

AN ECO-MATERIAL CULTURAL STUDY ON BIRD TRAPS AMONG THE PALAWAN OF THE PHILIPPINES

STUDI BUDAYA EKOLOGI DAN MATERIAL PERANGKAP BURUNG PADA MASYARAKAT PALAWAN DI PULAU PALAWAN, FILIPINA

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Abstract. This study clarifies how eco-material culture is exemplified in bird traps and the use in the environment in terms of: 1) the ecological aspects and material culture of bird traps; 2) the practicality of trapping techniques; and 3) the relationships among bird traps, birds, and people from an ethno-archaeological viewpoint. The research target is the Palawan, an indigenous people of Palawan Island, the Philippines. The research methods are interviews and participant observation. The research suggests that current bird traps are made of plant materials with nylon for convenience, but plant materials remain fundamental. Further, since Palawan bird-trapping technology is unrefined, and as traps are sometimes unsuccessful, trapping is likely done for enjoyment and as a challenge. Thus, bird traps connect humans to nature, as reflected in the Palawan's eco-material culture.

Keywords: Bird traps, eco-material culture, the Philippines, Palawan Island, Palawan people

Abstrak. Tujuan dari penelitian ini adalah menjelaskan perangkap burung yang menggunakan bahan-bahan dari tanaman dan penggunaannya di lingkungan, serta membahas tentang: 1) aspek budaya ekologi dan material dari perangkap burung; 2) teknologi perangkap burung; dan 3) hubungan antara burung, perangkap burung, dan manusia dari sudut pandang etnoarkeologi. Metode penelitian ini adalah wawancara dan observasi partisipan. Target penelitian adalah penduduk asli Pulau Palawan di Filipina. Penulis memastikan bahwa perangkap burung yang biasa digunakan pada masa kini dibuat dari bahan tanaman dan plastik nilon untuk kemudahan. Sementara itu, masyarakat Palawan masih menggunakan bahan-bahan tanaman sebagai bahan utama dalam membuat perangkap burung, dan teknologi yang digunakan merupakan perkembangan dari metode perangkap tradisional. Tujuan masyarakat Palawan menggunakan perangkap bukan semata-mata untuk menangkap burung, tetapi untuk menakut-nakutinya juga agar penduduk dapat hidup berdampingan dengan burung di lingkungannya. Dari hasil penelitian dapat disimpulkan bahwa perangkap burung merupakan alat yang digunakan oleh masyarakat setempat untuk hidup berdampingan dengan burung dan merefleksikan prinsip hidup masyarakat alami yang hidup berpusat pada budaya ekosistem dan material.

Kata kunci: Perangkap burung, budaya ekologi dan material, Filipina, pulau Palawan, masyarakat Palawan

INTRODUCTION

Bird traps are tools to catch birds primarily. However, there are other purposes to use bird traps. The hypothesis of this study is that bird traps are also tools to build a symbiotic relationship with birds. Judging from this research work among the Palawan, an indigenous group of shifting cultivators and fishermen in Palawan Island, the Philippines, this study reached the conclusion that bird traps are tools not only for catching birds but also for "bargaining"

with birds. Bird traps are also products of the ecological and cultural system to enrich their lives in natural society. Thus, bird traps are defined as an eco-material cultural artifact among the Palawan.

Bird traps have been used as a universal hunting method all over the world for thousands of years (Bub 1978: 11). Trapping is the best hunting technique; it involves complicated production and uses, indicating the degree of development of humans' cognitive abilities (Sano 2015: 137). Traps are a type of technology,

and intuition and knowledge of animals and nature are required to make a successful trap (Kreps 2016: XIII). Bird traps in particular reflect people's passionate nature, as a bird trap is the product of imaginative, original ideas, and a material culture that makes human-bird relationships pleasurable. Bird traps are simple hunting methods because birds have no teeth or claws (Bowler 2017: 1), and they also have the advantage of not requiring frequent checks (Oswalt 1983: 181-207) or movements, like throwing a spear (Leroi-Gourhan 2012: 387). In addition to the mere purpose of acquiring bush meat, using bird traps also can involve an element of play that leads to feelings of excitement (Gibson 2018: 4). In this way, humanity has devoted considerable passion to bird trapping. To elucidate each of the above issues concretely, it is necessary to examine the eco-material cultural artifact of bird traps and the society in which they are used.

Many studies have shown that bird traps are universal. Bub (1978: 17-307) provides a systematic description of about 200 kinds of bird traps in 13 countries from the perspective of ornithology. The study shows that bird traps have been used in diverse ways, such as for capturing birds for their feathers in Western nations (which are considered developed countries). However, it only includes cases from Europe and the United States and focuses on feathers; examples from Africa, Oceania, and South America are not included. Furthermore, the study does not seem very familiar with the developing world and East Asian bird traps. Another study on British bird traps identified 18 kinds, but the study recognizes the main purpose of bird traps as collecting feathers (Gibson 2011:1-35). A different study found 12 kinds of bird traps are used among the Tongwe people in Tanzania (Itani 1977: 500-508). In the Philippines specifically, 13 types of bird traps are described from the standpoint of material culture (MacGregor and Gardner 1930: 89-100). The study reports that bird traps can be used to capture live birds, a feature that greatly overlaps with the case focused on in this study. Moreover, it has been found that birds are hunted for their meat as well as for sport, but those hunted for sport are done so in a wider context, such as for trading

and breeding (Tsuji 2016: 335-336). Several guides on trapping animals, including birds (Kreps 2016: 1-153; Gibson 2018: 4) have been published, and several specific case studies of trap use (Ferdinandus-Mustamu 1985: 46-48, 76-90; Imai 1980: 12-14; Matsui 1977: 589-609; Oswalt 1976: 181-207; Tsuji 2013: 170-172) have been conducted, but few studies have explored bird traps systematically.

The present study is a contemporary ethno-archaeological examination. Ethno-archaeology focuses on using knowledge of modern-day people in order to understand past cultures and societies (Goto 2001: 1). Ethno-archaeological research on bird traps made mainly of natural products are also necessary because they tend to break down rather than to persist as artifacts. This study employs the lens of eco-material cultural artifact to clarify the ecological aspects of bird trapping on Palawan Island, as well as its material cultural elements, seeking to understand how these facets are intertwined with regard to bird traps. More specifically, this study attempts to reveal the relationship between ecology and material culture and how the latter functions within the former as eco-material culture. The study of eco-material culture focuses on human culture in an ecological environment, specifically on objects made from natural materials used by people for various reasons, like for sustaining their livelihoods, and drawing the relationships between ecology and materials in a natural society. It also attempts to connect ecological anthropology and material cultural study, which have both "eroded traditional divisions between humanistic and science-based approaches" on ecology and material culture (Ingold 2012: 427).

