



KEYWORDS: *Rock art – Archaeology – Peñablanca Caves – Philippines*

## RE-EXAMINING PICTOGRAMS IN THE CAVES OF CAGAYAN VALLEY, PHILIPPINES

Marie Grace Pamela G. Faylona, Caroline Marie Q. Lising  
and Eusebio Z. Dizon

**Abstract.** The rock art sites in Peñablanca caves located in the province of Cagayan, northern Luzon, Philippines, were initially explored in 1976–1977. An estimate of more than 350 forms of geometric motifs, namely anthropomorphs, purported botanical emblems and many other indistinct and vague forms of drawings were documented on the walls of the rockshelters and caves located in the Callao Limestone formation. Since then, no further in-depth research of the rock art has been undertaken. The sites were revisited by the authors to document and to study the rock art in greater detail. This is the first systematic documentation of the sites using close-range, digital photography. Digital image enhancement techniques to reconstruct and recompose the faded images were also employed. This paper presents preliminary findings of systematic observation and documentation of motifs in rock art sites visited in Peñablanca.

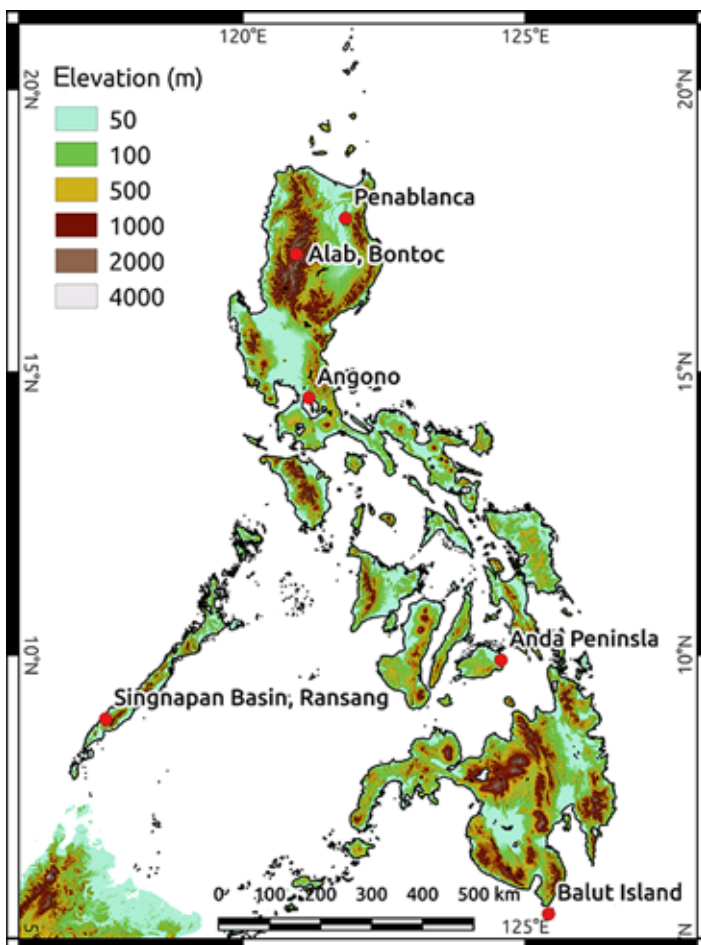
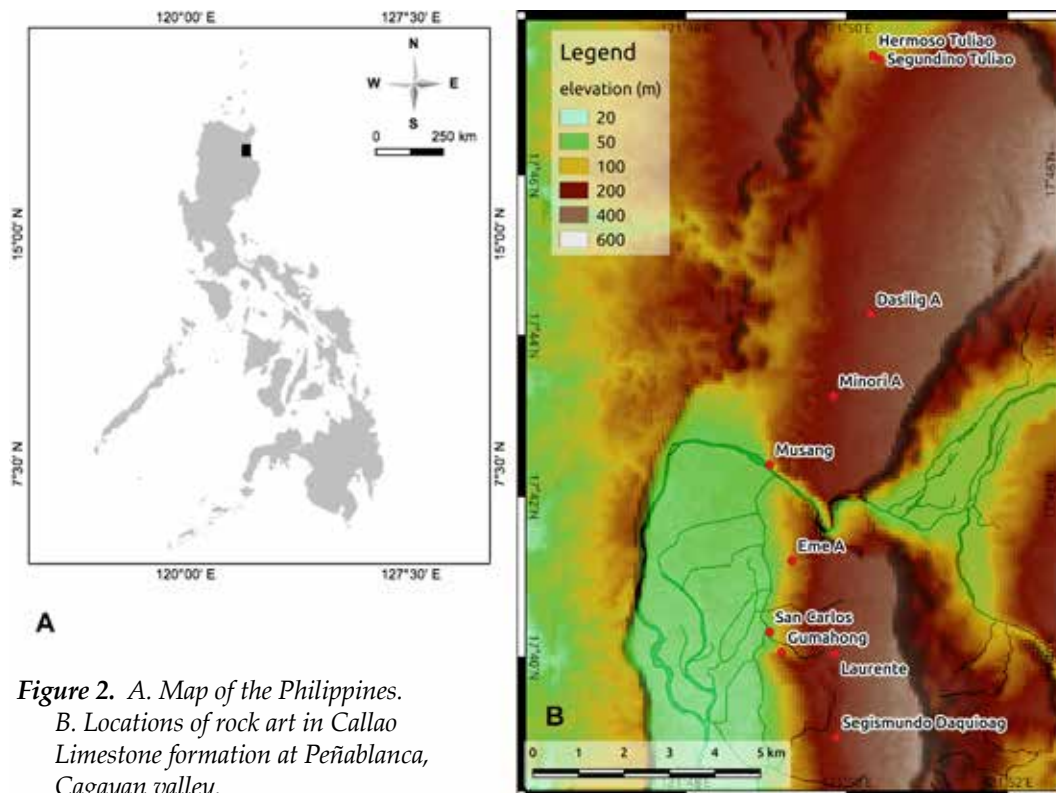


Figure 1. Rock art sites in the Philippines.

