SCIENTIFIC REINVESTIGATION OF THE ROCK ART AT GUA TAMBUN, PERAK
Vol 1: New Research

by

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Tan, N. H., & Chia, S. (2009, December). *Current research on the rock art at Gua Tambun*. Presented at the 19th Congress of the Indo-Pacific Prehistory Association, Hanoi, Vietnam.

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Tan, N. H. (2008, July). *Shedding new light on old paintings*. Presented at the National Archaeology Seminar, Penang, Malaysia.

Tan, N. H. (2008, June). *Revisiting the rock art at Tambun*. Presented at the 2nd USM Penang International Postgraduate Convention 2008, Penang, Malaysia.

PENGKAJIAN SEMULA SAINTIFIK LUKISAN GUA

DI GUA TAMBUN, PERAK

ABSTRAK

Kajian ini menelaah penyelidikan terbaru yang telah dijalankan di Gua Tambun, Perak, sebuah tapak lukisan gua di Malaysia. Tapak ini, yang pertama kali dilaporkan pada tahun 1959, merupakan sebuah pelindung gua yang mengandungi beberapa variasi lukisan gua berwarna merah, oren dan ungu. Lukisan-lukisan ini juga menggambarkan pelbagai bentuk manusia dan hidupan liar. Namun begitu, sejak tapak ini ditemui 50 tahun yang lalu, kajian mengenai tapak ini tidak seberapa disebabkan kesukaran dalam menangani masalah-masalah penyiasatan dan pengertian lukisan-lukisan gua ini. Sehubungan itu, tujuan kajian ini dijalankan adalah untuk menghasilkan kajian yang ilmiah lagi mendalam mengenai lukisan-lukisan yang telah dijumpai di Gua Tambun. Di antara kaedah-kaedah yang digunakan untuk merealisasikan matlamat ini adalah melalui penciptaan rekod dan inventori lukisan-lukisan di Gua Tambun, pigmen-pigmen yang telah digunakan agar dapat mentarikh dan menentukan teknologi pelukis-pelukis Gua Tambun serta perbandingan dan penentuan persamaan bentuk lukisan gua yang telah dijumpai di tapak-tapak lukisan gua yang lain terutamanya di Selatan Negara Thai. Melalui kajian ini, sebanyak 640 elemen lukisan gua – kebanyakanya dilihat dengan mata kasar – berjaya direkod and dikatalog berbanding laporan-laporan awal yang hanya menemui 50-80 elemen lukisan gua. Kesemua 640 elemen ini telah diperincikan di dalam jilid 2 kajian ini. Di sampling itu, banyak lagi lukisan berpanel kecil telah dijumpai tersebar di sepanjang dinding gua yang sebelum ini tidak pernah dilaporkan. Analisis pigmen-pigmen lukisan ini turut mengesahkan andaian awal bahawa sebahagian daripada lukisan-lukisan gua ini telah menggunakan hematit tem-

patan sebagai cat lukisan. Gipsum - sebuah bahan baru – juga berjaya dikesan di atas beberapa lukisan gua ini walaupun asal usulnya tidak dapat dikenal pasti. Sementara itu, perbandingan lukisan di antara Gua Tambun dan kelompok lukisan gua yang lain di kawasan Phang Nga, Selatan Negara Thailand, tidak mununjukkan hubungan di antara kedua-dua kawasan ini. Sebaliknya, kajian ini telah mengesahkan anggapan penyelidik awal di Gua Tambun dan mencadangkan beberapa teori baru yang dapat menentukan pentarikhkan lukisan Gua Tambun, identiti pelukis-pelukisnya serta identifikasi yang tepat berkenaan bentuk dan rupa lukisan-lukisan yang terdapat di tapak itu. Di dalam kajian ini, saya juga berhujuh bahawa untuk lukisan gua pada zaman Neolitik adalah lemah kerana terdapat ciri-ciri lain yang mencadangkan bahawa pentarikhan lukisan gua dersebut adalah lebih tua. Selain itu, kajian ini mencadangkan bahawa berdasarkan lokasi Gua Tambun, pelukis-pelukis asal kemungkinan besar berasal dari suku kaum Senoi atau Negrito (Semang) yang telah lama mendiami kawasan ini di antara 2,000 hingga 50,000 tahun dahulu. Walau bagaimanapun terdapat penunjuk yang mencadang bahawa lukisan ini kemungkinan dilukis oleh suku-suku kaum yang lain kerana terdapat beberapa variasi besar berbentuk antropomorfis yang dilukis merentangi fasa-fasa budaya yang berlainan. Melalui pengunaan sistem kriteria yang diperolehi daripada penggambaran ciri-ciri haiwan seperti tapak kaki, tanduk dan ekor, kajian ini menyelidik semula interpretasi awal Matthews yang mantafsir bentuk-bentuk haiwan seperti ‘dugong’, ‘harimau’ dan ‘tapir’. Saya turut mendebat bahawa ciri-ciri fizikal ini tidak semestinya muktamad seperti yang dinyatakan oleh Matthews; sebagai contoh, lukisan ‘rusa’ sinar X yang dijumpai di tapak ini lebih tepat ditafsir sebagai ‘Southern Serow’ atau kambing gurun (*Mountain Goat*). Tambahan pula, analisis-analisis penindihan lukisan gua ini menunjukkan kehadiran sekurang-kurangnya tujuh fasa budaya yang berbeza pada panel lukisan gua yang utama (Panel

C), yang mencadangkan bahawa Gua Tambun pernah digunakan pada tempoh yang panjang. Justeru, penemuan-penemuan kajian ini mencadangkan bahawa hasil lukisan gua di Gua Tambun merupakan sebuah proses kompleks yang pada tahap logistik pernah melibatkan berbagai-bagai pelukis yang memerlukan perancangan yang teliti pada tempoh masa yang berlanjutan.