The author has already published an article on the bird traps of the Palawan, a shifting cultivators and fishermen on Palawan Island in the Philippines, as well as their reasons for hunting birds (Tsuji 2016: 336-340), but the author was unable to discuss the elements of eco-material culture in that piece due to space limitations. Therefore, this study compensates for the shortcomings of the previous article. Furthermore, there is no archaeological research on the Philippines that has dealt with bird traps

sufficiently, and there is a lack of awareness in the sense that no systematic investigation has been conducted, especially concerning bird traps' connection to material culture. Thus, in this research a preliminary study is introduced on the material culture of a comparatively structured bird traps, focusing on Palawan bird traps on Palawan Island in the Philippines. Detailed information of the Palawan is described in next chapter.

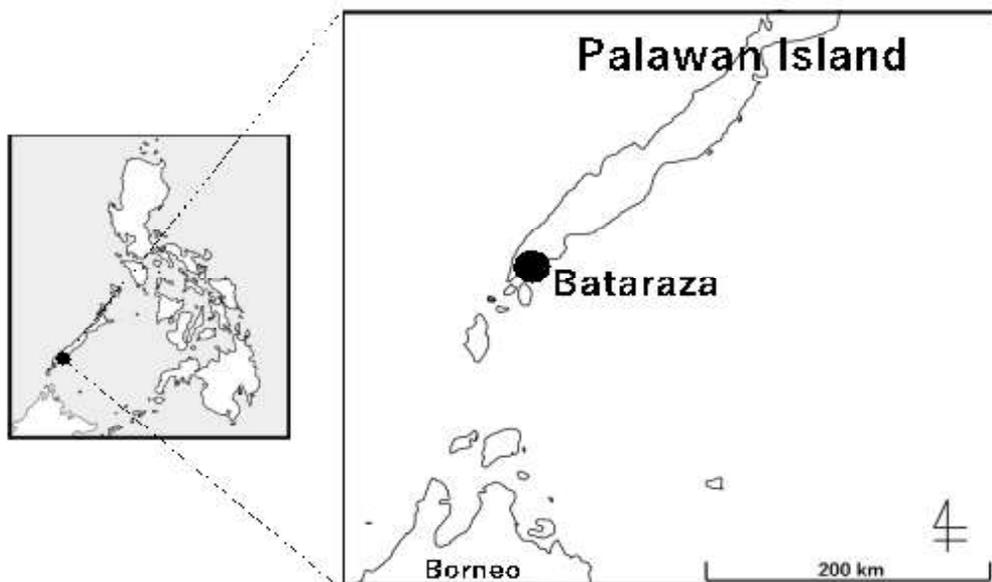
METHODS

The research was conducted at B Village where Palawan live in the municipality of Bataraza on the southern part of the island (Figure 1). As of 2017, the population comprised 546 people in 124 households¹. The author carried out field surveys among the Palawan in B village from August 9 to 20, 2013. The research methods included interviews, and participant observation. A total of 67 people (34 men, 33 women) took part, ranging in age from 10 to 70 (with an average age of 32). The author asked them about their experience with making and using bird traps, the types of birds they hunted, and their reasons for

hunting. During participant observation, the author asked people familiar with bird traps to make samples and investigated their structure and function by collecting objects. To identify birds, the author employed the bird encyclopedias developed by Fisher and Hicks (2000: 20-140) and Kennedy et al. (2000: Plate 1-72). Although the locals speak the Palawan language, they can understand Tagalog, the language in which the author conducted the research.

At the research site, the main subsistence activities are complex tasks consisting of shifting and coconut cultivation, coastal fishing and gleaning, and livestock husbandry. In recent years, a nickel mining company in Bataraza enlarged its operations, and quite a few locals work for it. In addition, people have started working on oil palm plantations and in banana gardens.

The Palawan practice animism. A person (*tarok*; vernacular Palawan), who is considered a shaman, socially performs rituals, which are related to shift cultivation and are meant to cure the sick (Tsuji 2008: 305-308). The Palawan's animism became diluted due to contact with



Source: Drawn by author 2019

Figure1 Location of the research site

¹ Based on the household survey record by the tribal chieftain of B Village.

neighboring Muslims and Christians, the death of elderly people who played a central role in rituals, and the influence of modernization. Their rituals have gradually become difficult to carry out.

Their social system is bilateral, and most neighbors are kindreds. Marriage is extended to second cousins. Dowry is prepared for the bridegroom to bestow upon the bride under negotiation among the parents and traditionally influential leaders (*panglima*; vernacular Palawan). A newly married couple tends to stay at the bride's house and the bridegroom works for the bride's family in a labor exchange until the couple can earn enough to be independent.

The Palawan are the largest of nine ethnic minorities on Palawan Island, with a population of 97,620 as of 2010 (National Statistics Office 2012: 100). They mostly live in mountainous areas in the southern part of the island and have relied on shifting cultivation as their main subsistence activity. However, problems emerged in relation to such farming following the rapid development of natural resources and the corresponding increase in the population (due to immigration from other islands), and the decline of soil fertility (Tsuji 2006: 101). Hence, in order to take advantage of marine resources, Palawan people from mountainous zones moved to B Village. Utilization of marine resources primarily occurs in coastal areas (Tsuji 2005: 77-79; 2006: 112).

The Palawan say they hunted wildlife, including birds, more often in the past, but this does not happen as much today because of reduced wildlife resources. Hunting tools, such as the blowgun and harpoon, are kept at home but are hardly used. People said they sometimes hunt birds but are not actively engaged in doing so. They do not raise many wild birds at home, and it seems that bird hunting occurs to some extent.