### Introduction

There is little known and published material on rock art in the Philippines. Most discoveries are cited only in archaeological site reports (Taçon and Tan 2012: 211). One of the well known publications on this topic is that of Peralta (2003), *The tinge of red: prehistory of art in the Philippines*. According to Peralta (2003: 58–59), ‘the earliest rupestrian art to be reported is located in the province of Rizal; it is now popularly referred to as the Angono petroglyphs’. Other rock art sites in the Philippines are the following: pictograms of Peñablanca in Cagayan Province, which are the subject of this paper; the red hand stencils in Anda Peninsula, Bohol Province (Santiago 2003); petroglyphs in Alab, Bontoc, Mountain Province; and the extensive Pālaqwan cave art in Singnapan Basin in Ransang, Palawan (Peralta 1983; Novellino 1999). In 2008, one of the co-authors of this paper also documented ‘watercraft vessels’ engraved on a boulder of a volcanic rock (perhaps basalt) in Balut Island, Saranggani Municipality of Davao Del Sur at the southern-most part of Mindanao (Dizon et al. 2009) (see Fig. 1).

As proposed by O’Connor et al. (2015), these rock art sites may have potential implications for the Austronesian painting tradition (APT). The sites are considered as part of the region with high co-occurrence with Austronesian speakers (Ballard 1992). In general, the Philippines do



**Figure 2.** A. Map of the Philippines.  
B. Locations of rock art in Callao Limestone formation at Peñablanca, Cagayan valley.

not possess rock art motifs of 'boats' or 'sun-rays' that may contribute to the APT. As mentioned above, there is only one site that has 'boat' motifs but no archaeological investigations relating to Austronesian studies have been conducted in the area.

At present, no further studies have been conducted on these sites mentioned above and to understand the context of the rock art. Only the Angono petroglyphs in Angono, Rizal Province were given some attention by an inter-disciplinary research team headed by the National Museum. This created a consciousness on the cultural value of the site (Bautista 1998; Stanley-Price and Abinon 1997). The information gathered from the Angono petroglyphs directed the authors to visit, examine and record other rock art sites in the Philippines. As an outcome, the authors visited the reported rock art sites in Peñablanca.

#### The study area: Peñablanca caves and rockshelters

Rock art occurs in several rockshelters and caves in Peñablanca, in the Callao Limestone formation in Cagayan valley, northern Luzon. This was explored by Wilfredo P. Ronquillo and Rey Santiago of the National Museum of the Philippines in 1976–1977. The Callao Limestone formation runs along the western foothills of the Sierra Madre and was formed during the late Miocene to early Pliocene, reaching a thickness of up to 540 m (Durkee and Pederson 1961; Mathisen 1980) (see Fig. 2). The Peñablanca cave sites play an important role in the study of pre-History and environmental change in northern Luzon (Mijares 2002, 2005, 2006a, 2007, 2008; Mijares et al. 2010; Ronquillo 1981, 2010; Thiel 1988; Wasson and Cochrane 1980). They present a long history of human occupation.

Because of this duration of human presence, the area contributed greatly to the study of archaeology, revealing numerous Palaeolithic cave occupation sites where the earliest hominin finds in the Philippines were uncovered (Mijares et al. 2010).

The rock art that was examined in Peñablanca can all be classified as pictograms. A pictogram is produced by applying natural pigments to rock surfaces by painting, drawing or other means, i.e. an additive process (Chippendale and Taçon 1998; Bednarik et al. 2010). In all sites considered here all drawings were probably made using charcoal. Petroglyphs, which are produced by incising, abrading, pounding or otherwise creating designs or figures by a reductive process on non-portable rock surfaces such as rock outcrops, bluff faces, rockshelters and caves, were not observed in the study areas.

To date, the data relating to the rock art in Peñablanca are only available in fragmented form. They are contained mostly in preliminary and unpublished survey reports (Peralta 1979; Tobias 1998). So far, the rock art was only recorded by tracing using transparent plastic sheets and markers. The quality of the available data is therefore variable. Furthermore, preservation state of the rock art is also variable and efforts at preserving it are non-existent. According to Tobias (1998), when she examined the pictograms in some caves, varying degrees of weathering on the drawings were observed. Since then, no monitoring of the pictograms was undertaken. Therefore, it seems crucial that the pictograms from different rock art sites need to be further documented and analysed, as well as their condition assessed before ongoing deterioration causes more damage.

Name of cave/ rockshelter	NM Site Code	Location		Dimension of the site				
		Brgy	Elevation (m asl)	Direction of the opening	Length (m)	Width (m)	Height (m)	
1	Musang	II 1977 J4	Quibal	87.00	S199 W	22.00	9.00	3.00
2	Segundino Tuliao	II 1977 P5	Nangilatan	164.00	N341 W	7.64	12.00	5.65
3	Hermoso Tuliao	II 2012 S	Quibal	152.00	S160 E	14.20	3.00	10.00
4	Minori A	II 1977 J11	Quibal	254.00	N27 E	36.00	9.50	5.27
5	Dasilig A	II 2012 T	Quibal	315.00	N90 E	19.50	10.50	3.20
6	Eme A	II 1977 G	Malibabag	262.00	N335 W	9.00	6.10	4.80
7	Laurente	II 1977 H1	Nannarian	195.00	N68 E	9.00	17.00	6.70
8	Gumahong	II 1977 H	Nannarian	175.00	N340 W	12.00	14.00	4.12
9	San Carlos	II 1977 H2	Nannarian	96.00	S276 W	11.00	5.30	1.00
10	Segismundo Daquioag A	II 1977 I11	San Roque	297.00	N340 W	13.40	6.70	3.40
11	Segismundo Daquioag B		San Roque	300.00	S148 E	17.30	4.60	4.00

Table 1. The Peñablanca rock art cave sites.

The current authors aim to document the drawings on the rock surfaces in the Peñablanca caves using methods that will potentially advance the understanding of the rock art in various ways. One aim will be to produce an inventory by documenting and describing the sites, panels and individual elements that constitute the Peñablanca rock art genre. A second aim will be the employment of digital enhancement methods to record the pictograms and fully distinguish heavily faded rock art elements as well as identify superimpositions.