SCIENTIFIC REINVESTIGATION OF THE

ROCK ART AT GUA TAMBUN, PERAK

ABSTRACT

This study presents the findings of the latest research conducted at the rock art site of Gua Tambun, in Perak, Malaysia. Gua Tambun is a rock shelter overlooking the city of Ipoh and it contains numerous paintings including depictions of wildlife and human forms in various shades of red, orange and purple. However, since its initial 'discovery' some 50 years ago, little research has been carried out at Gua Tambun because of the traditional difficulties in investigating and understanding rock art. The aims of this study is to expand the current knowledge about the rock art at Gua Tambun by creating a record and inventory of the site; conduct investigations into the nature of the rock pigments used to create the paintings; make comparisons with other rock art in the region, particularly in Southern Thailand to seek similarities in form; and to determine the date, technology and authorship of the rock art. Where early reports have estimated the number of 50-80 paintings present at the site, a staggering 640 individual rock art elements were recorded and catalogued, many of which were barely visible to the naked eye. Data on each of the 640 elements is presented in Volume 2 of this study. In addition, rock art was also found in many other smaller panels distributed along the walls of the shelter that were previously not reported. Analysis of the pigments confirmed an early assumption that at least some of the rock art were painted using haematite of local origin. Gypsum was also detected in some samples but its origin is uncertain. Comparisons with the nearest cluster of red-hued rock art in the region, in the Phang Nga region of Southern Thailand, revealed no significant similarities to Gua Tambun. This study confirms some of the initial assumptions made about the rock art

by earlier researchers, such as the composition of some of the paint pigments and the effects of weathering on the rock art and proposes several new theories about the age of the rock art at Gua Tambun, their authorship and the identification of animal forms. I argue that the existing reasoning for the site's Neolithic dating is weak, and that there are indicators that the site may be older. Related to the question of age is the authorship of the site; the location of Gua Tambun suggest a Senoi or Negrito (Semang) *Orang Asli* group authorship, and these peoples are estimated to have inhabited this region for at least 2,000 and 50,000 years respectively. Complicating the question of authorship are indications that the rock art appears to have been painted by multiple culturally-distinct groups of authors, because of the large variation in the anthropomorphs depicted over different cultural phases. Using an criteria-based system derived from the depiction of animal attributes such as hooves, horns and tail embellishments, I also revise some of the initial animal interpretations offered by Matthews: figures interpreted as the 'dugong', 'tiger' and 'tapir' do not reflect the physical characteristics of actual dugong, tiger and tapir; while the embellishments depicted on the x-ray 'deer' suggest that the Southern serow, or mountain goat, may be a better fit instead. Analysis of the superimpositions observed in the rock art indicated the presence of at least seven distinct cultural phases on the main panel of rock art (Panel C), which suggests that Gua Tambun was used over a long period of time. The findings in this study suggest that the creation of the Gua Tambun rock art was a complex process that on a logistical level involved multiple artists and required a degree of planning over an extended period of time.

CHAPTER 1

INTRODUCTION

In 1959, the rock art site of Gua Tambun was reported by Matthews, then-curator of the National Museum in Kuala Lumpur, in the journals Malaya in History (Matthews, 1959) and anthropological journal Man (Matthews, 1960). Up until then, most of the rock art sites known in Southeast Asia were situated in the eastern Indonesian islands of Borneo and Sulawesi. The discovery of rock art in Perak was hailed as a 'missing link' between the rock art sites found in India and Australia. While the Gua Tambun discovery was reported in the midst of other similar discoveries such as the Painted Cave in Niah, Sarawak and Tham Roob in Thailand, rock art rarely piqued the professional interest of early antiquarians and archaeologists. To that extent, while rock art in Southeast Asia continued to be reported in different parts of the region, it was rarely studied in detail. This study is an attempt to make a systematic study of one rock art site, that of Gua Tambun in Perak, using archaeological method and theory to expand the field of rock art research in Southeast Asia. As an introduction, this chapter will discuss the history and literature of Gua Tambun, overview the research questions and methodologies used for the study, and outline the general shape of this study.

The term 'rock art' is fairly new to the archaeological lexicon and also misleading, particularly, the usage of 'art' carries a connotation of visual aesthetics; the material form of expression meant for public display and consumption. Anthropologically, however, definitions of art are not so clear-cut, and many artefacts defined as 'artistic' do not have an aesthetic purpose as much as a ritual or communicative function.

Descriptions of rock art have been variedly named in Southeast Asia to include rock paintings, cave paintings and local translations thereof. Some scholars (Chippendale & Taçon, 1998a:6; see also Chippendale & Taçon, 2006) have proposed the adoption of the term 'rock-art' to symbolise the nuanced view of this material; such a term has not yet achieve wide usage yet and the term 'rock art' (without the hyphen) is used in this thesis. This study also follows the terms of reference used by the International Federation of Rock Art Organizations (IFRAO), which defines rock art as "non-utilitarian anthropic markings on rock surfaces, made either by an additive process (pictogram) or by a reductive process (petroglyph)" (Bednarik 2007:209). Implied from IFRAO definition are two broad classes of rock art – pictogram and petroglyph. Due to the nature of the Gua Tambun rock art, I will also refer to them as 'rock paintings', which is defined as a class of pictogram whose creation involves the addition of some other materials such as paint.

