

DECORATIVE ARTS OF THE BATEK INDIGENOUS PEOPLE: A SYSTEMATIC DOCUMENTATION OF FEATURES

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ABSTRACT

Background and Purpose: The present paper discussed the features of Batek Hep tribe of the Tembeling River, Pahang National Park dwellers' decorative arts, and the characteristics of three features which include the influence of Fibonacci numbers and Golden ratio in these decorative arts as well as whether its symmetrical elements are leaning towards the vertical or horizontal axis.

Methodology: The study adopted a qualitative approach where a content analysis was conducted. The arts being studied were the carvings on Batek bamboo dart cases. Initial impressionistic exploratory overview suggested some similar patterns. Therefore, a hundred bamboo dart containers were conveniently documented by systematic labelling, photographed, and analytically documented. Each bamboo dart casing was then purposively visually analysed. Immerging features were coded and themed. Simple quantification in terms of the carvings and the diameter and the base segment height of 26 bamboo dart cases was performed to put forth the three analysed art forms that is available and visible in Batek arts for the purpose of discussion.

Findings: The findings suggest that Batek decorative arts were mostly vertically symmetrical and conform to initial reported representations. The influence of Fibonacci numbers and Golden ratio could also be seen in these decorative arts. There were also repetitions of a sequential pattern that could be found on the dart cases.

Contributions: The significance of this study is, not only it documents an endangered artistic element, but it also serves as a mechanism to set apart the Batek Hep's decorative arts from other indigenous' decorative arts through systematic and analytical study on the characteristics of its features. Therefore, the findings contribute to the Malaysian artistic heritage pool of knowledge.

Keywords: Batek hep, decorative arts, Fibonacci numbers, golden ratio, symmetrical elements.

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1.0 INTRODUCTION

Cultural heritage can be classified into intangible and tangible cultural heritage. Tangible cultural heritage includes movable items like sculptures, buildings, and decorations among others. The world communities have been cherishing cultural heritage not only for the preservation of lifestyle but also as monetary gain through cultural tourism.

Malaysia is blessed with 22 indigenous tribes that flaunt with abundance of cultural heritage in form of sculptures, ornaments, and house designs. Intangible Malaysian indigenous tribe's cultural heritage includes dances, rituals, and hunting techniques. Even though the indigenous people are only considered as the minority population in a country, their cultural motifs and artefacts are important to be preserved as it represents their identity (Fisher & McDonald, 2016). There are numerous ways to preserve their cultural identity and one of them is through their crafts and artwork.

One of the 22 indigenous tribes in Malaysia is the Batek tribe. The Batek dwells several parts of the Pahang state. The Batek crafts and artwork include blowpipes or [bəlaw] in their native tongue, bracelets [knlah] and hair combs [cnilas] made of bamboo and they are creatively carved with intricate patterns of flora. The blowpipe is their main weapon yet to date, this weapon is also a source of their income in a much modern exhibition setting as they perform hunting demonstration for tourists (Lye, 2002). In these exhibitions, the miniature version of the blowpipes and dart cases [banə?] sets are sold. These souvenirs transport the Batek arts around the world. However, it is unstudied, undocumented nor conserved as part of their ethnic identity. Unlike the Indonesian royal intricate batik designed, for example, where the patterns are preserved as such that no photograph is allowed as copies of such patterns are much prohibited unless the communities receive due recognition.

In comparison to the Batek tribe, for the Mah Meri Malaysian indigenous people, their famous dreams or myths inspired masks and statues wood carvings (Norasmah & Husnorhafiza, 2011), weavings, Main Jo'oh dance and Ari Moyang are used to promote their culture tourism (Roddin, Yusof, & Sidi, 2015). These are among the many Malaysian indigenous tribe's cultural heritage. Even though the community is not constantly blessed with monetary gains from tourism, the endorsement for tourism is sturdy led by the faith that this business could safeguard their traditions towards a maintainable indigenous tourism accomplishment (Puvaneswaran, Sarjit, Talib, & Ma'rof, 2013). This belief, which is also applicable to the Batek tribe, is rather disturbing. Without proper measure, preservation may fail as these lucrative based tourism activities may be an ambiguous mean to preserve a culture. Although it may sustain few culture elements, it can lead to the loss of other similar significant cultural aspects thus why the documentation of the characteristics of their artworks is essential.

