

## Persistence of Bubo, Fish Trap in the Philippine Artisanal Fishery<Special Theme : Material Cultural Studies on Boats and Fishing Tools Based on the Museum Collections and Fieldwork>

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## Persistence of *Bubo*, Fish Trap in the Philippine Artisanal Fishery

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フィリピンの零細漁撈における筌漁ブボの永続性  
—その歴史・経済的背景と多様性に関する一考察—

シンチア・ネリ・ザヤス

Among the most pervasive fish traps in Asia and the Pacific, the *bubo* is the most common device in artisanal fisheries of Philippine communities. Its practical use endures for several reasons: a) reliability of *bubo* technology in time and space; b) living master trappers naturally pass on their knowledge and skills from generation to generation; and c) the places where traps are set up are usually public spaces or commons such as rivers, lakes, streams, and seas. In most countries where *bubo* trapping is practiced, trappers are peasants. This is certainly true in the case of the Philippines. This paper presents an examination of the variety of *bubo* fish pots and traps in the Philippines, specifically, and the use of *bubo* through time and space, along with its significance as a representation of indigenous and local knowledge that is environmentally friendly. Being small and artisanal, the *bubo* has proven to be adaptable to the changing climate and to rapid transformations in fishing technology.

アジア太平洋地域で最も普通に見られる魚筌の中で、ブボ (*bubo*) はフィリピンにおける零細漁民のコミュニティーにとって基本的な漁具である。その慣習が継続してきた背景には、a) 時空間におけるブボの技術への信頼性、b) 現在を生きる筌利用者による世代から世代への知識と技能の伝達、c) 筌が設置される場所の公共性とコモンズ性 (例えば、川、湖、小川、そして海) といった理由が挙げられる。多くの国々では、魚筌の利用者は農民がほとんどである。フィリピンでは、これは明らかに真実である。本稿では、特に、フィリピンにおい

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**Key Words** : artisanal fishery, fish pot, *bubo*, fishing technology, the Philippines  
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てブボと呼ばれる魚釜とその多様性, そして時空間を超えたブボの使用, および環境に優しい在来及び地域的知識の表象としてのその重要性について検証し示す。零細であるブボは, 気候変動や漁業技術の急速な変化に対し適応的であることが判明した。

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## 1 Introduction

What is a *bubo*? *Bubo* mean fish pot. They are generic terms for fish traps in many places in the Philippines, Indonesia, and all the way to Madagascar. The widespread use of the device reflects the utility of the ancient practice of fish trapping throughout the Malayo-Polynesian world. Similarities of the term indicate the languages in these areas as related. Throughout the Philippine archipelago, this *bubo* fishing implement is the most varied, i.e. it shows the most diverse fishing assemblage. Its shapes and sizes depend upon the trapper's knowledge of the ecological environment. Trapping with *bubo* gives a sense of independence to an individual fisherman.

Fish pots, as used technically, do not mean clay pots or terracotta pots.<sup>1)</sup> They simply mean a basket, as a container usually of wicker material or bamboo used to trap fish. Although its iconic image is a cylindrical piece of wicker basket, on the ground, *bubo* has various shapes, as Agustin Umali has described it:

(b)aited *fish pots* of different shapes and sizes (emphasis by author) made of webbed bamboo splints or chicken wire. They are provided with a non-return valve and a trap door for removal of the catch (Umali 1950: 106).

Talavera and Montalban observed the Pan-Philippine usages of *bubo*. Their varied shapes and peculiarities reflect local knowledge (ingenuity) of the makers. The shapes and sizes are expected to be a reflection of the trappers' knowledge of the target species and the nature of its habitat.

(I)n the Philippines there is probably no type of fishing implement that presents more varied shapes and peculiarities than the so-called *bubo*. A collection of *bubo* from various regions of the Archipelago would perhaps be the most heterogeneous assemblage of related fishing apparatus that could be brought together. Their differences in form are attributable to variations in the shapes of the individual parts and in the arrangements of the parts related to each other. The ingenuity of the individual makers is, of course, reflected in the divergent styles thus produced (Talavera and Montalban 1932: 452).