1.1 GUA TAMBUN

Early references to Gua Tambun do not refer to the rock art site itself, but to Gunong Panjang ('The Long Mountain'), the limestone massif in which it sits. Ingham and Bradford (1960:289) note that the iron ore in Gunong Panjang was known as early as 1921 and was considered to be of high grade, consisting of 68-69% metallic iron. Malayan Geological Survey Geologist Paton (1957) also conducted a survey of the iron ore deposits at Gunong Panjang and noted the mining works by the Malaya Mining Company at Gunong Panjang. A map of mineral resources in the Ipoh region (Scrivenor *et al*, 1957) shows five iron ore deposits surrounding Gunong Panjang, while Bean (1969:25) notes only two major deposits: the larger deposit is located in the northern

part of the mountain, while a smaller one is located in the western side. The reference to iron deposits at Gunong Panjang is significant because it becomes relevant during the analyses to determine the composition of the paints.

Mention of the rock art first appears in 1959, in a report by Matthews in the journal Malaya in History. There, he published a preliminary report about the discovery of the site. His initial identifications of the figures portrayed in the paintings include a 'dancing man', 'tiger', 'tapir', 'dugong' and 'sambur deer' (Matthews, 1959). Matthews noted the scarcity of rock-paintings known in Southeast Asian during that time, mentioning in particular the examples in New Guinea, Celebes and the lesser Sundas (van Heekeren, 1957), as well as Evans' (1937) earlier reports of the Negrito rock art in Lenggong, Perak. Matthews (1959:25) also mentions the existence of haematite-stained granite grinding stones on a ledge underneath the paintings, which remains the only mention in any of the related literature about such tools. The next year, Matthews' published a slightly longer report in Man (Matthews, 1960), which remains the primary source of information about the site. Some of the more salient details are outlined here.

Attributing the discovery of the rock shelter to Rawlings of the 2nd Battalion Gurkha Rifles, Matthews notes that the original floor of the rock shelter was extensively quarried by Chinese cultivators harvesting guano for fertilizer. Matthews (1960:5) indicates the presence of smaller paintings towards the northern and southern ends of the shelter, and although there were no accompanying pictures, he suggested that these paintings "may indicate the limits of an extensive and continuous mural which has partly disappeared".

Stylistically, Matthews identifies three distinct aesthetic styles utilised in the art, which are painted using haematite and rendered as various shades of red, orange and purple. The first style identified is outlined animals filled with lined or striped design; the second style is figures in solid silhouette, while the final is a stippled silhouette. Matthews singles out an anthropomorphic figure whose headdress closely resembles a kind of headdress worn by Harun the Aboriginal Negrito observed by Williams-Hunt (1952, Figure 3 & Plate 3). Consultations with other scholars in the region yielded stylistic similarities with rock art in Australia, South and Central India, and the South Celebes in Indonesia (Matthews, 1960:5). However, Matthews did not suggest a uniform stylistic tradition with these regions.

Slightly north of the main painting cluster, Matthews mentions a tree whose root system possibly lies at the original level of the cave where excavations were conducted. Stone flakes were found, along with the bone and shell fragments from assorted wildlife. A number of these bones were observed to be burnt, and the collective artefact assemblage was said to be strongly associated with the Hoabinhian industries found in Malaya. The material culture associated with Gua Tambun, which was reported by Matthews, includes a collection of 49 granite and quartz river stones, eleven worn by apparent grinding while 32 have been stained by haematite. However, Matthews reported that there was no positive association between the artefacts found and the paintings themselves. Besides the foreign granite and quartz stones, five flakes and flaked artefacts of hornsfel schist were identified and associated in a Hoabinhian context. There is no mention as to where these excavated remains are stored currently, as well as the granite grinding stones mentioned in the 1959 report. To date, only three artefacts have been traced to the National Museum, but these were recovered in 1984.

Enquiries to the Perak Museum in Taiping and the Heritage Conservation Centre in Singapore have also thus far proved fruitless.

According to Haji Jalil Osman (personal communication, February 11, 2009), a former museum staff who accompanied Matthews to Gua Tambun in 1959, there was no investigation into the role of the aboriginal population, or *Orang Asli*, with regards to the rock art due to threat of communist insurgents who waged guerrilla warfare from the jungles of Perak. Time in the field was limited because of safety concerns, especially since Matthews, being a Caucasian member of the team, was a security risk as he presented an obvious target for abduction or attack. The location of *Orang Asli* settlements were also not known at the time, as thus the team were unable to question any local *Orang Asli* about the rock art. It appears that *Orang Asli* settlement patterns have since changed a great deal, with rapid modernisation leading many aboriginal groups to live in permanent settlements. However, Faulstich (1984:141) reports that the area is traditional lands of the Semai *Orang Asli* group.