This paper is governed by these two research questions; are Batek artistic carvings influenced by any established concept?; and how may the evidential visual portrayals be best described? It attempts to study the influence of Fibonacci numbers, and Golden ratio in these decorative arts carvings. This will enable the Batek arts to be acknowledged as a beautiful representation of their culture and not some mere coincidences of carvers' skills. Secondly, its symmetrical elements are analyzed to determine their leaning inclination which is towards either the vertical or horizontal axis. This shall uphold the simplicity of the carvings led by presentation of nature or influenced by the surface of the bamboo sections. Presumably, since the bamboo is round, it offers an easier potential for horizontal carvings. This element is also investigated. The significance of this study is beyond mere documentation. It serves to alleviate the Batek artworks to a much reputable status. The Batek artworks is due recognition as it is a well-thought art rather than an accidental flow of copied design.

While the Mah Meri wood sculpture of baby monkey has received UNESCO certification (Hafiz, 2018), the Temuan (another Malaysian indigenous tribe) artist Shahar A/L Koyok has received the 2017 Independence research grant to study his community's arts at the Australian National Gallery (Dania, 2017) and Richard Koh Fine Art gallery (Lin, 2021), the Batek arts is due to receive any international attention. In the local scene, Dawum (2018) reported the Mah Meri selling their arts at the Indigenous People Art Museum, Kuala Lumpur and the Semai trades at the Indigenous Museum, Gombak. Yet there is no mentioning of the Batek arts. Nurul Riduan and Liza (2020) urgently called for the saving of the Batek people from extinction. The death of a community can only be preserved by living their lifestyle through cultural heritage revitalization. Thus, this makes this study significant.

The Batek artworks have received very minimal discussion and consideration. Compared to other indigenous tribe in Malaysia, the Batek tribe has yet to receive enough attention and only minimal discussions on them are available. Currently, the documentation on the Batek tribe is still limited (Mohd Noor, Tengku Sharif, & Mohammad Noh, 2019).

In a study by Nurul Fatanah (2010), a snake-like image was visible. This image might be a presentation of a river as the Batek rarely presents the image of fauna in their arts. However, Mohd Noor et al. (2019) reveal that the images found in Nurul Fatanah (2010) is no longer visible in their documentation. This suggests a deterioration or loss of artistic images. This loss may be led by the death of the carver, and this variable is worthy of a future research as it may predict a much vital inclination such as failure to pass on knowledge skill and failure to preserve the cultural heritage images (Mohd Noor et al., 2019). This is because the Batek are known for experiential learning and knowledge are pass through 'show' (Lye, 2005). Due to this, the Batek's knowledge of their traditional artwork differs from generation to generation (Sahdan, Che Rose, & Ahmad, 2009). If this were to continue, with the lack of documentation and undue recognition, the Batek artworks are left vulnerable to extinction.

To date, there is no governmental strategies nor policies to protect the Batek arts from extinction. The nose flute tradition, arts, even language of the Batek are endangered. Diseases from contacts led to the deaths of the Batek people (Nurul Riduan & Liza, 2020) and there are no actions in the pipeline to save their beings. On the significant of the study or practical implication to the benefit of policy makers/government agencies, this study may assist the government to plan to document, revive and replicate similar success of the Mah Meri arts. This will also support the sustainability of the Batek Hep arts and creates financial security for the tribe.

2.0 LITERATURE REVIEW

These Pahang State National Park's dwellers have been adopting the similar blow piping and fire-starting demonstrations to tourists for years (Tengku Sharif, Mohd Noor, & Ahmad, 2012; Endicott, Lye, Zahari, & Rudge, 2016) that many have deserted other cultural heritages and skills such as the lyrics to their traditional songs, nose flute traditions, ways to build traps, methods to build boats and many other craftsmanship, even some survival skills. These artworks may not have received due recognition as they have been replaced by modern machines or the traditions have only been observed by females because in this tourism-based activity, females are only indirect lifestyle exhibitionists rather than demonstrators.