There are three main groups of fish pots or *bubo* in the local language according to Ruangvivakul *et al.* (2004: 248): cylindrical, rectangular, and semi-cylindrical traps. These are grouped as small, large, and extra-large. Small traps are about 50 cm long, 40 cm wide, and 20 cm high. Large traps are about 160 cm long, 100 cm wide, and 50 cm high. The extra-large ones are about 500 cm long, 320 cm wide, and 100 cm high. Fundamentally, bamboo is the material used to make frames, with a non-return funnel and woven matting that surround the trap. However, polyethylene or mononylon is used for small traps; steel wire netting is used for larger ones that have a hexagonal mesh of about 2.0–2.5 cm.

Being widely used, the practice of using a *bubo* is undertaken both in inland and inshore spots of the islands. Inland fishery trappers' knowledge of hydraulics of rivers and streams are most important when the weirs, barriers or barricades are set in place with *bubos* acting as collecting pots. Inland *bubo* trappers employ a range of variations and sizes of the *bubos* they use, an indication of ethno-limnological knowledge amassed through long observation and practice. This knowledge can be demonstrated for instance in the fake fish nesting assemblage used to attract fish about to spawn, luring or enticing them using bait (Aldaba 1931a: 2–13; 18) to the sophisticated engineering constructs of barriers set up in large river systems (Montilla 1931: 65–71; Blanco 1956: 47–52). For trappers of the sea, a different set of knowledge is required. The authors have presented the following.

... inshore fisheries require substantial knowledge reefs, and shoals, *takot*. For instance, *bubos* are dropped in the various parts of the shoal, on its slopes, on the shoal itself, at its corner or even in between two shoals. Trappers never share the locations of their frequented spot, it is a trade secret. Old and popular shoals have names in themselves. A manifestation of cognitive map possessed by master trappers (Zayas 1994: 101–106).

As artisanal gear, a *bubo* is an eco-friendly kind of fish trap that harms neither the prey nor the environment. Being an individual activity, the amount of catch it can take has limitations because the device size dictates the maximum amount of

the catch. The materials used for making *bubo* simply show the abundance of bamboo and vines, even to this day. *Bubos*, in a way, contribute to ocean biodiversity because there is a limit to its usage. *Bubos* are constructed for target organisms, for example, the *panak-alimango* from Cuyo Island which is used for catching *alimango* ‘land crab’ (Umali 1950: 130), and the *bubo-sa-hipon*, a cylindrical fish pot with a nonreturn valve on its two openings used in Laguna for catching shrimp (Umali 1950: 106). As it has been observed in estuary fisheries, a *panggal* usually catches smaller crabs and fish, and shellfish, whereas a *bubo* usually catches larger fish (Monteclaro et al. 2017: 82).

This report presents an examination of the variety of *bubo* fish pots and traps in the Philippines, specifically the use of *bubos* through time and space, and their significance as a representation of indigenous or local knowledge that is environmentally friendly. The major sources analyzed and referred to herein are watercolor paintings in 20<sup>th</sup> century, and several earlier studies of *bubo* use in the Philippines in the 1930s and after the 1980s to the present, including the author’s own data and publications. The author also refers to some *bubo* collections at the National Museum of Ethnology in Japan (Minpaku). This report presents discussion of these materials based on the context of *bubo* and trap fishing in the Philippines.

Fish and shellfish are the major sources of meat protein in the Philippine diet. They come from the vast territorial waters and inland waters and inland water wetlands. As a matter of fact, *bubos* have been important trapping devices in inland bodies of water.