RESULTS AND DISCUSSION

Palawan Bird Traps and other Hunting Methods

As for bird hunting methods in the research area, the author confirmed 14 techniques (Table 1). These include nine types of bird traps, roughly divided into: 1) snare traps (*litag*; vernacular

Table 1 Bird Hunting Methods of the Palawan

Classification	Name of trap
Snare trap (<i>litag</i>)	<i>Litag</i> (general snare trap)
	<i>Bintuka</i> (powerful snare trap)
	<i>Sārok</i> (powerful snare trap both for birds and animals)
	<i>Pidlong</i> (snare trap using <i>Alocasia</i> fruit)
	<i>Perangkap</i> (snare trap using a drop lid)
Wire trap (<i>silo</i>)	<i>Labay</i> (wire trap for the red junglefowl)
	<i>Bilagong</i> (wire trap for the water hen)
	<i>Rakar</i> (wire trap set in a bird's nest)
Methods without traps	<i>Bingbing</i> (wire trap set in a tree)
	<i>Impulut</i> (bird lime)
	<i>Kākwiṭ</i> (bird whistle)
Missile	<i>Kākā?</i> (imitation of bird's cries)
	<i>Supok</i> (blowgun)
	<i>Tilador</i> (slingshot)

Source: Created through the author's participant observation and interviews

Palawan; five kinds); and 2) wire traps (*silo*; vernacular Palawan; four kinds). There are alternative methods that do not involve traps such as bird lime and imitating a bird's cries or whistle. There are also two types of missiles: the blowgun and slingshot.

Snare Traps (*litag*; vernacular Palawan) **General snare trap (*litag*)**

Plants such as bamboo (*kawayan*; vernacular Palawan; specifically, *Bambusa* spp.) are used to make the springs of a trap, and birds are captured when the springs bounce upward. The springs are pierced and affixed to the ground. The nylon thread at the apex of the spring is tightened. A nylon thread is placed at the top of the spring, which makes the tip of the thread falls as the bird hangs. Fasteners made of wooden branches are affixed to the ground, and wooden pieces are tied around the center of the thread. When a piece of wood catches on a fastener, the spring works in a sudden manner. When a bird touches the piece of wood and the wood is removed from the fastening tool, the bird is snared and bounced up in the air. Food such as rice and grains are used as bait. Red junglefowls, quails, and spotted doves are the primary targets. Currently, nylon parts are used, but in the past, rattan (*way*; vernacular Palawan; specifically, *Calamus* spp.) was used. A *Litag* is

a basic trap that seven or eight-year old children can make.

Powerful snare trap (*bintuka*)

The structure of this trap is almost the same as that of a *litag* but it is more powerful and can kill birds (Figure 2). By strengthening the spring with wood and nylon strings, it is possible to catch larger prey. The plant material, which becomes the spring, is unidentifiable. Here, rice and grains are also used as bait. Red junglefowls, spotted doves, and others are the main targets. This trap must be used carefully since in the past, its wooden pieces accidentally stabbed an elderly person from the village in one eye, causing blindness.

Powerful snare trap for birds and other animals (*särok*)

The snare is strongly supported by struts made of plants such as *Lepisanthes rubiginosa* (*ämbobosog*; vernacular Palawan) and *Streblus ilicifolius* (*ulos*; vernacular Palawan; Figure 3). A wire is placed around the trap. A fence is created with bamboo (or a similar material) beside the trap so that a bird will enter it. The bird is snared when it touches the device, which is crossed with nylon in a trap made of rattan. Although this trap is chiefly used to catch red junglefowls, it is versatile and can catch mammals² as well.

Snare trap using *Alocasia* fruit (*pidlong*)

Materials such as *Lepisanthes rubiginosa* are used (Figure 4). It is designed to look like a spot where a bird might perch, and ripe *Alocasia* fruit (*Alocasia odora*; *biga*; vernacular Palawan) is used as bait. When a bird is drawn toward the fruit, it touches the perch, and the ring of the trap makes the bird jump upward. The Japanese reef warbler, slender-billed crow, and Asian koel are often hunted.



Source: Photo by the Author 2013

Figure 2 Powerful Snare Trap (*Bintuka*)



Source: Photo by the Author 2013

Figure 3 Powerful Snare Trap for Birds and Animals (*Särok*)

Snare trap using a drop lid (*perangkap*)

Bamboo and *Eupatorium* (*Eupatorium odoratum*; *däläyä*; vernacular Palawan) are used as materials (Figure 5). The trap in Figure 5 was created using a case of beverages for the purpose of convenience, but normally, the lid is woven from bamboo. The lid falls when a bird touches the wooden pieces to eat grains of rice.

² For mammals: Crab-eating macaque (*Macaca fascicularis*, *uyaw*; vernacular Palawan), Palawan bearded pig (*Sus ahoenobarbus*, *biyäk*; vernacular Palawan), Palawan bearcat (*Arctictis binturong whitei*, *mänturun*; vernacular Palawan), Asian palm civet (*Paradoxurus hermaphroditus*, *masäk*; vernacular Palawan), Philippine short-tailed porcupine (*Thecurus pumilus*, *landak*; vernacular Palawan), a kind of squirrel (*Callosciurus* sp., *basing*; vernacular Palawan), Malayan pangolin (*Manis javanica*, *tänggiling*; vernacular Palawan). For reptiles: Palawan water monitor (*Varanus palawanensis*, *pilus*; vernacular Palawan). Sometimes these animals are caught.



Source: Photo by the Author, 2013
Figure 4 Snare Trap Using *Alocasia* Fruit (Pidlong)



Source: Photo by the Author 2013
Figure 5 Snare Trap Using a Drop Lid (Perangkap)

This trap do not kill the trapped bird, thus it is caught alive. Quails, king quails, and spotted doves are the main targets.

Wire Traps (silo; vernacular Palawan)
Wire traps for red junglefowl (labay)

A bundle of rings is used for the trap, which is mostly used to catch red junglefowls (Figure 6). People judge the bird's path based on detailed clues such as foot prints; then, they set the trap. Birds are caught alive. In the past, rattan was used, but now nylon substitutes it.

Wire trap for quails (bilagong)

Nylon rings are set around a thick stem (e.g., *Eupatorium*). The surrounding grass is beaten down and a path is made for birds. Quails are the principal hunting target and caught alive. King quails and spotted doves can also be caught.

Wire trap set in a bird's nest (rakar)

It is dome-shaped, and skeleton-like figures made of bamboo strips and nylon rings are attached to the four corners of the base of the dome (Figure 7). The trap is placed in a bird's nest in a tree and it is covered up. The trap is set when the parents (birds) are absent. As they return to their nests, they become tangled in the nylon traps and are caught alive. The emerald doves, spotted doves, and Japanese leaf warblers are the primary targets.