2.1 Malaysian Indigenous Tribes

Figure 1 below shows the indigenous Malaysian tribes' homelands. There are 22 indigenous groups in Peninsular Malaysia. They are divided into three main groups, the Semang, Senoi and Aboriginal Malays. The Batek is categorized as the Semang Negrito (Ratios, 2006). There are merely 1,648 Batek to-date out of the more than 198 thousand Malaysian indigenous (Nurul Riduan & Liza, 2020).



Source: The Star Graphics, 2009

Figure 1: Orang Asli homelands

2.2 The Batek Tribe

Carey (1976) stated that the Batek Hep tribe considers themselves 'people of the forest' due to their intimate relationship with nature (Ibrahim, Abdullah, & Simin, 2015). Most Batek appreciate their freedom to move and having varieties in their economic activities (Endicott, 1984, 1995). Compared to other indigenous groups, the Batek in Pahang still have their territory protected in the national park (Carsten, 1997; Lye, 2011). As forages, selling forest products like rattan and aromatic sandal woods are part of their source of income apart from their hunting activities (Endicott, 2016). The Batek, according to Sahdan et al. (2009), experienced cultural changes due to the development of ecotourism activities in the national park as they try to mediate between cultural preservation and tourism benefit (Bruner, 2005; Salazar & Graburn, 2014). Traditionally hunter-gatherers, some of the Batek are involved in the tourism industry either as exhibitionists of their lifestyle or serving as tour guides and boatmen (Man, Zahari, & Omar, 2009). Whether this interaction between the Batek and the tourists can help to sustain

their traditional practices or destroy them depends on the conditions of their interactions (Cohen, 1988; Greenwood, 1977; McLaren, 1998).

2.3 Batek Arts

While Batek men work as guides and boatmen, the women sell Batek arts and handicraft to the tourist (Nurul Fatanah, Mustaffa, & Salleh, 2016; Teh & Nik Norma, 2015). With the ecotourism blooming in the area, the artwork has been transformed to make it more suitable to be sold as souvenirs to the tourist as how it also happened to the indigenous tribe in Sami, North of Scandinavian (Viken, 2007) and the Rungus community in Kudat (Liu, 2008). This production of handicraft according to Fan, Chang, and Ng (2020) has helped the women to keep the skills to make the blowpipes and arrows alive. Over the years, Endicott (1988) has documented the Batek's way of life, while Ahmad, Mohd Noor, and Tengku Sharif (2011), Sultan (2009) and Lye (2002, 2005) have studied their language. However, the documentation and discussion on the Batek Hep' artwork is rather limited. Nurul Fatanah (2010) managed to capture Batek arts in the form of their hair comb and the dart cases, discussing on the designs and also carvings that were presented by the Batek community.

Another study by Mohd Noor et al. (2019) had investigated these artworks by visually and descriptively analyzing them using Dewey (1934)'s art theory. It was found that each carving on the dart cases is unique and mostly depicting floral images. These dart cases have /gəl gəl/ 'waists' – a ring-like carving around them. Their findings also indicate that these dart cases also function as a communication tool in which the carvings illustrate additional meanings which are significant to their community, like how the Batek's life revolve around seven beings (Mohd Noor et al., 2019).

2.4 Fibonacci Numbers

Fibonacci sequence is a sequence of numbers named after a great Mathematician, Leonardo Fibonacci. The sequence begins with the number 1 and 1. In order to get the next number, the two previous numbers need to be added together, 1, 1, 1+1=2, 2+1=3, 3+2=5, 3+5=8, 5+8=13,... (Posamentier & Lehmann, 2007). Therefore, the Fibonacci sequence is 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ... (Shannon & Power, 2019). Interestingly, this set of numbers has been found to have a significant relation throughout nature. For instance, Atela, Golé, and Hotton (2003) stated that even though there are thousands plant species around the world, there are only a few ways in which the leaves, florets and scales are arranged and these phyllotactic constructs tend to be two successive elements in the Fibonacci sequence (Valladares & Brites,

2004). In addition, according to Thapa (2017), the fractions describing the plant screw axes consist of the Fibonacci number ratios as well which is $1/2$, $1/3$, $2/5$, $3/8$, $5/13$, $8/21$, $13/34$, Watson (2017) added that Fibonacci numbers influence can also be seen in the vascular structures of the plant. Studies also reveal that lodgepole pine resin canals exist in sets of 5, 8, 13 and 21 (Fredeen, Robert, & Kevin, 2004) and that Fibonacci numbers are also present in the leaves and petals arrangement of plants (Devlin, 2011). Thus, since the Batek artwork is mostly based on the nature around them, it would be valuable to see whether their representation of art is also influenced by these Fibonacci sequence of numbers which converges into a very special fractional which is known by the early Greek Mathematicians as the Golden Ratio (Mallik, 2004).