Altogether ten rock art sites were revisited in Peñablanca during the current fieldwork, which all contain pictograms. These sites are Dasilig A, Eme A, Gumahong, Hermoso Tuliao, Laurente, Minori A, Musang, San Carlos, Segismundo Daquioag A and B, and Segundino Tuliao caves. During fieldwork basic site and figure recording were initially conducted (see Table 1). Field notes, maps, photographs and drawings were used in recording the pictograms. A checklist was used to ensure systematic and comparable documentation during the recording of rock art sites and motifs (i.e. location, site dimension, type and formation of rock faces, sediment subsurface investigations etc.). All motifs were photographed using structured lighting, multi-view by taking several images from a single camera and image-based digitising methods where it constructs the opacity hull (Cai 2011). The Adjust Color Tool of the IPhoto program was used in enhancing the image file after it was digitised.

### The rock art sites in Peñablanca

#### a. Northern formation

##### 1. Musang Cave (National Museum Site Code: II 1977 J4)

Musang Cave is named after a civet cat that is present in the area. The cave has been examined twice, in 1976 and 1997. The first was during an exploration by the

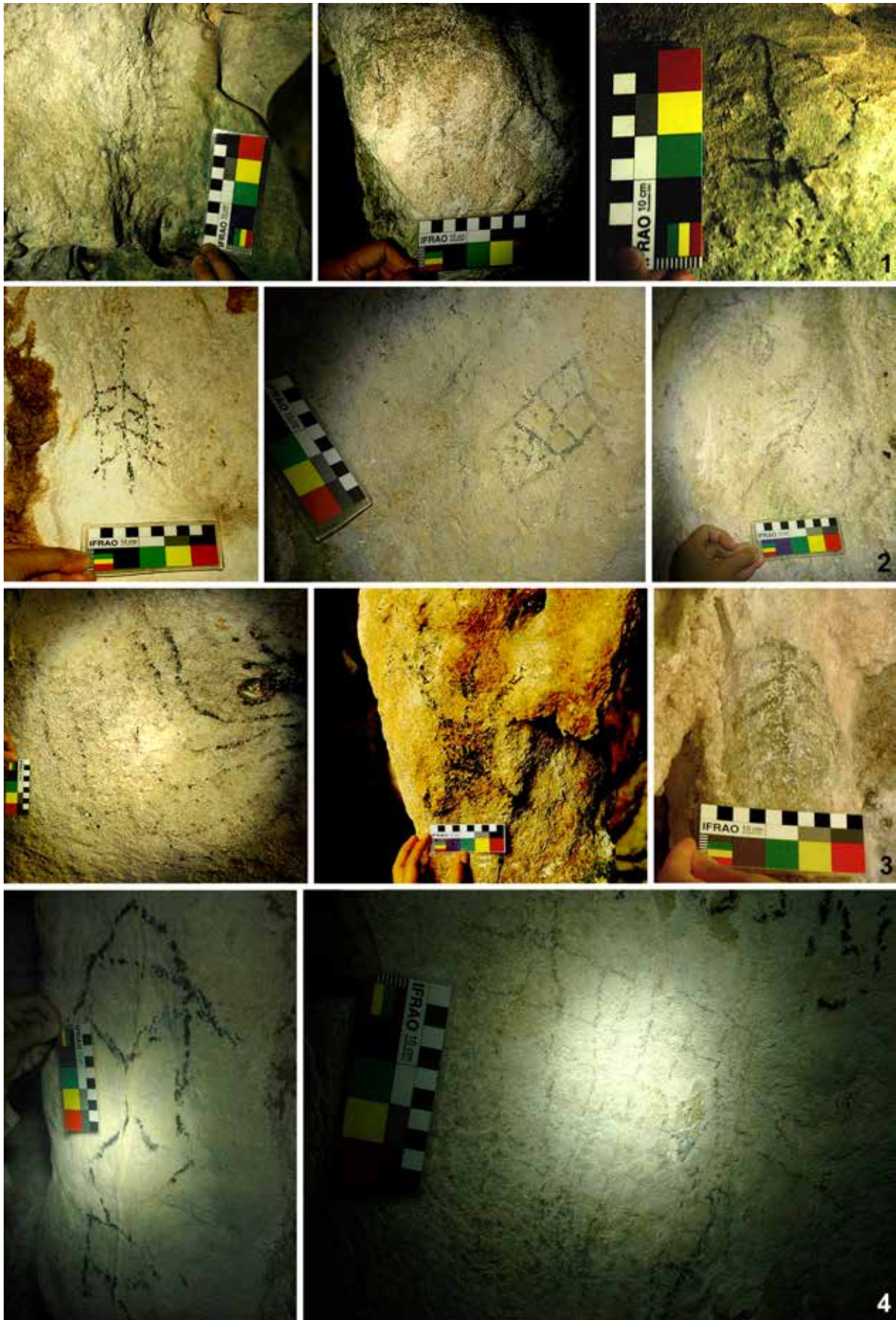
National Museum of the Philippines and included an excavation by Barbara Thiel for her PhD dissertation in 1980. The second was part of Tobias' regional study of the area. There were three pictograms mentioned in their reports. At present, these three pictograms are still visible, but could hardly be seen. Only one pictogram can be seen thoroughly, perceived as an animal-like figure when viewed at an angle (see Fig. 3-1). This motif also has some linear scratches on the limestone with greenish moss.

Other archaeological materials present are stone flakes and flake tools, animal remains, namely pig bones and teeth, deer bones and teeth, human bones, shells, a few beads and pottery sherds. The shells generated radiocarbon dates of between 9850 and 2680 years BP from excavation levels 3, 5, 6a, 7a, 8 and 10, representing two cultural levels. The dates were generated by the laboratory of Gakushuin University (Thiel 1988).