Wire trap set in a tree (bingbing)

The author did not investigate this type of trap and it will not be mentioned here in after.



Source: Photo by the Author 2013
Figure 6 Wire Trap For Red Junglefowl (*Labay*)



Source: Photo by the Author 2013
Figure 7 Wire Trap Set in a Nest (*Rakar*)

Hunting Methods without Traps: The Pre-stage of the Bird Trap

Bird lime (*impulut*)

The sap of the breadfruit (*Artocarpus altilis*; *impulut*; vernacular Palawan) or jackfruit (*A. heterophyllus*; *nangka*; vernacular Palawan) is used to catch birds (Figure 8). A tree trunk is scratched with a hatchet, and the sap is collected with sticks. The hunter determines the tree where the bird often stops and smeared the sap on the tree's branches. The Japanese leaf warblers, golden-bellied gerygones and blue-naped parrots are among the key targets.

Imitation of bird's cries (*kākā*)

The cry of a red-legged crane (*kākā, kākā, kākā*) is imitated. Hence, this type of bird is the main target. When the hunter approaches the bird, he/she kills it with a hatchet.

Bird whistle (*kākwit*)

When a hunter whistles like a bird (Figure 9) on a moonless night, birds of the water hen family (such as the white-bellied water hen) will approach, and the hunter kills them with a hatchet. This seems to be a developed form of *kākā*, described earlier. *Schizostachyum lumampao* (*bongbong*; vernacular Palawan) and *S. lima* (*sumbiling*; vernacular Palawan), the genera of bamboo, are used to make a whistle. The trunk is processed with a hatchet so that a sound comes out.



Source: Photo by the Author, 2013
Figure 8 A Man Collecting Bird Lime (*Impulut*; Vernacular Palawan) From a Jackfruit Tree



Source: Photo By the Author, 2013
Figure 9 Bird Whistle (*Kākwit*)

Missiles

Blow gun (*supok*)

Making a blow gun is done by removing the internal nodes from a bamboo (*Bambusa* spp.) stem, about 150-200 cm in length, and the stem is carved into a hollow cylinder (Figure 10). Beeswax is then used to cover the tip and strengthen it. Further, more bamboos (*Bambusa* spp.) are processed into a rhombus shape and coated with poison. Although the contents of the poison are not clear, they are probably extracted from beetle larvae. The arrows are put into a quiver. When hunting, the arrow is placed into a blowgun, and the arrow is blown with a strong breath from the mouthpiece.

Slingshot (*tilador*)

A y-shaped handle of a slingshot is made by shaping it from a branch or trunk of a jackfruit tree (Figure 11). Tips of the y-shaped handles are bound with a strong rubber strip obtained outside of the village, and leather patches are attached to the rubber to launch a stone like a bullet.



Source: Photo by the Author 2007
Figure 10 A Palawan Man with a Blow Gun (*Supok*)



Source: Photo by the Author 2007
Figure 11 A Palawan Boy with a Slingshot (*Tilador*)

The Eco-Material Culture of Bird Trapping in Palawan

Bird Trapping Materials Used Among the Palawan

The Palawan use snare and wire traps as well as hunting tools that do not involve traps or missiles. The author confirmed 12 out of 14

methods, including bird traps (Table 2). As a result, the author was able to determine which hunting methods involve plant materials, used both in the past and present. Thus, pieces of equipment (including traps) are products of nature. Currently, at least 10 types of plant materials are used, excluding those that cannot be identified. Plant materials are used more often than the Palawan acknowledge. Bamboo (*Bambusa* spp.) is used the most frequent due to the ease of processing it, as well as the degree to which it improves snare traps. Although not all bamboo types have been identified, more than eight types have been categorized (including *Schizostachyum lumampao* and *S. lima*)³, they are also used as materials for daily life. In addition to bamboo shoots, *Lepisanthes rubiginosa* (*ãmbobosog*) is used as a strut, which becomes the spring of a snare trap. This plant is edible; its leaves are fed to goats, so people have relatively close relationship with it. The plant materials shown in Table 2, including bamboo and *ãmbobosog*, are also closely linked to people. Any tree of such plants can be employed as a pillar for a bird trap, but the plant materials that should be used are specific.

Table 2 Plant Materials Used for Bird Traps and Other Hunting Methods

Material	Scientific name	Local Name	litag	bintuka	sàrok	pidlong	labay	bilangong	rakar	perangkap	impulut	kàkwit	supok	tilador
1	Bamboo	<i>Bambusa</i> spp.	kawayan	•	-	•	-	-	•	•	-	-	•	-
2	Rattan	<i>Calamus</i> spp.	way	-	-	•	•	-	-	-	-	-	-	-
3	ãmbobosog	<i>Lepisanthes rubiginosa</i>	ãmbobosog	-	-	•	•	-	-	-	-	-	-	-
4	Ulos	<i>Streblus ilicifolius</i>	ulos	-	-	•	-	-	-	-	-	-	-	-
5	Alocasia	<i>Alocasia odora</i>	biga	-	-	-	•	-	-	-	-	-	-	-
6	Eupatorium	<i>Eupatorium odoratum</i>	dàlayây	-	-	-	-	•	-	•	-	-	-	-
7	Breadfruit	<i>Artocarpus altiss</i>	impulut	-	-	-	-	-	-	-	•	-	-	-
8	Jackfruit	<i>Artocarpus heterophyllus</i>	nangka	-	-	-	-	-	-	-	•	-	-	•
9	Bongbong	<i>Schizostachyum lumampao</i>	bongbong	-	-	-	-	-	-	-	-	•	-	-
10	Sumbiling	<i>Schizostachyum lima</i>	sumbiling	-	-	-	-	-	-	-	-	•	-	-
11	Other (unidentifiable)	-	-	•	•	-	-	-	-	-	-	-	-	-
12	Nylon	-	-	•	•	•	•	•	•	•	-	-	-	-
13	Rubber	-	-	-	-	-	-	-	-	-	-	-	-	•

Source: Participant Observation and Interviews

³ In this study, I only mention eight kinds of bamboo: *kawayan*, *patongsog*; vernacular Palawan, *rabo*; vernacular Palawan, *bayog*; vernacular Palawan, *napnap*; vernacular Palawan, *taring*; vernacular Palawan, *bongbong*, and *sumbiling*.