In 1962, the famed Danish explorer Count Eigil Knuth published a paper making comparisons between Gua Tambun and Tham Roob, the site discovered by Knuth during the Thai-Danish survey. Tham Roob is situated in Northwest Thailand near the mountains bordering Myanmar, some 1,000 km north of Gua Tambun. Knuth postulated a significant relationship between Tham Roob and Gua Tambun because of their geographical position – in that they were the two rock art sites known within the Southeast Asian mainland at the time and made an assumption that their antiquity was the same, or at the very least that the people who were responsible for Tham Roob "must have made it an advanced station for such southbound migrations" (1962:3).

Knuth (1962:3) drew striking similarities over the physical qualities of both sites, in that they were situated on cliff-faces with their rock paintings exposed over tree-tops – thus lending both sites an air of "monumentality". To that extent, Knuth was inclined to interpret Gua Tambun and Tham Roob as "oracle" sites. Tham Roob has since not appeared anywhere else in the English-language rock art literature, although since Knuth's discovery many more rock art sites have been discovered in Thailand. Most of the literature about Thai rock art has been written in Thai, however, and remains inaccessible to the author.

It is significant to note that the name 'Gua Tambun' does not appear in the reports by Matthews and Knuth, who both referred to the limestone mountain formation Gunong Panjang. However, by the late 70s the name 'Gua Tambun' had been in use and was gazetted and protected under the Antiquities Act 1976, and is currently in the process of being gazetted as a heritage site under the National Heritage Act 2005.

New research at Gua Tambun emerges some 20 years later in 1984, when Paul Faulstich wrote a preliminary report on the rock art at Gua Tambun for a proposed study. Faulstich (1984:141) makes first mention of the possible link between Gua Tambun and the aboriginal Semai tribe who fall under the Senoi culture subdivision. This link is on the basis that the site is located along the traditional inhabitation boundaries of the Semai, but there has yet been any effort to make direct connections or ethnographic studies with the Semai (or any other aboriginal group) to the rock art. Faulstich associates the 'squatting' figure with similar ancestor cult rock art by agriculturalists from Southern China, which in turn suggests that the creators of the rock art at Gua Tambun were agriculturalists. While this hypothesis fits in nicely with earlier position of Senoi

authorship, since the Senoi also practice shifting cultivation, Faulstich writes that the link is so far conjectural.

Faulstich also writes about the x-ray style paintings, which can be found in India and Australia, but is not well-known in Southeast Asia, and thus may be a marker for cultural transmission. Lommel (2000) suggests that x-ray style rock art is a shamanistic motif that has reached Northern Australia by way of Asia through Siberia. His conclusions seem to be based more on stylistic similarity rather than archaeological evidence. Faulstich (1990:125) further expanded his ideas on the x-ray style art in a paper in the Bollettino del Centro Camuno di Studi Prehsitorici, noting that the x-ray style art is only a small proportion of the paintings at Gua Tambun – no more than a dozen – and only the image of the 'pregnant' deer contains an actual depiction of x-ray art. Comparing the x-ray style rock art of India, Australia and Gua Tambun, Faulstich concludes that the lack of chronological development in Gua Tambun indicates that the x-ray art was not developed *in situ* but probably introduced, and that the flow of diffusion, if indeed the style was imported from Australia or India, remains unclear because of the lack of secure dates in all three regions. However, he notes that the poor state of conservation of the rock art suggests that they are of considerable age.

The result of Faulstich's 1984 survey culminated in a report deposited a year later at the National Museum in Kuala Lumpur, which details recommendations for the conservation and management of the site (Faulstich, 1985). The possible options for conservation and preservation were reviewed; many of the newer "high-tech" solutions such as the treatment of the rock surface with moisture barriers and chemical treatment of the paintings were not recommended because of the lack of research into the long-term

effects of such treatment. Options to restrict access such as closing the site to visitors and erecting fencing at the base of the rock wall were also not recommended because they were deemed unfeasible. Other recommendations such as graffiti removal and the construction of walkways were carried out, but incorrectly or incompletely implemented. For example, Faulstich recommended that graffiti should be removed instead of painted over (1985:5) but there is evidence at the site that patches of the rock wall near the floor have been painted over with grey paint contrary to the recommendations. One notable recommendation that seems to have been ignored is the establishment of an archival record for the site, particularly since conservation practices only serve to delay, but not reverse, the eventual deterioration of the site. It is hoped that this study will provide the necessary baseline documentation for the Gua Tambun rock art.

The same year that Faulstich's conservation and management recommendations were deposited with the National Museum, the museum embarked on a project to preserve the rock art. The national daily newspaper New Straits Times quoted curator Paiman Keromo saying that the team's goal was to make tracings for documentation, as well as make grooves on the rock surface to run off flowing water (Kam, 1985). The team also reportedly cut some of the stalactites that were deemed to pose a danger to visitors and the article carried a photograph of one of the museum staff tracing outlines of the rock paintings with chalk. These tracings and the results of the National Museum study do not appear to have been made publicly available.

While the site has never been dated, a general consensus seems to have emerged that the paintings of Gua Tambun were of the Neolithic period (Nik Hassan & Moore, 1998; Zulkifli, 2003; Adi & Zulkifli, 2004). Adi and Zulkifli (2004) mention that Mat-

thews attributed the site to the Neolithic, although my reading of Matthew's material reveals no such assertion. It may be possible that the Neolithic date may have arisen from the surface finds of cord-impressed pottery recovered from the site in 1984 (Adi, 1992; Faulstich, 1990). Furthermore, Zulkifli (2003:141) suggests that the paintings are evidence for a "more sophisticated Neolithic society", reflecting the life and economic activity of past people.