##### 2. Segundino Tuliao Cave (National Museum Site Code: II 1977 P5)

It takes more than one hour and a half to go to the cave, starting from the main road of Barangay Nangilatan. The route is densely vegetated and crosses a stream. The cave has three chambers. The first and second chambers have pictograms. In the first chamber, 24 pictograms were documented. Two pictograms were found in the second chamber. It was the second time that this cave was examined, the first exploration was in 1976, during which 42 pictograms were recorded (Tobias 1998).

Most of the drawings are intersecting lines, 'leaf skeleton' motifs and net-like figures as well as grids with dots in the middle of the squares. Some figures are too faded to identify, have been rubbed off or are incompletely preserved. They are all placed on flat surfaces and near a bluff. Some drawings are grouped



*Figure 3. Sample pictograms found in caves at the northern Callao Limestone formation: 1. Musang Cave, 2. Segundino Tuliao Cave, 3. Hermoso Tuliao Cave, 4. Dasilig Cave.*

together in one area, others form superimpositions. A number of drawings have lichens on them or are near termite paths.

There have been occurrences of treasure hunting activities inside the cave as reported by Tobias (1998). Other archaeological materials found in the cave are broken andesite flakes and shells. The site has potential for archaeological investigation and substantial archaeological deposits.

### 3. *Hermoso Tuliao Cave* (National Museum Site Code: II 2012 S)

Hermosa Tuliao Cave was named after the owner. The floor of the cave dips around 20–25° and becomes narrow towards the interior of the cave wall. The cave was last explored in 1976. A corn plantation was then observed on the top of the cave, which might have negative effects on the preservation of its deposits.

Overall 15 pictograms were documented at this site. They are located on flat surfaces on the walls of the cave. Some are found on the tip of stalactites. The drawings recorded showed human-like figures with wide bodies and 'leaf skeleton' and wheel-like figures. There are drawings that are fading, spotty and there are also remains of pigments on other wall areas. It is interesting to note that one of the motifs measures more than 50 cm.

Aside from the pictograms, not much information on this cave is available. Nevertheless, the cave deposits appear to be of substantial volume and earthenware pottery sherds with impressed designs were found on the surface.

### 4. *Minori Cave A* (National Museum Site Code: II 1977 J11)

Minori Cave is a limestone tunnel cave. It has four chambers, designated as A, B, C and D. Chamber A contains pictograms, is facing NE 27 and has a length of 14.20 m. Altogether 38 pictograms were recorded during the current fieldwork. They were found on prepared smooth surfaces on the limestone walls. They are mostly 'human' stick figures, kite and ladder-like figures, the contour of a 'fish' and an 'arrow', and 'leaf skeletons'. Most of the drawings are very faded and unrecognisable. The whole wall area of the cave is highly vandalised and a lot of lichens can be observed. Several graffiti are superimposed on the pictograms (see Fig. 5-1).

The cave has been visited several times. Excavations were conducted by members of the National Museum of the Philippines in 1981–1982 (Alba 1982) and 1999. In 1999, a radiocarbon date on charcoal of around 4600 yr BP was generated from cultural layer II. Most of the artefacts are stone flakes made of andesite and chert and were characteristic of an expedient lithic technology (Mijares 2001 and 2002).

### 5. *Dasilig Cave A* (National Museum Site Code: II 2012 T)

Dasilig Cave has three cave openings designated

as A, B and C. Pictograms are located only in cave A, which is facing NE 90 and has a length of 19.50 m.

Thirty-eight pictograms were recorded in the cave. Most are located around the tips of stalactites in the middle platform. There are also several pictograms positioned on the bluff crevasse of the cave wall. Most of the drawings are intersecting lines, 'leaf skeleton' and net-like figures and other linear forms. Termite nests are visible on some of the walls. Several graffiti are located inside the cave, though they do not interfere with the rock art.

No archaeological excavation has been conducted in this area. This is only the second time that the cave was visited as part of an archaeological survey. The cave is currently used as a temporary campsite. Furthermore, deforestation activities were observed along the path to the cave.

#### b. *Southern formation*

### 1. *Eme Cave A* (National Museum Site Code: II 1977 G)

The Eme Cave Complex is located at the western slope of the Callao Limestone southern formation in Barangay Malibabag. It lies 2 km south-west of the National Museum of the Philippines Field Station at Callao Resort. Cave A, with pictograms, is facing NW 335 and has a length of 9 m.