2.5 Patterns in Sequence Level Form

In this study, sequential patterns were probed experimentally to sequence check for integer existence in unique configurations in progressive form. The effect of two or more factors is often tested in finding mathematical patterns which are often constructed in identical, repeated form (Campbell, 2010; MaBouDi et al., 2020). In describing art form, this can be translated into a design that describes a growth from a solid foundation to a narrowed tip. Having more factors at the based shall therefore affect the numbers of patterns that may appear at the middle then contracted at the summit. This means that, in the present study, a sequential pattern commences with a larger basis, trailed by a slighter one up to the upper portion. A harmonic achievement of sequential patterns in arts creates a balanced and well-proportionate design which feast the eyes.

In learning traditional patterns, the use of animate sequential patterns with narration can assist students to learn about Chinese arts better than those of animation and on-screen text. This shows that the study of patterns has merit and its congruent can lead to a harmonic agreement in design and heritage cultural knowledge. This makes the present study relevant, to safeguard the Batek arts and create a notable merit for their arts.

2.6 Golden Ratio

The Golden ratio is also notable when talking about the relation between mathematics and nature. It is a number that is approximately equal to 1.618, which is represented by the Greek symbol known as phi (ϕ) (Posamentier & Lehmann, 2012). The concept of Golden ratio has a very close relation to the Fibonacci numbers discussed above.

The golden proportion had been defined and used by the Greeks since the ancient period. However, the influence and application of this bridge between mathematics and visual arts still extends until today (Thapa & Thapa, 2018). Examples of Golden ratio can well be seen in nature such as in shells, plants, and flowers. The aesthetic value of this proportion makes it applicable to both arts and architecture.

Understanding the value of this golden ratio, many artists and architects throughout history have been proven to have applied this golden ratio in their works. Some of them, according to Garland (1987) include the Middle Ages paintings of Madonna, ancient Chinese bowls, Syrian floor mosaics and Indian statues of Buddha. Thapa and Thapa (2018) added the “Mona Lisa” by Leonardo da Vinci, the Parthenon in Athens and the Khufu’s Pyramid of Egypt to the list, all in which portrays that given the right proportion, they will have better aesthetic value (Grigas, 2013).

2.7 The Present Study

This paper only focuses on three of the visual presentations of the Batek decorative arts. These are the main visible impressions on the Batek dart cases art product which are the samples of the study. These bamboo dart cases are carved by the Batek community and sold as souvenirs to tourists.

In this present study, Batek arts are discussed in terms of the presence of the three mathematical concepts which are Fibonacci sequence, sequential patterns, and the Golden ratio. The purpose of the study is to confirm and scientifically prove the existence of such concepts in the arts of the Batek people. This confirmation shall elevate the arts of the Batek people by ensuring that such arts production is not aimless nor a coincidence. Therefore, the justification for adopting these concepts are the Fibonacci numbers and Golden ratio concept can describe patterns in nature (Campbell, 2010) and as most depiction of flora is the most prominent presentation in the samples of this study, it is only logic to test these concepts onto the samples. Initial impressionistic exploratory overview also suggested some similar patterns on the Batek dart cases. These visible patterns include symmetries and natural sequences of Fibonacci. The bamboo dart cases being studied are as shown in Figure 2.



Figure 2: Dart cases

3.0 METHODOLOGY

For the purpose of this study, the qualitative approach where content analysis was adopted as the research methodology had been conducted. Content analysis was used to study media depiction of carving on rhino axis in Yufang, Stoner, Lee, and Clark (2016) while Hunter (2008) adopted the same analysis in studying photographed items. As the arts being studied here are of carvings on bamboo blowpipes and dart cases, and they were also photographed, content analysis was deemed the best method to adopt. Therefore, this study adapted the method used by Yufang et al. (2016) and Hunter (2008) as it fitted the purpose of this study. Conventional content analysis allows contents, in this case, photographed sculptures on dart cases, to be observed as codes and categories are defined during data analysis. Codes are derived from the data as richer phenomenon can be gained from this approach (Hsieh & Shannon, 2005).