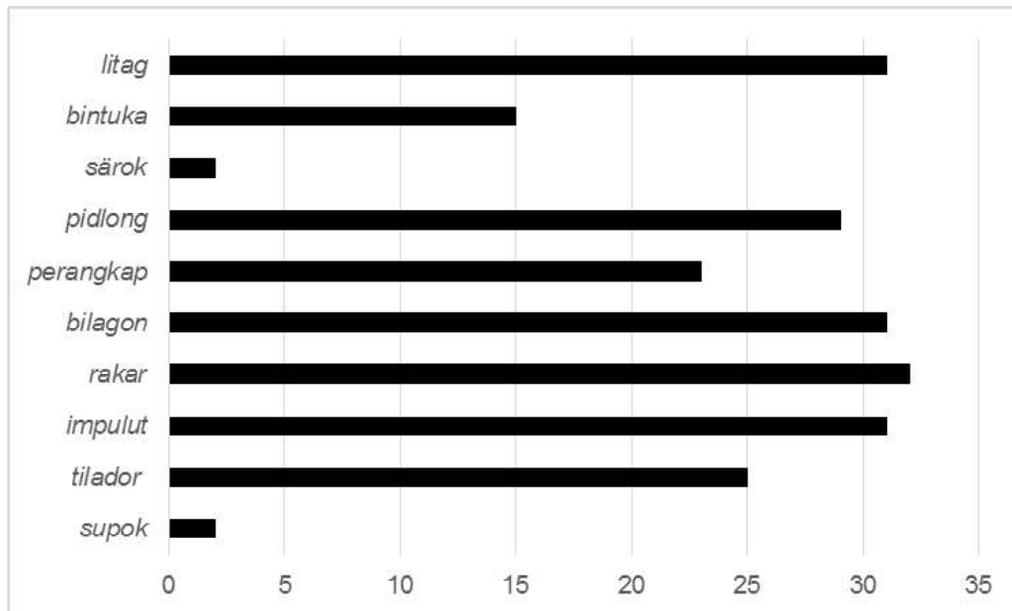
In the past, rattan (*Calamus* spp.) was used as part of a bird trap that capture the bird and for binding purposes. Today, nylon is used for all bird traps instead of rattan. Presently, rattan resources are decreasing dramatically due to overexploitation, coupled with the popularity of nylon. The use of nylon, which is easier to process and harder for birds to escape from, has progressed. It is unclear exactly when nylon was introduced and became popular⁴. Moreover, due to the widespread use of nylon, it will be necessary to clarify in future interviews whether the efficiency of hunting birds has risen as visibly as in the fishing industry. This way, nylon becomes increasingly used as a superior functional material in key points of bird traps. It is an indispensable element for contemporary bird traps.

The bird traps shown in Table 2 are made of two to five kinds of materials (with an average of 2.75 types). Five materials are used for the powerful and elaborate snare trap for birds and animals (*särok*), while three for the general snare

trap (*litag*), the snare trap that uses *Alocasia* fruit (*pidlong*), and the snare trap using a drop lid (*perangkap*), as well as two others. Hence, bird traps are made of various materials. Moreover, as bird traps no longer require traditionally used plant materials, they have developed into mixed structures with contemporary nylon. Nylon is employed for all bird traps, which indicates nylon has now become an essential indigenous or folk material owing to its widespread use.

Frequency of Hunting Birds Using Technology

This section discusses the frequency of hunting birds based on the use of technology. The Palawan use other tools besides bird traps for hunting. The author investigated the tools and methods based on hunting frequency for the year prior to the survey (from August 2012 to August 2013). In August 2013, the author administered a questionnaire survey and interviews, and the final data set comprising information from multiple questionnaires and interview sessions (Figure 12).



Source: Questionnaires and Interviews

Figure 12 Frequency of Bird Hunting Tool Use by the Palawan From August 2012 To August 2013 (N=67 People; Information Compiled From Multiple Questionnaires and Interview Sessions)

⁴ Palawan Island was "the last frontier of the Philippines." A large number of settlers rushed there for new opportunities starting in 1949. It is estimated that nylon was introduced through fishermen (and others) at the time, and a convenient environment developed that is suitable for creating bird traps.

The frequency of use for the general snare trap (*litag*), the snare trap using a drop lid (*perangkap*), and the sna

re trap using *Alocasia* fruit (*pidlong*) is high, but the three traps are relatively easy to create and employ. On the contrary, making the snare trap for birds and animals (*sārok*) and the powerful snare trap (*bintuka*) require skills and labor; thus, both traps are hardly used, especially the *sārok*. The wire trap for quails (*bilagong*) is frequently used and setting it up is as simple as placing nylon wire traps on grass. The wire trap set up in a bird's nest (*rakar*) is the most repeatedly used chiefly by people who can climb trees. The wire trap for red junglefowls (*labay*) did not appear in the results but sometimes it is used by men who are passionate about capturing the creature.

Among the hunting methods that do not use traps, bird lime (*impulut*) is often used. Birds can be easily caught using the sap of trees of breadfruit and jackfruit as the smell may attract birds. At the same time, this technique is employed with high frequency because it is suitable for hunting birds, including parrots and common hill myna, that are traded at high price. The study on imitating a bird's cries (*kākā*) and a bird's whistle (*kākwi*) did not result anything, and both are rarely employed due to low certainty of success. Regarding missiles, the blowgun (*supok*) is primarily used by youth and the elderly, but not as frequent as the slingshot (*tilador*). The latter is actively employed because creating and using a *tilador* is easier than a *supok*.

As mentioned above, the Palawan mainly use the *litag*, *perangkap*, *pidlong*, *bilagong*, and *rakar*, and people frequently also employ the *impulut* and *tilador* in addition to wire traps (*silo*). Generally, it can be determined that the Palawan select particular hunting equipment according to the ease of making and using the particular tool and based on its effectiveness in hunting and capturing birds.

