current archaeological record concerning the nature of the Hoabinhian culture and its place in the prehistory of Southeast Asia.

C6.S14

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