A hundred bamboo dart containers were conveniently documented through systematic labeling, photographed, and analytically documented. Visible impressionistic analysis was then conducted on each dart cases. Immerging features were recorded, coded and themed. Out of the one hundred bamboo dart cases, only 26 containers will be discussed in detail in the next section of this paper as the existence of the three analyzed visual presentations are the most prominent on these dart cases. This is to put forth, confirm and justify three analyzed art forms that is visible and available in Batek arts.

4.0 ANALYSIS AND DISCUSSION

4.1 Existence of Fibonacci Numbers Influence

In studying the influence of the Fibonacci numbers in the carvings of these dart cases, the following elements as recorded in Table 1 were carefully studied; the number of /gəl gəl/ ‘line waists’ (refer to Figure 3), both top and below. The top /gəl gəl/ recorded a minimum of 5 and a maximum of 20 with an average of 12 top waistlines yet the lower waistline has less. This is to allow the placement of the strap/handle. The number of petals of the flowers carved (average 6) and the number of leaves on each side of the stem of the plants (average 2) are also documented. The representations of petals and leaves are carefully and thoroughly thought of as they demand precision and careful placements. Each bamboo section and width rarely pose high challenges to the Batek as bamboos sections are known to be at an almost similar size.

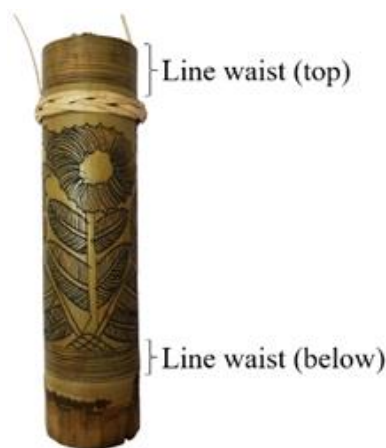


Figure 3: Line waist; top and below

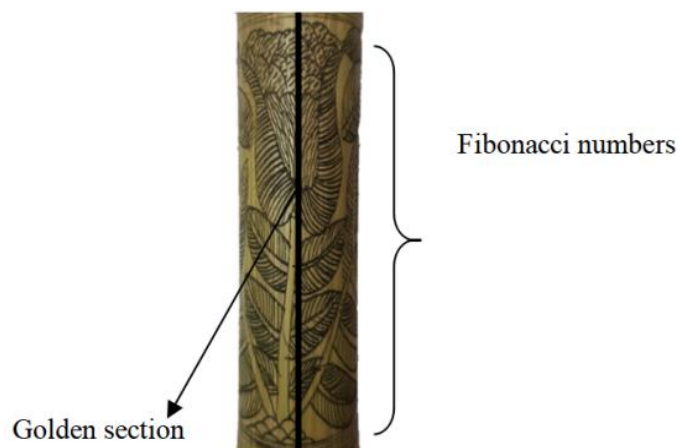


Figure 4: Tested variables

Since the carvings were based on the floral patterns and plants, the number of petals and leaves were a bit difficult to determine for some of the samples. And thus, the ones which cannot be determined were recorded as “not clear” and the ones which do not have the elements were recorded as “not available”.