Birds to be Hunted

The interviews revealed that the Palawan use at least 10 kinds of bird traps and hunt 18 families of wild birds (Table 3)⁵. Regarding scientific order, the Passeriformes constitute 12 kinds as the largest number of birds, followed by four Columbiformes and four Galliformes, respectively. Aside from Anseriformes and Ciconiiformes, none of the birds mentioned earlier migrate; hence, bird hunting is not based on seasonality suggesting that birds are frequently sought after. Many of the hunted species are from the families of Columbidae, Phasianidae, and Cacatuidae which all of them tend to be captured alive. The Columbidae and Phasianidae families are hunting targets for the above-mentioned snare and wire traps. The Cacatuidae are mostly captured with bird lime and are subject to being bought and sold, together with Sturnidae, and are not eaten.

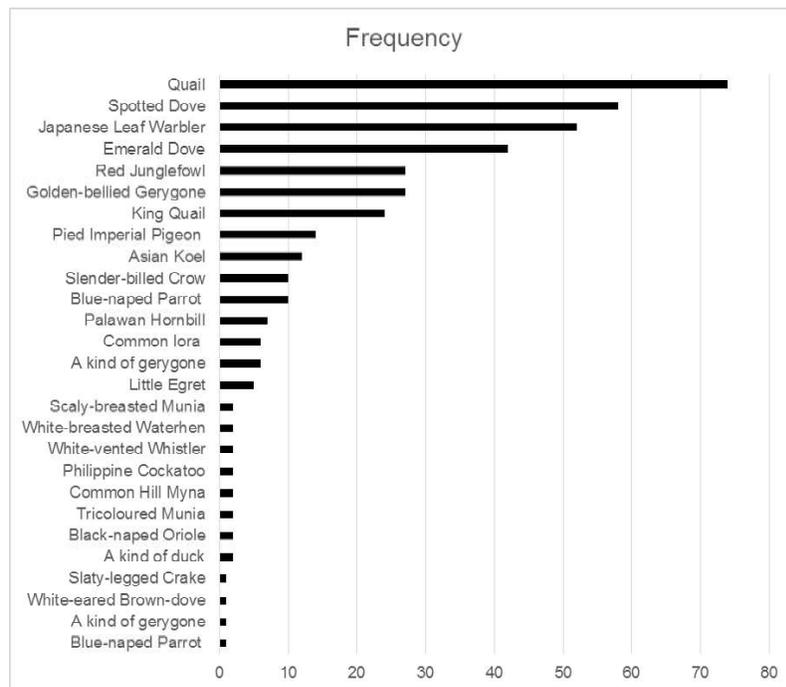
Furthermore, the author clarified the hunting frequency of 28 kinds of birds based on the questionnaire survey and interviews (Figure 13a). According to the hunting frequency chart, the following birds are captured primarily through trapping: quail, spotted dove, Japanese leaf warbler, emerald dove, red junglefowl, golden-bellied gerygone, and king quails are hunted more often. Both men and women are proficient at hunting quails, Japanese leaf warblers, and emerald doves, followed by king quails; however, men are expert in capturing the red junglefowls, while women in golden-bellied gerygones. The difference between the two sexes is that men are enthusiastic about hunting red junglefowls, whereas women are not. Men take pride in owning red junglefowls that they capture without any help. In addition, small birds such as the Japanese leaf warblers and the golden-bellied gerygones are often hunted because the Palawan said these small birds are edible. By hunting small birds, the Palawan can refine their hunting

⁵ In terms of targeting particular birds, the Palawan people hunt birds that are notoriously disruptive to their fields, such as the brown hawk-owl (*Ninox scutulata palawanensis*, *ngok-ngok*; vernacular Palawan) and the large-tailed nightjar (*Caprimulgus macrurus*, *pirokod*; vernacular Palawan). Since owls have big eyes and sharp nails, it is thought that women who eat them will give birth to children that resemble them. The large-tailed nightjar is said to make a person cough if eaten.

Table 3 Birds Hunted by the Palawan

	Order	Family	Local Name	Scientific Name	English Name
1	Anseriformes	Anatidae	wild duck	<i>Anas sp. ?</i>	A kind of duck
2	Psittaciformes	Cacatuidae	lāgay	<i>Cacatua haematuropygia</i>	Philippine cockatoo
3	Psittaciformes	Cacatuidae	pikoy	<i>Tanygnathus lucionensis</i>	Blue-naped parrot
4	Psittaciformes	Cacatuidae	Kālit	<i>Prioniturus platenae</i>	Palawan racquet-tailed parrot
5	Galliformes	Phasianidae	labuyu	<i>Gallus gallus</i>	Red junglefowl
6	Galliformes	Phasianidae	Pugo	<i>Coturnix japonica</i>	Quail
7	Galliformes	Phasianidae	toking	<i>Coturnix chinensis</i>	King quail
8	Galliformes	Turnicidae	alimokon	<i>Turnix ocellata</i>	Spotted button quail
9	Piciformes	Picidae	tālakitok	<i>Dryocopus javensis</i>	White-bellied woodpecker
10	Ciconiiformes	Ardeidae	tilabong	<i>Egretta garzetta</i>	Little egret
11	Passeriformes	Cettiidae	bokborok	<i>Phylloscopus borealis</i>	Japanese leaf warbler
12	Passeriformes	Cettiidae	kākasa	<i>Phylloscopus sp.</i>	A kind of warbler
13	Passeriformes	Estrildini	dignas	<i>Lonchura punctulata</i>	Scaly-breasted munia
14	Passeriformes	Estrildini	maya	<i>Lonchura malacca</i>	Tricolored munia
15	Passeriformes	Corvidae	tamsik	<i>Pachycephala homeyeri</i>	White-vented whistler
16	Passeriformes	Corvidae	Wak	<i>Corvus senca</i>	Slender-billed crow
17	Passeriformes	Oriolidae	āntālihawān	<i>Oriolus chinensis</i>	Black-naped oriole
18	Passeriformes	Chloropsis	kāribungan	<i>Aegithina tiphia</i>	Common lora
19	Passeriformes	Acanthizidae	saritsit	<i>Gerygone sp.</i>	A kind of gerygone
20	Passeriformes	Acanthizidae	tārapsing	<i>Gerygone sulphurea</i>	Golden-bellied gerygone
21	Passeriformes	Sturnidae	kiyaw	<i>Gracula religiosa</i>	Common hill myna
22	Passeriformes	Turdidae	Bilad	<i>Saxicola caprata</i>	Pied bush chat
23	Gruiformes	Rallidae	biskār	<i>Rallinae urizonoides</i>	Slaty-legged crane
24	Gruiformes	Rallidae	tāriwokwok	<i>Amauromis phoenicurus</i>	White-breasted waterhen
25	Columbiformes	Columbidae	takurkor	<i>Streptopelia chinensis</i>	Spotted dove
26	Columbiformes	Columbidae	kāryasāw	<i>Chalcophaps indica</i>	Emerald dove
27	Columbiformes	Columbidae	putian	<i>Ducula bicolor</i>	Pied imperial pigeon
28	Columbiformes	Columbidae	alimokon	<i>Phapitreron leucotis</i>	White-eared brown-dove
29	Coraciiformes	Bucerotidae	talosi	<i>Anthracoceros marchei</i>	Palawan hornbill
30	Cuculiformes	Cuculidae	sungkaling	<i>Eudynamis scolopacea</i>	Asian koel