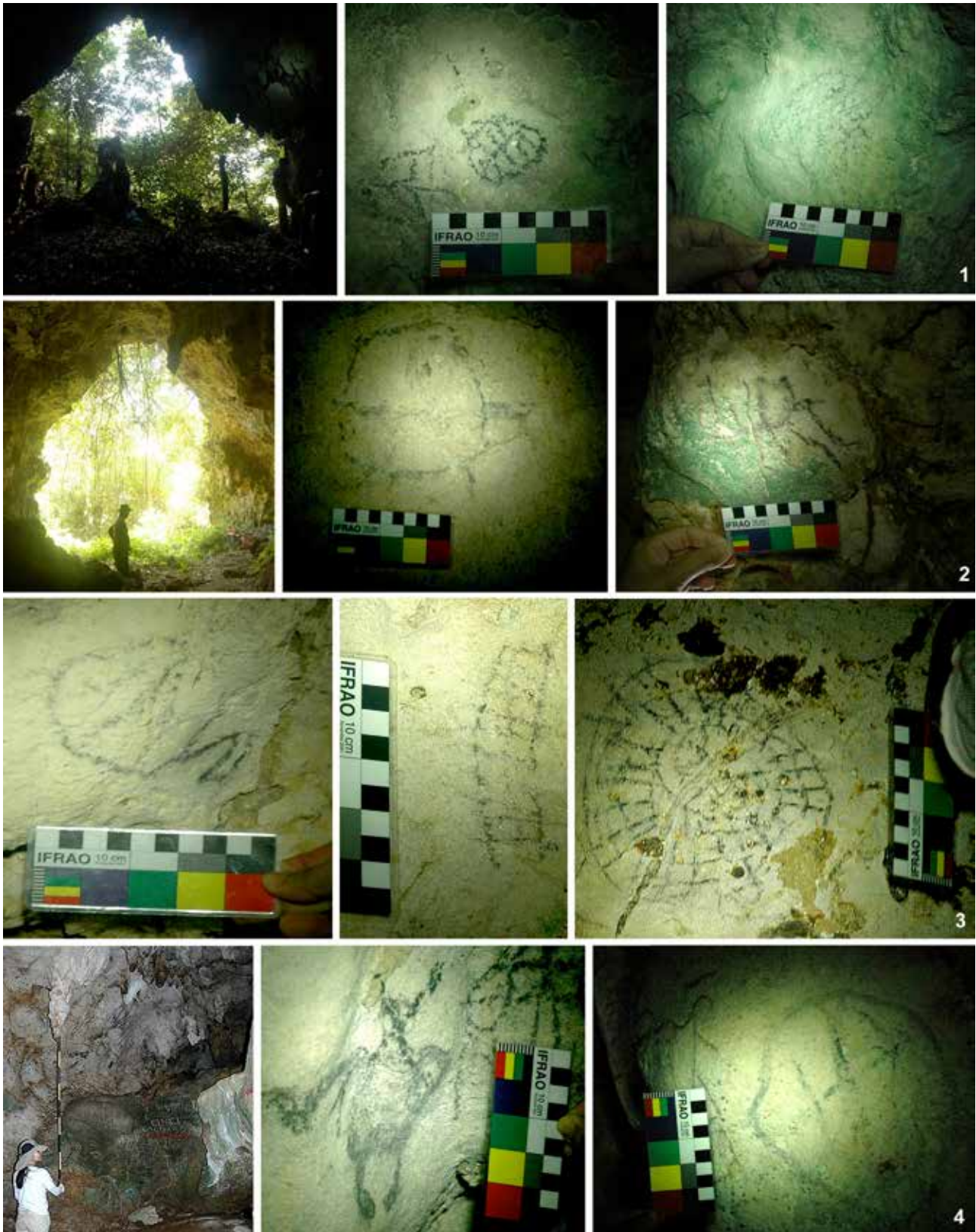
There are 20 pictograms documented. They are all found on the left-hand wall of the cave entrance. All drawings appear to be in good condition; however, the walls are extensively covered with lichens. Most pictograms are of leaf-like figures and linear forms.

The cave complex was first discovered during the 1976–1977 archaeological survey of the National Museum and followed by several research excavations (Mijares 2006a; Mijares and Lewis 2009). It is formed by three caves under a good forest cover. Excavations uncovered chert, andesite and basalt flakes, lithic debris, land snails and riverine (*Thiara* sp.) shells, and animal bones. The cave also shows a period of black and plain pottery, which is contemporaneous with the shell midden formation phase in the valley. This was supported by a radiocarbon determination on charcoal of 1908±74 uncal. BP or 2010–1690 cal. BP (Wk-14882).

### 2. *Laurente Cave* (National Museum Site Code: II 1977 H1)

Laurente Cave derived its name from a local folk song. Seven pictograms were found inside the cave. They are all linear patterns and appear very faded. Most of them are drawn on a prepared surface of the cave wall. The drawings are affected by lichens and termite structures.

The site was visited more than once for archaeological investigation (Ronquillo and Santiago 1977; Henson 1977; Tobias 1998). During the authors' exploration, there were still earthenware sherds on the surface. It was also observed that soil and guano quarrying was frequently carried out inside the cave



**Figure 4.** Sample pictograms found in caves at the southern Callao Limestone formation:  
 1. Eme Cave A, 2. Laurente Cave, 3. Gumahong Cave, 4. Segismundo Daquioag Cave.

with the respective negative effects on archaeological deposits.

3. Gumahong Cave (National Museum Site Code: II 1977 H)

Gumahong was named after a local religious group that uses the place as a chapel. A big cross was placed inside the cave and the site is known for a place where



Figure 5. Caves that were gravely vandalised: 1. Minori Cave, 2. San Carlos Cave.

people from the area practice specific religious rituals. This is the third time that the cave was visited for archaeological investigation. Previous visits were by Ronquillo and Santiago, and Tobias's cave exploration in 1976 and 1998, respectively.

Pictograms are concentrated on the wall of the second level of the cave. Most are inside the bluff crevasse of the wall. They are drawn on the prepared flat surface of the wall and lichens were surrounding the drawings. There are signs of vandalism on the cave walls but these are not interfering with the pictograms. Termite nests are also present on the cave wall. There are 30 drawings that were recorded and they are mostly linear and geometric drawings (cross, grid, circle with rays etc.), leaf, kite-like and web-like figure, and 'leaf skeleton'.

#### 4. San Carlos Cave (National Museum Site Code: II 1977 H2)

The cave is located at the western flank of the limestone formation south of the Pinacanauan River in Barangay Nannarian. Eighteen pictograms have been documented. Most drawings are situated on the left wall and pillars of the cave. The drawings here are linear and geometric designs, 'leaf skeleton' and 'kite' figures. The patterns are quite similar to those at Gumahong and Eme A Caves. All drawings were highly disturbed by graffiti (see Fig. 5-2).

This is the third time that the cave was visited

for an archaeological investigation. Treasure hunters have disturbed the area. In the recent investigation, earthenware sherds and various fragments of bones and teeth were observed on the surface.

#### 5. Segismundo Daquioag Cave A and B (National Museum Site Code: II 1977 I11)

Daquioag Cave has two openings, labelled as A and B. The number of pictograms documented in caves A and B is 22 and 26, respectively. Most of the drawings are 'leaf skeletons', geometric designs, interconnected diamond lines and circle patterns, zigzag patterns, kite-like figures and anthropomorphs with wide bodies. The sizes of the pictograms vary from 5 to 50 cm. They are mostly drawn on surfaces around the stalactites which are now covered with lichens. Most of the pictograms are faded. Termite nests on the walls as well as some graffiti were observed as well.

Earthenware sherds and chert flakes were found on the surface of the cave floor. This is the second time that the cave was visited for archaeological investigations.