Table 1: Existence of Fibonacci numbers

Sample number	No. of line waists (Top)	No. of line waists (Below)	No. of petals	No. of leaves on each side of the stem	Existence of Fibonacci numbers
S1	8	7	4, 5	2	√
S2	19	7	N/C	4,3,2	√
S3	16	9	N/A	N/A	X
S4	10	7	N/A	N/A	X
S5	9	8	N/A	1,3	√
S6	8	10	4, 7, 8, 9	N/C	√
S7	5	3	N/A	N/A	√
S8	7	7	N/A	6	X
S9	8	8	N/A	N/A	√
S10	15	15	N/C	1	√
S11	11	11	3	1,3	√
S12	8	8	8, 10	1,2,3,4	√
S13	13	9	N/A	N/A	√
S14	15	9	N/C	1	√
S15	18	11	N/C	1,2,3	√
S16	20	9	N/C	1,3	√
S17	8	4	N/A	N/A	√
S18	15	9	N/C	1,2	√
S19	7	7	3, 4	N/C	√
S20	27	10	N/A	N/A	X
S21	17	11	8, 10	1,3	√
S22	17	8	N/C	1,3	√
S23	19	12	N/C	1,2,3	√
S24	15	11	6, 7	1,2,3	√
S25	5	3	N/C	1,3	√
S26	11	9	3, 4	1,2	√
<i>average</i>	12.73	8.53	6.33	2.09	

√: The Fibonacci number exists in part of the dart case

X: The Fibonacci number does not exist in part of the dart case

N/C: Not clear

N/A: Not Available

For the purpose of this study, the sample is recorded as having the Fibonacci numbers influence if any one of the elements studied matches the number in the Fibonacci sequence. Based on the

data presented in Table 1, it can clearly be seen that the carvings somehow are very much influenced by the Fibonacci numbers as out of the 26 samples recorded, only four samples were found to have no influence of the Fibonacci sequence of numbers at all.

4.2 Existence of Golden Ratio Influence

Other than the Fibonacci numbers, the dart cases are also examined in terms of its compliance to the Golden ratio concept. For this section, the elements studied were the diameter of the bamboo and the bamboo base segment height. Instead of focusing only on the carvings, for this part, the focus is more on the bamboo that is used for the dart cases.

Based on the findings depicted in Table 2, 12 out of 26 samples adhere to the Golden ratio proportion. This means that most of the bamboo used to make the dart cases had carefully been selected to make sure that they have a good proportion that will give them the beauty that they deserved.

Table 2: Existence of golden ratio

Sample number	Diameter (a)	Bamboo base segment height (b)	a/b	Existence of golden ratio
S1	4.5	2	2.250	X
S2	4	3.3	1.212	X
S3	4.5	2.5	1.800	X
S4	3.9	2.5	1.560	√
S5	4.6	3.9	1.179	X
S6	4.5	3	1.500	√
S7	4.8	3	1.600	√
S8	4.8	2.5	1.920	X
S9	4.5	3	1.500	√
S10	3.5	2.3	1.522	√
S11	4.3	2.5	1.720	X
S12	4.4	2.8	1.571	√
S13	4.5	2.4	1.875	X
S14	4	2.3	1.739	X
S15	4.3	2.6	1.654	√
S16	4.2	2.7	1.556	√
S17	4.1	2.6	1.577	√
S18	4.5	2.5	1.800	X
S19	4.5	3.3	1.364	X
S20	4	4	1.000	X
S21	4.3	2.2	1.955	X
S22	4.2	2.3	1.826	X
S23	4.5	2.7	1.667	√
S24	4.5	2.5	1.800	X
S25	4.5	3	1.500	√
S26	4.5	3	1.500	√

Falls in interval [1.5, 1.7]

√: The golden ratio exists in part of the dart case

X: The golden ratio does not exist in part of the dart case

Source: Fieldwork, 2019

4.3 Symmetrical Element in the Carvings on Dart Cases

The symmetrical element in these carvings were observed using systematic content visual analysis where observations of symmetrical features were set on axis on whether the patterns are symmetrical and whether they are leaning towards the horizontal or the vertical axis. Table

3 below portrays the findings on the symmetrical element in the carvings on the samples studied.

Based on the Table 3 below, almost all the samples that have the symmetrical elements are vertically symmetrical. This indicates a pattern in the carvings by the Batek community in which the floral pattern used are, if symmetrical, more inclined to be vertically symmetrical. Item S13 and S17 are unique in this case. In each item, they both have divided depiction of flora that one is horizontal and another vertical, thus reported as both.

From the 26 samples studied, one prominent finding is the symmetrical presentation of the stalk image, as shown in Figure 4. Every main stalk consists of one flower and two to three sets of symmetrical leaves. This main stalk is accompanied by two symmetrical stalks on both sides. These symmetrical stalks come with three sets of leaves on its outer left and right with one leaf in its inner side which fit in the space left by the leaves from the main stalk.