Source: Questionnaires and Interviews



Source: Questionnaires and Interviews

Figure 13a Frequency Of Birds Hunted by the Palawan (N=67 People; Information Compiled From Multiple Questionnaires and Interview Sessions)

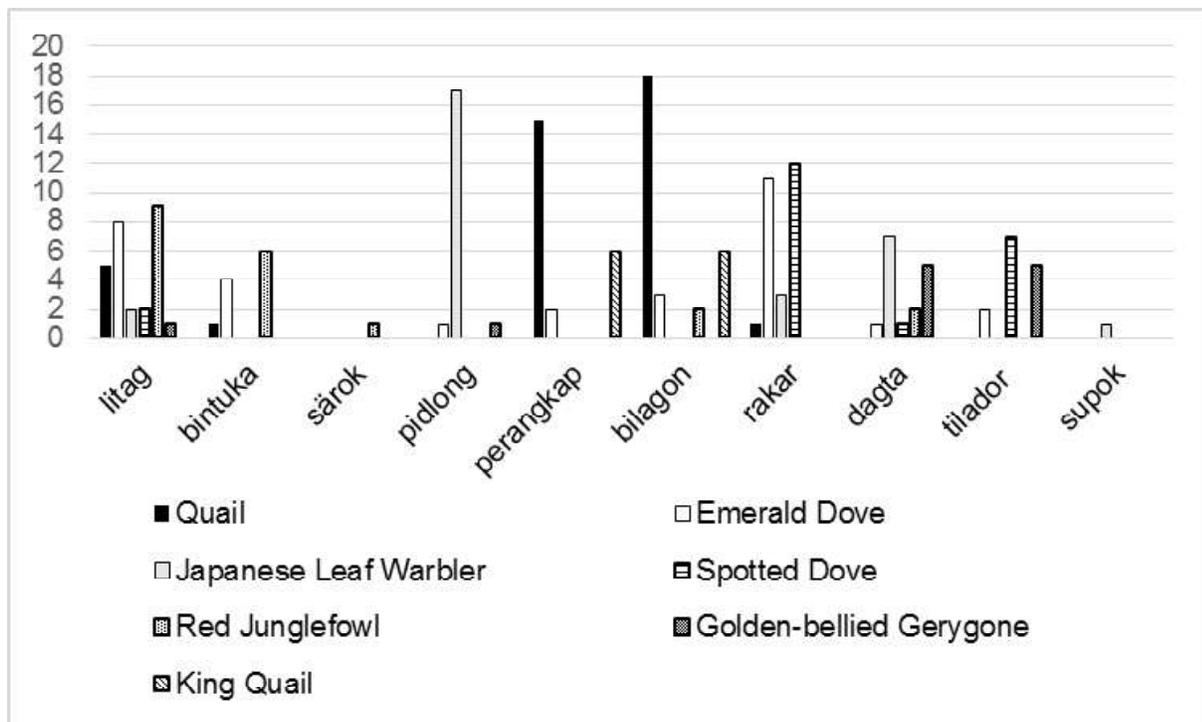
techniques, which helps add to the activity's overall enjoyment. Bird trapping is seen as pleasurable, the root of which is interspecies competitiveness between human and birds.

Relationship Between Targeted Birds and Traps

This section clarifies which birds are hunted along with the corresponding method. Seven bird species, i.e. quail, emerald dove, Japanese leaf warbler, spotted dove, red junglefowl, golden-bellied gerygone, and king quail, are hunting targets. The ways in which the birds are captured are discussed below. Although other birds, besides these kinds, are hunted, to avoid an overly complicated discussion, this section focuses only on representative targeted birds. The author obtained the data by means of questionnaires and interviews conducted from August 2012 to August 2013.

The line-chart in Figure 13b shows the hunting frequency of birds and the corresponding method used to catch them. Overall, the following traps have a high capture rate: snare traps, such as the general one (*litag*), the one using *Alocasia*

fruit (*pidlong*), the one using a drop lid (*perangkap*), and wire traps (*silo*) such as the one for quails (*bilagong*) and the one set in a bird's nest (*rakar*). Furthermore, the data revealed that almost no hunting was done with a bouncing trap such as the powerful splash trap (*bintuka*) or the powerful snare trap for birds and animals (*särok*). The wire trap for catching red junglefowls (*labay*) was not used at all. Besides traps, bird lime (*impulut*) and the slingshot (*tilador*) are employed, but from the viewpoint of frequency, the main hunting methods consist of traps. In terms of snare traps, the *litag* is used to capture the most kinds of birds, and overall, quails are the type of bird caught most with this kind of trap. The use of *pidlong* has a high rate of success in catching Japanese leaf warblers, and the *perangkap* is used mostly for hunting quails. In other words, the *litag* is used as a general trap, whereas the *pidlong* for small birds, and the *perangkap* for quails. The data on wire traps demonstrates that the frequency of capturing birds with *bilagong* and *rakar* is high. A *bilagong* is mostly used to catch quails, while the *rakar* is used to catch four out of five species of



Source: Created By the Author Based on the Questionnaires and Interviews

Figure 13b Number of the Five Most Common Birds Captured According to Trap Type (N=67 People; Information Compiled From Multiple Questionnaires and Interview Sessions)

birds. However, a *rakar* is primarily used to capture pigeon birds, such as the emerald and spotted dove nesting in trees.