#### Summary: general observations and interpretation

The authors were able to record and document 241 pictograms, covering a total of 10 caves and rockshelters in Peñablanca, during their exploration. These numbers are lower compared to the 1976–1977 data of 372 (Table 2). The pictograms were recorded

Name of cave/ rockshelter	NM Site Code	Rock art						Design	Condition
		Recorded No. of rock art motifs in 1976-1977	No. of motifs in 2012			Total			
			No. of complete figures	No. of partial figures	Total				
1	Musang	II 1977 J4	3	1	2	3	Animal-like form	fair	
2	Segundino Tuliao	II 1977 P5	42	18	8	26	'Leaf skeleton' and net-like figures; grid with dots in the middle of the squares	fair-good	
3	Hermoso Tuliao	II 2012 S	18	11	5	16	Anthropomorph with wide body; 'leaf skeleton' figure; wheel-like figure	fair-good	
4	Minori A	II 1977 J11	62	15	21	36	'Human' stick figure; kite and ladder-like figures; 'fish'; 'arrow'; 'leaf skeleton'	bad	
5	Dasilig A	II 2012 T	18	22	16	38	'Leaf skeleton' and net-like figures; linear forms	fair	
6	Eme A	II 1977 G	51	13	4	19	'Leaf' figure and linear forms	fair	
7	Laurente	II 1977 H1	14	1	6	7	Linear patterns	fair	
8	Gumahong	II 1977 H	51	27	13	30	Linear and geometric drawings; 'leaf', kite-like and web-like figures; 'leaf skeleton' figure; 'grave' cross; circle with 'rays'	fair	
9	San Carlos	II 1977 H2	63	11	7	18	Linear and geometric designs; 'leaf skeleton'; 'kite' figure	bad	
10	Segismundo Daquioag A	II 1977 I11	8	10	12	22	'Leaf skeleton'; geometric designs; interconnected diamond lines and circle patterns; zigzag pattern; 'human' figure with wide body	fair	
11	Segismundo Daquioag B		42	13	13	26	'Leaf skeleton'; interconnected circles patterns; zigzag patterns; geometric designs; kite-like figure	fair	

Table 2. Observed rock art in Peñablanca caves.

digitally with a Nikon D70 camera on six megapixels using an 18–70 mm Nikkor lens from a distance of approximately 12 inches/.30 metres. An IFRAO Standard Scale was used for size and colour reference. Most images were recorded on manual and aperture settings as lighting conditions varied on a cave-by-cave basis. Where natural lighting was completely absent, an LED headlamp with white light was used for illumination.

All sites are located at an elevation of more than 80 m asl. Moreover, most drawings are clustered at the left side of the cave entrance. The size of most drawings is between 5 cm and 30 cm.

Furthermore, the motifs were categorised into the following: zoomorphs, which are elements that have been interpreted as possible animal forms; anthropomorphs, or human-like shapes; geometric features, including regular shapes such as squares, circles, ovals and approximations thereof; 'botanical' shapes that look like leaves; and abstract shapes or linear designs that occur in repeated form but could not be classified into the other four categories.

The major type of pictograms in Peñablanca rock

art is the abstract motif, constituting 53.5% of the whole assemblage. The zoomorphic and anthropomorphic pictograms only comprised 2.9% of all motifs. The remaining rock art elements have 'botanical shapes', 12.9%, or were classified as geometric, 30.7% (Table 3).

In the end, six anthropomorphs were recorded (Fig. 6a). The rest appear to be aniconic (Figure 6b). The anthropomorphs include human-like stick or wide-bodied figures. The 'botanical' forms are consistent in terms of size and shape across all sites surveyed. All of them resemble leaf skeletons or leaf shapes.

It is interesting to note that some geometric images from the Peñablanca rockshelters and caves appear to have similarities with images in rock art sites in Lenggong, Perak, Malaysia. This applies especially to the net- and kite-like motifs (Saudin et al. 2008).

Based on the local history and anecdotal accounts gathered, the pictograms may have been there more than a hundred years ago. According to Hermoso Tuliao, who is a hunter and was one of the guides during the 1976–1977 exploration by the National Museum, the drawings were present before he was



	Name of cave/rockshelter	Category				
		Zoomorphs	Anthropomorphs	Geometric	'Botanical'	Abstract
1	Musang	1			1	1
2	Segundino Tuliao			7	3	16
3	Hermoso Tuliao		2	1	4	9
4	Minori A		3	8	4	21
5	Dasilig A			19	3	16
6	Eme A			2	4	13
7	Laurente			1		6
8	Gumahong			13	2	15
9	San Carlos			3	8	7
10	Segismundo Daquioag A		1	8	1	12
11	Segismundo Daquioag B			12	1	13
	TOTAL	1	6	74	31	129
	%	0.4	2.5	30.7	12.9	53.5

Table 3. Distribution of pictograms by category.

born. He is now 86 years old and considered as one of the oldest residents in Peñablanca. However, this needs further verification and identification with respect to which drawings were already there during the initial exploration and which ones were never changed.

**Discussion and conclusion**

The cave sites in Peñablanca presented a habitation and burial area of pre-Historic man in the Philippines (Ronquillo 2010). Moreover, it is the place where the early Austronesians migrated to Luzon (Mijares 2006b). This was proven by the unearthed red-slipped earthenware sherds and polished adzes which are considered as cultural markers of Austronesian farmers (Bellwood 1997 and 2007; Mijares 2005 and 2006b). However, the examined pictograms in Peñablanca caves may not be able to fully infer attributes of the Austronesian painting tradition as presented by Ballard (1992). Most of the caves visited are relatively inaccessible. They have anthropomorphs or human figures in Hermosa Tuliao and Seguis mundo Daquioag A caves. Only Gumahong Cave features a pictogram of a 'sun' drawn as a circle with rays (see Fig. 4-3). Some of the caves were also used for burial rites and beliefs but there were no pictograms of boats, canoe burials or humans with headdress that may be associated with the Austronesian painting tradition. Furthermore, most pictograms are not positioned at ten metres above the cave floor.



Figure 6. Types of pictograms in Peñablanca rock art.