Another general belief concerning the age of the paintings involves the fact that Gua Tambun is the main red-coloured rock art site in Peninsular Malaysia - besides Gua Cerita in Langkawi, which is dated to the historic period - while the other sites are rendered in black, probably from charcoal. Given that there have been ethnographic examples for some of the black-coloured sites (Evans 1927; Williams-Hunt 1957; Sanim, 2006), the general assumption is that red-coloured sites are older than the black-coloured ones. This assumption has also not been tested as there are no absolute dates published for any black-coloured rock art site in Peninsular Malaysia.

Despite being more recent, Faulstich's work seems to be cited less in recent literature due to the poor availability of rock art research and literature in this region. It was only because I was in direct contact with Dr. Faulstich that I was able to access his work. Literature pertaining to Gua Tambun produced in the last two decades tends to re-state the initial observations made by Matthews. Despite Matthews' (1960:2) caution that any attempt to identify the animals "specifically" would be "unwise", the more recent work of Yong (1989), Datan (1998), Ahmad (1998), Chen, (2001) and Adi & Zulkifli, (2004) perpetuate the tentative identifications of 'tapir', 'deer', 'tiger', 'wild boar', 'dugong' as actual interpretations. Chen (2001:768) even makes a curious mention

about the presence of positive handprints, which has never been observed, but this may be a misreading of Matthews' description of a "five-fingered drooping design" (Matthews, 1960:1). This author does not share the same identification, nor sees any design that can be described as a positive human handprint in the Gua Tambun corpus. Thus, it can be argued that little new information or understanding has been developed on the Tambun paintings since Matthews first wrote about it 40 years ago.

Recent literature, both academic and popular, has also tended to highlight the need for conservation and further study at Gua Tambun (Yong, 1989; Adi 1992; Datan, 1998). Newspaper articles occasionally highlight the poor state of preservation of the site (Gua Tambun berbahaya, 1996; Lim, 2001; Prehistoric drawings risk being lost, 2006; Koh, 2006), which raises some short-term interest about the site but no long-term action from the authorities. This may be because of the early observations by Matthews (1960) and Faulstich (1985) that the rock art is relatively secure because of its height and inaccessibility.

In summary, the literature about Gua Tambun has tended to be based largely on the initial observations by Matthews (1959, 1960) and supplemented by a secondary, but never fully published study conducted by the National Museum in 1984 and 1985. Despite Matthews' caution about the unreliability of his interpretations of the forms on the rock wall, his identifications of animals have endured in subsequent literature without reference to their speculative nature. No study has been performed on the artefacts retrieved from the site in 1959 and 1984, the majority of which cannot currently be traced within the National Museum. Nothing is known about the exact number and nature of the rock paintings at the site, and the basis for the Neolithic dating of the

site rests on the unsupported assumption of an agricultural society and the discovery of a cord-impressed pottery sherd recovered from the highly-disturbed archaeological context. Finally, conservation and preservation remains a critical issue, as existing conservation and management recommendations by Faulstich (1985) have not been properly executed.

1.2 OBJECTIVES OF RESEARCH

From the reading of literature of the past 50 years since the modern 'discovery' of Gua Tambun, it appears that many of the assumptions and interpretations posited by Matthews (1959, 1960) have been taken at face value, particularly on the interpretation of the animal forms. However, data such as records of the rock paintings and details of the exact number and distribution of the paintings do not exist, and hence it appears that a basic level of research has not been carried out. The aims of this study can be organised into five main themes: Documentation, Physical and Chemical Analysis, Comparison, Dating and Interpretation.

a. Documentation: Documentation plays a primary role in this study as the exact number and the forms of each rock art element was not known at the start of the study. Estimates vary in number, as Matthews (1960:1) writes that "over 50 can be seen clearly", while a brochure by Yayasan Perak (n. d.) estimates the number of paintings to be "more than 24". A detailed inventory of the rock art will help establish a permanent record and provide a basis for comparison for future researchers especially to trace the effects of deterioration on the rock art over time. The documentation of the rock art answers the following questions:

- How many rock art elements are present in the site?
- What does each element look like at this point of time?
- What are their dimensions?
- How can we best organise the rock art data?
- What patterns can be detected from the rock art?

b. Physical and Chemical Analysis: There is a need to test the assumptions that have been made about the nature of the rock art pigments. In particular, the physical and chemical analysis of the rock art may provide clues into what the pigments were used and their methods of production. The first assumption, which can easily be examined, is the composition of the pigments used in the rock art. While Matthews (1959) initially stated that the pigments and the staining on the associated tools were haematite, there seems to be no indication in past literature that compositional studies were ever conducted. A similar assumption was made of the red-coloured paints of Gua Niah in Sarawak, which was reported around the same time of Gua Tambun (Harrisson, 1959). It was not until very recently when Pyatt *et al* (2005) proved through chemical analysis that the rock paintings were made from tree resin rather than inorganic iron oxides. This local example is immediately relevant to one of the lingering assumptions of the rock art at Tambun: are the paintings really composed from haematite? Indeed, while haematite is indeed a common colouring material used in rock paints, it is premature to take Matthews' initial assumption for granted. Furthermore, analysis of the paint residues might point to new insights into the composition of the paint, and perhaps the manufacturing process behind the paint. Analysis of the material recovered from Gua Tambun will answer:

- What were the materials used to produce the rock art at Gua Tambun? Are the paints haematite as originally assumed?
- How was the rock art produced?
- How were the paints produced?
- How did they deteriorate?

c. Comparison: Over the last 50 years, the amount of known rock art sites in South-east Asia has skyrocketed. From the three sites known in Malaysia in 1959, the current count today is 22 (Mokhtar, 2008). In neighbouring Thailand, over 200 rock art sites have been found in clusters to the north, north-eastern and southern parts of the country (Srisuchat, 1996). Where Matthews (1960) and Faulstich (1990) have sought to make stylistic comparisons of rock art with those found in India as well as Australia, we now have plenty of examples which are geographically nearer to make comparisons with. In the comparative analysis of this study, the research questions were:
   - What other rock art sites are there in Southeast Asia that may be com pared to Gua Tambun?
   - Does the nearest cluster of rock art sites, especially in Southern Thailand share any similarity with Gua Tambun?

d. Dating: The chronology of the site is not well understood. While Accelerator Mass Spectrometry (AMS) radiocarbon dating has successfully been used in other rock art context, this author feels less confident in this method because of the documented contamination of the site's walls with chalk, as well as the question of whether carbonaceous material were even used in the pigments in the

first place. However, the complex arrangement of superimpositions present in the Gua Tambun rock art has been pointed by previous scholars (Faulstich, 1984; Paiman, in Kam, 1985). Because of the detailed documentation this research will conduct, a relative chronology can be established based on the superimpositions and level of fadedness present on the rock art. Research into the dating of the rock art deal primarily with a few basic questions:

- Are there discernible cultural phases reflected in the Gua Tambun rock art?
- Is the assumption that the Tambun rock art is of the Neolithic period acceptable?
- Can we date the rock art of Tambun using absolute and relative methods?

e. Interpretation: Current identifications of the rock art rest in the eye of the beholder, and require a more self-reflexive, nuanced and criteria-based approach to properly classify the rock art into meaningful terms. Besides identifying the images on the rock wall, there is also the question of interpreting Gua Tambun as an archaeological site, which can be derived from the results of the current and previous research. Interpretive questions will help us to understand:

- How may we systematically make sense of rock art whose authors and intentions are unknown to us?
- What identifiable forms can be depicted on the walls of the rock art?
- What can similar rock art sites in the region tell us about the rock art of Gua Tambun?
- Who painted the rock art at Gua Tambun?

1.3 RESEARCH METHODOLOGY

In the last 30 years, rock art research has shifted from discerning meaning and making interpretations to the use of scientific methodologies and more rigorous recording and analyses. In effect, rock art research has begun to look at rock art less as 'art' but as a class of material culture by itself. Because rock art is not well studied in Southeast Asia, the methods used reflect the experiences and methodologies of researchers in other parts of the world, as well as the more traditional methods used in archaeology. The data collected and interpretations formed for this research used six main methods: Literature review, fieldwork and recording, digital image analysis, laboratory analysis, dating, experimental archaeology and interpretation. A brief overview of each process is presented in this chapter here, while greater detail is discussed in the corresponding chapters.

1.3.1 LITERATURE REVIEW

As little rock art research has been conducted in Southeast Asia, a review of the existing rock art literature was essential in determining the appropriate methodologies and theories for this study. The literature reviewed broadly cover three areas of interest: the recent history of Gua Tambun, the archaeology of rock art in Southeast Asia, and the theories and methodologies used in current rock art research that are applicable to the rock art of Gua Tambun.

While the prehistoric past is the focus of this research, understanding the recent history of Gua Tambun – since its modern discovery in 1959 – provides better understanding into how the site has changed since it became open to public, and more importantly how the disturbed context of the site limits this and future research; additionally, I

relied on interviews with people who had worked at the site previously to gain their insights into Gua Tambun. The literature and recent history of Gua Tambun has already been reviewed earlier in this chapter.

A closer look at the existing literature originating from Southeast Asia indicates that there are a significant number of rock art sites in this region despite recent claims to the contrary. Rock art, ranging from the prehistoric to the recent ethnographic past, has been documented within the boundaries of almost every modern nation-state of Southeast Asia, notably in Malaysia, Philippines, Thailand and Indonesia and with the exceptions of Cambodia and Singapore. Some research of the literature was also devoted into the rock art of India, Southern China and Northern Australia, the regions adjacent to Southeast Asia where connections to Gua Tambun have been alluded to. The literature of rock art research in Southeast Asia and beyond is reviewed in greater detail in Chapter 2.

1.3.2 FIELDWORK AND FIELD RECORDING

For many years, antiquarians and archaeologists operating in Southeast Asia have been content with mentioning rock art as an aside to the material finds – indeed, most of the rock art sites described in Chapter 2 reveal little detail about the actual art themselves besides some photographs or sketches and preliminary observations. Current archaeological thought (see Bednarik, 2007; Whitley, 2005; Loendorf, 2001) prescribe treating rock art sites as archaeological sites. Thus, proper rock art recording is essential to meet the requirements for archaeological study and interpretation, and also as a tool for conservation and cultural resource management (Wainwright, 1990:56). Where an archaeological site is the boundary in which data is collected, and the pit is the basic

unit for data collection, the parallel for basic unit of data is in the panel, as defined as “a group of rock art motifs occurring in very close proximity, on a rock surface of reasonably uniform orientation” (Bednarik, 2007:208). Rock art is typically recorded on a panel-by-panel basis.