From the above information, it is evident that birds' behavior and habitat are reflected by the types of bird trap used by the Palawan. Therefore, it is important to grasp the overall relationship between humans and birds, such as the eco-material cultural artifact involving trap materials, affinity (compatibility between traps and birds), and human's familiarity with traps (developed by observing birds' habits and learning more sophisticated hunting techniques). Trap-building and hunting techniques have improved over time because of an accumulation of knowledge of the hunters based on human-nature relationships. Currently, the tendency is to use simply-made snare and wire traps. This way, bird traps have evolved according to a deeper understanding of the habits of the captured bird and its way of life.

CONCLUSION

From the standpoint of eco-material culture, the bird traps of the Palawan and their hunting methods connect human, environmental, and cultural views from an ethno-archaeological perspective. In summary, the author identified 14 kinds of hunting methods, nine of which are bird traps; of these, five are snare traps, and four are wire traps. The Palawan use bird traps in different situations; they advocate for hunting birds in an indirect way that does not involve the active use of the human-body during the act of catching the bird. They hunt in a variety of ways, including using techniques that do not involve traps. In addition, unconfirmed bird traps may exist, but this study only covers nine confirmed types.

There are few ethnographic descriptions on trapping, including bird traps (Cole 1922: 378-386; Fox 1952: 290-299; Fujiki 1971: 102-112; MacGregor and Gardner 1930: 89-100; Muder 1982: 88-94; Revel 1990: 250-254). From ethnographic studies, it can be concluded that there are more or less 13 kinds of more broadly used types of bird traps. Thus, it is likely inaccurate that only 13 types exist. At present, only MacGregor and Gardner's (1930: 89-100)

study describes more than ten types of bird traps in the Philippines, and nine were elaborately identified by the author (cf. Tsuji 2016: 326), it is probable there are more.

In terms of successful bird trapping, Palawan bird traps can capture more than 30 types. In the future, a quantitative survey is needed to determine how many birds are actually hunted, either as a form of subsistence or leisure. However, the number of ethnological or archaeological accounts in the Philippines that refer to the quantitative aspects of bird trapping is extremely small; therefore, it is necessary to examine this subject in the future based on ethnographies from around the world.

The Palawan are shifting cultivators and fishermen who collect copra and raise secondary livestock. Bird traps allow the Palawan to obtain animal protein, but they do not rely on birds as their main form of subsistence; thus, birds are a secondary form of subsistence. In the past, there may have been more bird resources than today, and bird traps may have been used more often; such can be inferred by the existence of various hunting methods. Today, however, bird traps do not necessarily provide sufficient source of protein, rather, they are used for other purposes. Their persistent use is not only utilitarian, but also cultural.

Generally speaking, bird traps are essentially a food acquisition technique. However, because the prey is small, it seems more logical to target other animals as well, such as wild boars and monkeys, to efficiently obtain sources of protein. In the case of birds, if many traps are installed, it would be possible to acquire more protein. But most of the Palawan's livelihood comes from agriculture and fishing; however, their simple bird traps are time-saving tools (once the traps are set, they do not require more labor) to add variety to their subsistence activities. The Palawan use a limited variety of bird traps and are relatively unconcerned about the amount of meat they provide; they will eat small birds too.

The Palawan include bird traps in their subsistence activities to compensate for the shortage of animal protein, but acquiring protein is not their only reason for hunting birds. Rather,

the purposes of hunting birds are diverse. The Palawan also hunt birds for sport (i.e. for leisure); elements of play in bird hunting are deeply ingrained in their culture (Tsuji 2016: 336-340). Generally, they keep the birds they captured, the same way as people in other countries keep pets. Birds' songs are important facets of bird-breeding, and if a bird has a particularly pleasant song, it will be hunted recurrently. Further, some Palawan hunt birds so that they can use them as children's toys and cat food, while others shun them because birds cause damage to fields.

Thus, the Palawan hunt with bird traps for multiple reasons. Although hunting birds does not make a substantial contribution to their subsistence, they may continue to do so with unsophisticated traps because of the excitement and enjoyment they receive from the hunting activity. Bird traps are a form of eco-material cultural artifact that involve the connection between birds and people, intergenerational relations, and even between people and nature. If one considers that hunting birds and the emotions derived from the activity are positive, then bird traps can also be regarded as a tool for enjoying a connection and communication with birds. Animal traps are a product of human ingenuity and range from high- to low-level technology; bird traps generally consist of low-level technology. Although not mentioned in this study, the traps for capturing monkeys and wild boars are more robust, take more time and effort to create, and usually include non-plant materials. Bird traps, with their simple, plant-based construction, fall under the category of an eco-material cultural system.

Why do the Palawan not build more complex bird traps? In terms of cost, making a bird trap and judging whether a bird will be captured, bird traps barely cost anything. Simple plant materials that are used are those that do not require any production or financial cost. Living with little to no cost production is a feature for people who live more closely to nature, but the use of plant materials in making bird traps increases the

possibility that the traps will fail, and birds will escape. In recent years, nylon has been incorporated, and bird traps are becoming more flexible and stronger, but they are still not robust enough.

A robust bird trap has a high probability of successfully capturing an animal. However, when part of the enjoyment comes from the level of challenge of capturing birds, the sense of fun and curiosity decreases when catching birds becomes easy and assured. The Palawan utilize their intelligence and accumulated knowledge to negotiate with nature by using eco-material culture to obtain birds, which are blessings from nature. If the traps fail to work, the Palawan will refine their method of building traps. Thus, the Palawan ensure the traps they build are functional but not highly efficient because they enjoy "bargaining" with birds. The logic of the natural world where people make use of eco-material culture reflects the ties between humans and birds as a cultural system.

An ethno-archaeology study on bird traps today should consider the past when people might have hunted birds more frequently with different methods. This study demonstrates that the Palawan have hunted birds with several kinds of traps, and this case can be applied to the study of other cultures and histories around the world. Today, the number of birds is decreasing due to drastic environmental changes, breeding, hunting, and trapping. Recording the cultural and environmental elements related to bird traps with reference to the concept of eco-material culture will help preserve a cultural and natural relationship between human and birds. It is also useful to investigate bird traps in terms of the history of human adaptation to the environment and the nature of humans, which will allow making elaborate tools for purposes ranging from basic subsistence to simple amusement. This study shows that bird traps are ethno-archaeologically important as eco-material cultural artifact that can be used to study human subsistence, trapping technique, and mentality as well as human evolution.

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