Table 3: Symmetrical element in the carvings on dart cases

Sample Number	Symmetrical on vertical axis	Symmetrical on horizontal axis	Not symmetrical
S1	√		
S2	√		
S3			√
S4			√
S5			√
S6			√
S7			√
S8			√
S9			√
S10			√
S11			√
S12			√
S13	√	√	
S14	√		
S15	√		
S16	√		
S17	√	√	
S18	√		
S19			√
S20			√
S21	√		
S22	√		
S23			√
S24	√		
S25			√
S26			√
Total	11	2	15



Figure 6: Examples of the sequential patterns

4.4 Sequential Pattern in the Carvings on Dart Cases

One of the repeating patterns that can be seen on these dart cases is the ring-formation which constructs some sort of a sequential pattern which begins with a bigger base, followed by a smaller one up to the top. Figure 6 above shows some of the examples of the said pattern on the dart cases.

The pattern is usually carved on the “line waists” as its based, whether it is facing upwards or downwards. It could either be a base for a plant or it could also be an independent pattern on its own. As presented in Figure 7, the pattern is formed with a bigger base, which has five curves and referred to as Level 1, followed by Level 2 with four curves, Level 3 with three curves, Level 4 with two curves and topped with Level 5 with one curve. The number of levels depends on the number of curves that it has at Level 1. The bigger the number of curves, the more levels it would have.

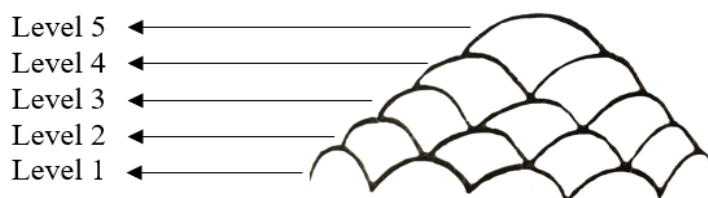


Figure 7: Sequential pattern in Batek arts

Table 4 below shows the recorded sequential pattern on the 26 samples that were being studied. All the 26 samples have this sequential pattern, with the lowest level being 4 and the highest

10. These mathematical sequential patterns may be drawn for division purposes where it indicates the beginning or the end of a pattern. The multiple occurrences of these patterns suggest the possibility of a more significant meaning to the Batek tribe.

A new mathematical pattern that appears based on this finding on the Batek artistic representation of sequential patterns can be described as below:

$$\{L - i + 1\}_{i=1}^L$$

L: number of curves at Level 1

i: level of representation

Table 4: Sequential pattern on dart cases

Sample Number	Number of Curves at Level 1 (L)	Pattern	Mathematical form
<i>S1</i>	6	{6, 5, 4, 3, 2, 1}	$=\{6 - i + 1\}_{i=1}^6$
<i>S2</i>	10	{10, 9, 8, 7, 6, 5, 4, 3, 2, 1}	$=\{10 - i + 1\}_{i=1}^{10}$
<i>S3</i>	9	{9, 8, 7, 6, 5, 4, 3, 2, 1}	$=\{9 - i + 1\}_{i=1}^9$
<i>S4</i>	10	{10, 9, 8, 7, 6, 5, 4, 3, 2, 1}	$=\{10 - i + 1\}_{i=1}^{10}$
<i>S5</i>	4	{4, 3, 2, 1}	$=\{4 - i + 1\}_{i=1}^4$
<i>S6</i>	4	{4, 3, 2, 1}	$=\{4 - i + 1\}_{i=1}^4$
<i>S7</i>	5	{5, 4, 3, 2, 1}	$=\{5 - i + 1\}_{i=1}^5$
<i>S8</i>	5	{5, 4, 3, 2, 1}	$=\{5 - i + 1\}_{i=1}^5$
<i>S9</i>	4	{4, 3, 2, 1}	$=\{4 - i + 1\}_{i=1}^4$
<i>S10</i>	8	{8, 7, 6, 5, 4, 3, 2, 1}	$=\{8 - i + 1\}_{i=1}^8$
<i>S11</i>	6	{6, 5, 4, 3, 2, 1}	$=\{6 - i + 1\}_{i=1}^6$
<i>S12</i>	4	{4, 3, 2, 1}	$=\{4 - i + 1\}_{i=1}^4$
<i>S13</i>	7	{7, 6, 5, 4, 3, 2, 1}	$=\{7 - i + 1\}_{i=1}^7$
<i>S14</i>	8	{8, 7, 6, 5, 4, 3, 2, 1}	$=\{8 - i + 1\}_{i=1}^8$
<i>S15</i>	4	{4, 3, 2, 1}	$=\{4 - i + 1\}_{i=1}^4$
<i>S16</i>	4	{4, 3, 2, 1}	$=\{4 - i + 1\}_{i=1}^4$
<i>S17</i>	5	{5, 4, 3, 2, 1}	$=\{5 - i + 1\}_{i=1}^5$
<i>S18</i>	6	{6, 5, 4, 3, 2, 1}	$=\{6 - i + 1\}_{i=1}^6$
<i>S19</i>	5	{5, 4, 3, 2, 1}	$=\{5 - i + 1\}_{i=1}^5$
<i>S20</i>	10	{10, 9, 8, 7, 6, 5, 4, 3, 2, 1}	$=\{10 - i + 1\}_{i=1}^{10}$
<i>S21</i>	5	{5, 4, 3, 2, 1}	$=\{5 - i + 1\}_{i=1}^5$
<i>S22</i>	4	{4, 3, 2, 1}	$=\{4 - i + 1\}_{i=1}^4$
<i>S23</i>	5	{5, 4, 3, 2, 1}	$=\{5 - i + 1\}_{i=1}^5$
<i>S24</i>	5	{5, 4, 3, 2, 1}	$=\{5 - i + 1\}_{i=1}^5$
<i>S25</i>	4	{4, 3, 2, 1}	$=\{4 - i + 1\}_{i=1}^4$
<i>S26</i>	4	{4, 3, 2, 1}	$=\{4 - i + 1\}_{i=1}^4$

The difference between this newly found sequential patterns from the Fibonacci pattern is that the sequential pattern will appear when the sum of the available level is deducted by the number of the current level to produce the amount of item that shall appear unlike the Fibonacci where the output acts as the plus agent to produce the next total amount of items. This shows Fibonacci patterns can appear in any given directions (Campbell, 2010) whilst the sequential patterns that exist in Batek arts are based on horizontal levels rising vertically. The sequential patterning

action is already proven in nature (MaBouDi et al., 2020) yet to formularize them in the field of arts is novel and supported by Park, Chang, Tang, Treagust, and Won (2020) who analyzed students' drawings and found five patterns interplay in sensory, substance and unseen substance pictorial representation levels.

5.0 CONCLUSION

The Batek decorative arts are mostly based on the nature around them, specifically the floral patterns and plants for the dart cases. Mohd Noor et al. (2019) discussed how these artworks are closely related to their beliefs and ways of life. Although there are some of the dart cases which are carved in a more geometrical manner rather than the normal floral and plants pattern, the latter is more prominent in their choice of design for the carvings. As nature is closely abiding to the Fibonacci concept, the representations of flora and fauna in Batek art may imitate such observations in a much-refined manner. The findings which suggested the existence of Fibonacci influence means that the Batek Hep are attentive of their surrounding (Ibrahim et al., 2015) and this is reflected in their carvings which resemble the true nature that surrounds them. This is because as stated earlier, most of the plants around us do have the Fibonacci sequence element (Atela et al., 2003; Devlin, 2011; Fredeen et al., 2004; Valladares & Brites, 2004; Watson, 2017) and with these carvings complying to the same characteristic, it shows that the Batek are representing the floral patterns on its dart cases rather accurately.

In summary, Batek arts have these qualities; firstly, it abides to Fibonacci concept; secondly, it possesses Golden ratio influences; and thirdly, the appearances of sequential patterns appear at a minimum of four. The appearances of these qualities shall differentiate the Batek tribe's arts from other Malaysian indigenous tribes' arts. Batek carvings, being congruent to the Fibonacci concept and Golden Ratio influences elevates their value as they are not aimlessly drawn nor mere impressionistic of the carvers. Thoughts and creativity are placed in hand to produce such heritage worthy memento.

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