It is also important to note that despite numerous calls over the years, there is currently no standardised method for recording rock art other than the broad principles summarised here. In the case of America, where rock art is often located in national parks and Native American ancestral lands, rock art recording documents vary from state to state (Loendorf, 2001:59). Bednarik (2007:58) seems to eschew the use of standardised forms, arguing that rock art is not “particularly suited to adequate characterisation on a standard form” and not a reliable source for statistical data.

Whitley (2005:18) outlines data collection in rock art research as three primary tasks: site mapping, narrative recording and graphic documentation, which are ordered in according to the resolution in detail. Mapping of the rock art sites is the first and basic objective, to provide detailed and standardised measurements of the site and to mark the relative positions of the rock art panels.

Narrative recording is the second layer of documentation that requires descriptive field notes of the site in whole, and for each panel. The name Gua Tambun is fairly deceptive in that the site hardly qualifies as a cave, and perhaps more accurately described as a rock shelter resting some five storeys above ground level. The main panel of rock art rests some 6 to 20 metres above the current surface, while a number of modern graffiti has been etched on the wall at floor-level.

The final level of data collection is the graphic documentation of the rock art. While the site map and narrative site descriptions mainly aid in documentation for administrative and macro-level purposes, the graphic documentation of each element is intended to be the most detailed form of recording used in rock art research. However, Bednarik (2007:59) has pointed out that the methods used to derive detailed graphic documentation of rock art panels are extremely subjective, and can range from freehand drawings on the least accurate scale to micro-topographic and laser microscopic scans, currently the most accurate and precise way to record rock art technologically possible.

In Malaysia, direct tracing methods have been used previously to record rock paintings, where a plastic sheet is placed over the rock surface and then the rock art is traced with a permanent marker. However, direct tracing risks incurring damage to the rock surface because of pressure applied by the pen tip as well as the danger of the plastic sheet being in constant direct contact to the rock art. Balancing the needs for non-invasive methods of recording with accuracy and budgetary constraints, photographic documentation is currently the most tenable means of graphic documentation available. Up until recently, cameras were constrained by the limited number of exposures (usually 36 for a 35mm camera) in film and the fees incurred for processing film. Today, a single memory card can record hundreds, if not thousands, of photographs. Because of advances of technology in digital photography and photographic enhancement methods, very high-quality photographs of rock art can be captured using fairly inexpensive equipment that is widely available on the consumer market (see Bednarik, 2007; Mark & Billo, 2006, Chandler & Fryer, 2005). In addition, digital media is immensely scalable and portable; at the time of writing, 2-4 GB storage cards are common for digital cameras, while portable hard drives have reached the 1 TB range. In

comparison, a high-resolution JPEG is about 4 MB, while the TIFF formats used in this study are around 35 MB each. These images can be scaled down to lower than 100 KB without any drastic loss in picture quality.

An important trend seen in the recording of rock art, as a by-product of being able to examine rock art on a microscopic and molecular level, is an emphasis on non-invasive methods. Earlier rock art researchers made no second thought over coming in physical contact with the rock art by way of tracing the paintings over transparent sheets or by spraying distilled water onto rock paintings and engravings to increase the contrast for better recording on film. It is now known that such contact can be detrimental to rock art research, as even the use of distilled water has been known to render radiocarbon readings inaccurate (Chaffee *et al*, 1994).

The primary documentation conducted at Gua Tambun was carried out in the first two weeks of January 2009. The site was mapped using a theodolite and a laser distance measurer. A 35ft high by 30ft wide scaffolding was specially constructed in front of Panel C, where the largest concentration of paintings were located, which enabled the research team to examine the rock surface and paintings up close and record approximately 80% of the rock paintings at the same height. The results of fieldwork are presented in Chapter 3.

1.3.3 DIGITAL IMAGE ANALYSIS

As noted earlier, photographic documentation is the primary method of recording and analysing data because rock art is largely immovable. The evolution of digital photography has greatly reduced the cost of recording rock art without a corresponding

reduction in quality. Digital photographs form the bulk of archaeological data from this research, and digital image analysis is primarily used in rock art research to enhance rock images that have faded or obscured (David *et al*, 2001; Mark & Billo, 2000, Clogg & Diaz-Andreu, 2000). The methods used in digital image analysis are outline in this section and discussed in greater detail in Chapter 4.

There are three general classes of image enhancements that can be used on rock art: greyscale images, full-colour and false colour (Mark & Billo, 2000). The eventual aim of all image enhancements is to allow the viewer to see the rock art clearer, by reducing the background noise of the image, increasing the colour intensity of the rock art element, isolating the shape of the rock art or using a combination of such techniques. Greyscale enhancements were performed on the black-and-white archival photos acquired from the National Museum and used to compare the rock art of today with those taken 25 years ago. Full-colour enhancements were generally used to give rock paintings richer saturations of colour so that they can be more visible without actually interfering with the rock art. Digital tracings of the rock art were also made in order to determine the shape of the rock art and establish their spatial relationship to one another on the rock wall. The ability of Adobe Photoshop to create virtual layers over images also meant that it was possible to mark out the stratigraphic order of rock art and establish a relative chronology of the paintings. The ability to dynamically manipulate digital tracings was also far less time-consuming than working with traditional pen-and-paper tracings.