Virtually nothing is being understood currently about the cave markings in Peñablanca. Thus, creating an inventory of pictograms is highly significant and has to be a first step in analysis. Likewise, recording and documenting the pictograms in Peñablanca caves and rockshelters will play an important role in future conservation and research efforts at the sites, as it provides a baseline inventory with which comparisons can be made.

*Acknowledgments*

The authors would like to thank the following: the five anonymous RAR reviewers of this paper; Domingo Pagulayan and Bonifacio Pacion of Peñablanca Station of the National Museum of the Philippines; Domingo Pagulayan's family, especially his wife, Nida, for guiding us throughout

our fieldwork; Rogie Tuliao, grandson of Hermoso Tuliao, and Edgardo Calimag, son of Pedro Calimag, for allowing us to explore in their property; Lariden Honorio of the Protected Area Management Board, Peñablanca Protected Landscape and Seascape; Emil Robles for working on our map; Clyde Jago-on and Harpy Valencia for determining the elevation of the caves in the Callao northern formation; Anton Carag, Dr Ronald and Wilma Guzman, and Gerry; Pinky Alivia for making our fieldwork more comfortable in Peñablanca; and Dr Martin Porr for making time to review this paper.

Professor Marie Grace Pamela G. Faylona  
Faculty of Behavioral and Social Sciences  
Philippine Normal University  
Manila  
Philippines  
faylona.mgpg@pnu.edu.ph

Caroline Marie Q. Lising  
Archaeological Studies Program  
University of the Philippines Diliman  
Quezon City  
Philippines  
myqlising@gmail.com

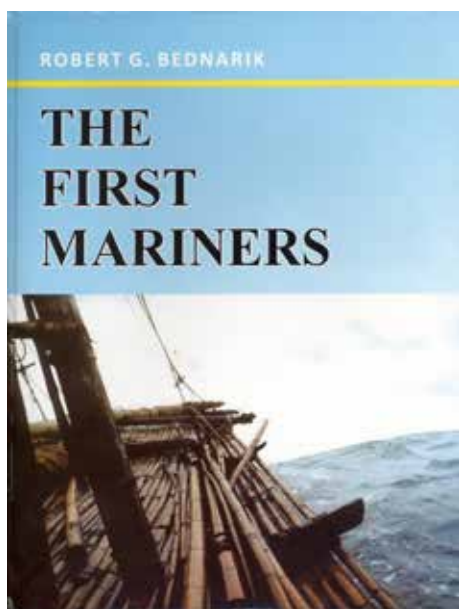
Eusebio Z. Dizon  
Archaeology Division  
National Museum of the Philippines  
Manila  
Philippines  
drbongdizon@yahoo.com

## REFERENCES

- ALBA, E. 1982. Field report in the Minori Cave, Peñablanca, Cagayan. Unpubl. manuscript.
- BALLARD, C. 1992. Painted rock art sites in western Melanesia: locational evidence for an 'Austronesian' tradition. In J. McDonald and I. P. Haskovec (eds), *State of the art: regional rock art studies in Australia and Melanesia*, pp. 94–106. Occasional AURA Publication 6, Australian Rock Art Research Association, Melbourne.
- BAUTISTA, A. 1998. Archaeological excavation at Angono petroglyphs rockshelter, Binangonan and NM Branch compound, Angono, Rizal. Unpubl. manuscript, National Museum of the Philippines.
- BEDNARIK, R. G., A. ACHRATI, M. CONSENS, F. COIMBRA, G. DIMITRIADIS, TANG H., A. MUZZOLINI and Y. A. SHER 2010. *Rock art glossary: a multilingual dictionary*. Occasional AURA Publication No. 16, Australian Rock Art Research Association Inc., Melbourne.
- BELLWOOD, P. 1997. Prehistoric cultural explanations for widespread language families. In P. McConvell and N. Evans (eds), *Archaeology and linguistics*, pp. 123–134. Oxford University, Melbourne.
- BELLWOOD, P. 2007. Southeast China and the prehistory of the Austronesians. In Tianlong Jiao (ed.), *Lost maritime cultures: China and the Pacific*. Bishop Museum Press, Honolulu.
- CAI, Y. 2011. Pattern discovery from eroded rock art. In F. Stanco, S. Battiato and G. Gallo (eds), *Digital imaging for cultural heritage preservation: analysis, restoration, and reconstruction of ancient artworks*, pp. 429–499. CRC Press.
- CHIPPINDALE, C. and P. S. C. TAÇON (eds) 1998. *The archaeology of rock-art*. Cambridge University Press, Cambridge.
- DIZON, E., B. ORILLANEDA and J. SANTIAGO 2009. A preliminary report on the investigation of a group of stone ruins at Marorong Islet and the archaeological survey at Balut and Sarangani Islands, Sarangani Municipality, Davao Del Sur. *Proceedings of the Society of Philippine Archaeologists* 7: 61–70.
- DURKEE, E and S. PEDERSON 1961. Geology of northern Luzon. *American Association Petroleum Geologists Bulletin* 45: 137–168.
- HENSON, F. 1977. The Laurente Cave archaeological project: a preliminary report. Unpubl. manuscript, National Museum of the Philippines.
- MATHISEN, M. E. 1980. Plio-Pleistocene geology of central Cagayan valley, northern Luzon. Philippines. Unpubl. PhD thesis, Iowa State University.
- MIJARES, A. S. B. 2001. An expedient lithic technology in northern Luzon (Philippines). *Lithic Technology* 26: 138–152.
- MIJARES, A. S. B. 2002. *The Minori Cave expedient lithic technology*. University of the Philippines Press, Manila.
- MIJARES, A. S. 2005. The archaeology of Peñablanca cave sites, northern Luzon, Philippines. *Journal of Austronesian Studies* 1(2): 65–92.
- MIJARES, A. S. B. 2006a. Lowland-upland interaction: the 3500–1500 BP ceramic evidence from the Peñablanca cave sites, northeastern Luzon, Philippines. In *Uncovering Southeast Asia's past: selected papers from the 10th International Conference of the European Association of Southeast Asian Archaeologists: the British Museum, London, 14th–17th September 2004*, Vol. 10, p. 360. NUS Press, Singapore.
- MIJARES, A. S. B. 2006b. The early Austronesian migration to Luzon: perspectives from the Peñablanca cave sites. *Indo-Pacific Prehistory Association Bulletin* 26: 72–78.
- MIJARES, A. S. B. 2007. *Unearthing prehistory: the archaeology of northeastern Luzon, Philippine Islands*. Vol. 1613, British Archaeological Reports, Oxford.
- MIJARES, A. S. B. 2008. The Peñablanca flake tools: an unchanging technology? *Hukay, Journal of the University of the Philippines Archaeological Studies Program* 12: 13–34.
- MIJARES, A. S., F. DÉTROIT, P. PIPER, R. GRÜN, P. BELLWOOD, M. AUBERT, G. CHAMPION, N. CUEVAS, A. DE LEON and E. DIZON 2010. New evidence for a 67,000-year-old human presence at Callao Cave, Luzon, Philippines. *Journal of Human Evolution* 59(1): 123–132.
- MIJARES, A. S. B., and Lewis, H. A. 2009. Cave sites in northeastern Luzon, Philippines: a preliminary soil micromorphological study. *Asian Perspectives* 48(1): 98–118.
- NOVELLINO, D. 1999. Towards an understanding of Pálaqwan rock drawings: between visual and verbal expression. *Rock Art Research* 16(1): 3–24.
- O'CONNOR, S., J. LOUYS, S. KEALY and MAHIRTA 2015. First record of painted rock art in Kupang, West Timor, Indonesia and the origins and distribution of the Austronesian painting tradition. *Rock Art Research* 32(2): 193–201.
- PERALTA, J. 1979. Preliminary report on the petroglyphs of the Peñablanca caves. Unpubl. manuscript, National Museum of the Philippines, Manila.
- PERALTA, J. 1983. The Tau't Batu: a pattern of transhumance. In J. T. Peralta (ed.), *Tau't Batu studies*, pp. 73–179. Monograph 7, National Museum and the Presidential Assistant on National Minorities (PANAMIN), Manila.
- PERALTA, J. 2003. The tinge of red: prehistory of art in the Philippines. Anvil Publishing, Manila.