Digital methods of recording and analysis provide four distinct advantages over traditional methods: non-invasiveness, accuracy, portability and scalability. Firstly, they

are non-invasive - even tracings on plastic sheets have a danger of causing abrasive damage to the rock surface, while contact is not required for digital photography. The use of flash photography, which may hasten the deterioration of pigments, was also sidestepped by using a combination of camera settings (longer exposure times or increasing the sensitivity of the light sensor) and post-processing techniques in the computer. In addition, digital manipulations of rock art are fully reversible.

Secondly, digital recordings and analysis provide a greater degree of accuracy in determining the shape and colour of rock art than traditional methods. Digital photographs produce more accurate reproductions of rock art compared to sketches, scale drawings and tracings because they are direct recordings of the light reflected off the rock art. Because colours on digital images can be numerically quantifiable, contrast adjustments can be precisely measured and adjusted, taking the guesswork out of determining boundaries of individual elements and eliminating the need for contaminative contrasting techniques such as chalking and liquid spraying.

Thirdly, data is much more manageable in digital format than the traditional pen-and-paper medium. Both methods were used in this study, and the data that was recorded in forms took up the space of a thick telephone directory – in contrast, a portable hard disk with a relatively meagre 80 GB of memory was able to keep over 6,000 high-resolution photographs, digital scans of the physical forms, and all the drafts, research papers and administrative documents related to this study into a package that was the size and thickness of my hand. By the end of this study, the data has expanded to twice its size, but with no corresponding increase to the physical medium. While Bednarik (2007:71-72) has pointed out that no storage medium is infallible or perpetual,

digitised data can theoretically be longer-lasting and more space-efficient than photographs and slides.

Finally, digital recordings and manipulations of rock art are scalable, so that data than is spread over metres of rock wall can be easily worked with on a desktop. Scalability becomes evident when working with panels of rock art exceed a metre in height or width, as physical tracings are recorded on a 1:1 scale. High-resolution digital images can also be scaled down without noticeable degradation of image quality for distribution over the internet and email. It should be noted that scalability in this case is only downwards – a high-resolution image can be scaled down to a low-resolution one but the reverse is not true.

While digital image recording and analysis provide a number of advantages over traditional pen-and-paper methods, it is premature to say that digital methods are absolutely better than traditional ones. The relative fragility of storage media necessitates the need for adequate backup protocols – one can hardly damage a physical photograph or tracing by dropping it on the floor, but one can jeopardize entire years of work if the same happened to a storage medium such as a hard disk. The issue of colour calibration and accurate colour representation is something that has not yet been resolved even through digital methods. Technological knowhow is another factor for successful application of digital imaging techniques to rock art. The software and techniques used in this study has only been around for a decade, and undoubtedly new software and techniques can and will be developed in the future.

1.3.4 LABORATORY ANALYSIS

The examination of paint residues, particularly in the case of rock paintings, has been particularly beneficial to the study of rock art. A number of physical and chemical analysis methods have been used in rock art research, X-Ray Diffraction (XRD), Scanning Electron Microscopy-Energy Dispersive X-ray (SEM-EDX) and experimental archaeology.

The primary question to be answered in the analysis of pigments is their composition and their method of manufacture. It has long been assumed that the rock paintings were created using haematite, and thus analysis of pigment samples would held prove or disprove this assumption. An experiment was also designed to replicate and observe changes in the rock paints as it is exposed to the weather in order to understand how the rock art at Gua Tambun could have deteriorated over time. The results of the pigment analysis are discussed further in Chapter 5.

1.3.5 DATING

As archaeology deals with the understanding of human pasts through their material culture, the question of age plays an integral role in archaeological investigations. However, rock art as a class of material culture is notoriously hard to date. There is a notable lack of chronometric dates from rock art sites in Southeast Asia, and most rock art sites have been dated on the basis of associated finds, iconographic and stylistic analysis, and ethnographic accounts. The main dating approaches are considered here: chronometric dating, dating by association, relative dating of the superimposition of the rock art and by comparison with other rock art sites.

It has only been in the last few decades that archaeologists have been able to perform direct dating of rock art through chronometric techniques that have been developed in the earth sciences, as well as the ability now to examine archaeological material on a microscopic scale. That said, the chronometric dating of rock art is still largely dependent of the material used to create them, and the techniques available to date rock art is still more limited than other classes of archaeological material such as bones and pottery. The most common direct dating technique used for rock art research is AMS radiocarbon dating, which is advantageous over traditional radiocarbon dating because only a minute sample is required. Practically almost every region in the world has had some degree of radiocarbon dating done to its rock art sites, with the notable exception of India and Southeast Asia (Rowe 2001a). The nearest radiocarbon dates acquired in relation to Southeast Asia come from the Guangxi province in Southern China, dated between 2370 and 2115 b. p. from a single panel of rock art (Li, 1992, cited in Rowe, 2001a).

As revolutionary radiocarbon dating might be, the technique is limited to material which contains carbon or other organic material. It is observed that red-coloured paintings are often a mixture of iron oxide and water (Ward *et al*, 2001) and would yield little or no organic sample to date. The pigments sampled from the rock art at Gua Tambun appear to be a simple haematite-liquid mix and do not appear to contain carbonaceous material in the pigments, and therefore cannot be dated using the radiocarbon technique.

More often than not, relative dating is the more common form of dating performed on rock art and several forms of evidence can be used. Dating of rock art by associ-