- RONQUILLO, W. 1981. The technological and functional analysis of lithic flake tools from Rabel Cave, northern Luzon, Philippines. Anthropological Paper 13, National Museum of the Philippines, Manila.
- RONQUILLO, W. P. 2010. State of archaeological research in Cagayan valley, northern Luzon, Philippines. *The Journal of History* 46(1-4): 23-34.
- RONQUILLO, W and R. SANTIAGO 1977. Archaeological caves and open sites exploration at Peñablanca, Cagayan Province. Unpubl. manuscript, National Museum of the Philippines, Manila.
- SANTIAGO, R. 2003. Archaeological overview of Bohol Island prehistory. In R. Villegas (ed.), *Tubod: the heart of Bohol*, pp. 22-27. National Commission for the Culture and the Arts, Manila.
- STANLEY-PRICE, N. and O. B. ABINION 1997. Seminar-workshop on the preservation of the Angono petroglyphs. Unpubl. manuscript, National Museum of the Philippines, Manila.
- TAÇON, P. S. C. and N. H. TAN 2012. Recent rock art research in Southeast Asia and southern China. In P. Bahn, N. Franklin and M. Strecker (eds), *Rock art studies. News of the world IV*, pp. 207-214. Oxbow Books, Oxford.
- THIEL, B. J. 1980. Subsistence change and continuity in Southeast Asian prehistory. Unpubl. PhD thesis, University of Illinois at Urbana-Champaign.
- THIEL, B. 1988. Excavations at Musang Cave, northeast Luzon, Philippines. *Asian Perspectives* 28(1): 61-81.
- TOBIAS, C. 1998. The petroglyphs of Peñablanca caves in Cagayan valley. Unpubl. BA thesis, University of the Philippines, Manila.
- WASSON, R. J., and R. M. COCHRANE 1980. The Cagayan valley, Luzon, the Philippines. *Bulletin of the Indo-Pacific Prehistory Association* 2: 49-56.

RAR 33-1207



## *The first mariners* ROBERT G. BEDNARIK

**Research India Press, 2014, 335 pages, 190 mostly colour plates, hardcover, ISSN 978-93-5171-007-3.**

This volume summarises the history and findings of the First Mariners Project, which the author commenced in 1996 and which is engaged in exploring the Ice Age origins of seafaring. This is the largest archaeological replication project ever undertaken. It has so far involved many hundreds of people, the construction of eight primitive vessels with stone tools under scientifically controlled conditions, and the sailing of six of them. Four bamboo rafts have succeeded in accomplishing the historically documented crossings they sought to replicate, the other efforts have failed. One of the successful experiments, a 1000-km journey to Australia in 1998, attempted to recreate the first human arrival in Australia, probably around 60000 years ago. Others addressed the much earlier sea crossings documented to have taken place in the islands of Indonesia, the earliest of which occurred up to a million years ago. Two of these experiments have featured

in BBC productions, two others in National Geographic documentaries. This book describes the archaeological background and relevant issues comprehensively and it comprises an extensive pictorial record, of both the experiments and the archaeological basis of this research. It is unique in its approach, because in all such previous maritime adventures it has been tried to prove some point or other, usually that a certain crossing of the sea was possible. This project, by contrast, only deals with proven crossings for which archaeological information about their approximate timing is available. Its purpose therefore is not to prove any colonisation, but to establish what the minimum technological and cognitive conditions would have been to succeed in such maritime achievements of the very distant past. The book contains a detailed discussion of early palaeoart.

The publisher's recommended retail price of this volume is US\$150.00 (c. \$A205.00). AURA has acquired a number of copies at cost price and is making these available to members at \$A40.00 each (81% discount), plus postage for 1.8 kg weight. Please order your copy at

AURA, P.O. Box 216, Caulfield South, VIC 3162, Australia, or [auraweb@hotmail.com](mailto:auraweb@hotmail.com)

We accept Visa and MasterCard.