### 1.1 *Bubo* as Austronesian Fishing Tools

Linguistically, the protoform *\*bubo*<sup>2)</sup> exhibits very few variations in form and function; it is widely distributed among the languages of the Austronesian language family, which extends from Taiwan to Madagascar to Fiji in Melanesia. As Blust and Trussel (n.d.) have reported, reflexes of Proto-Austronesian (PAN) *\*bubo* are among the most persistent words which refer to a cultural artifact. Materially, *\*bubos* are wickerwork baskets made of bamboo, about 1 m long and roughly conical in shape, with a smaller conical entrance of converging bamboo splints. In the ethnographic present, Blust and Trussel, added that such traps were generally placed in the mouths of rivers or in the sea near the shore, baited and sometimes weighted with stones to keep them below water and to prevent them from drifting. Fish or eels which enter to take the bait are able to slip through converging splints of the trap mouth, but they are unable to exit. Larger and structurally more complex varieties include two or more compartments, each entered in the same way through successively more restrictive openings which culminate in a cul-de-sac (PWMP *\*bunuq-an*) from which the fish are ultimately collected.

Aklanon, one of the many Philippine languages spoken in Panay Island, has the same form as the Proto-Malayo-Polynesian (PMP) *\*būbo*, which refers to a

conical bamboo basket trap for fish (Blust and Trussel n.d.). The proto form *\*būbu* is a reconstructed form derived from various languages with cognate words within the Malayo-Polynesian language family. However, the trap is not rare. It has been used traditionally in Africa, Western Europe, among Inuit, etc. Its widespread use reflects the importance of this trap. The Austronesians might have brought it from Taiwan. It was subsequently carried by their descendants throughout Southeast Asia (including Madagascar) and Oceania (Blust and Trussel n.d.: 1368). *Bubo* is a fishing device relic. Most possibly, it is one of the oldest fishing devices still used in the Philippines.

## 1.2 Pervasive Use of the *Bubo* in Philippine Trap Fisheries

Several source materials attest to the pervasive use of *bubos* in Philippine fisheries: the watercolor paintings of Jose H. Lozano in the mid-19<sup>th</sup> century, and the results of studies reported in the 1930s by Talavera and Montalban (1932), Aldaba (1931a; 1931b; 1931c), Montilla (1931), Umali (1950), and Blanco (1956). The prevalence of its usage indicates the prevailing level of fishing technology during the two time periods that they were observed, as well as the availability and accessibility of materials, mostly bamboo, which are very commonly found on the Philippine Islands. The use of these stationary traps indicates that inland and inshore fisheries reflect the type of watercraft used, or the non-use of it. In other words, the devices are readily manufactured by any fisherman wishing to catch fish. As a matter of fact, Vicente Aldaba observed that, in Cardona, Rizal (along Laguna de Bay),

... both the catching of the fish and the manufacture of *bubos* have become quite an industry. Here the *bubos* are made in large numbers and are placed at the bottom of the lake. They can be bought at a very reasonable price, around 15 pesos a hundred. The maker also sets the *bubos* in the water for any fisherman at about 20 pesos a hundred, including the cost of the *bubos* themselves (Aldaba 1931a: 21–22).

More than a century ago, *bubo* traps were numerous, especially where people congregated. A *bubo* was actually an iconic part of the landscape and the seascape of Manila and its environs. Images of these devices can be seen in the bustling Pasig River being transported in a *banca* ‘wooden dugout boat without outrigger’ held by a person as part of the baggage to be transported elsewhere or containing a newly hauled catch to a sidewalk for sale, etc. Jose Honorato Lozano, the ethnographer painter in modern times, depicted such rural scenes where a *bubo* was part of the assemblage of people moving about.

## 2 Review of *Bubo* Fishery in the Past and Present

### 2.1 Images of *Bubos* of the Mid-19<sup>th</sup> Century

Jose Honorato Lozano (1851–1885) a master watercolor painter, left graphic images of riverine and maritime life around Manila and its environs in 19<sup>th</sup> century. Known to art historians as a visual chronicler and ethnographic painter *par excellence* of life in the Philippines, he painted numerous scenes of local livelihood in and around Manila. Such images reflected the geography of the Philippines.

The Philippines is an archipelagic country crisscrossed by many rivers and streams. Dwellers of the interiors are linked to the coast through the river system and its tributaries. It is no surprise that numerous Philippine ethno-linguistic groups identify themselves as peoples of the river. Tagalog villages developed along rivers. The word Tagalog come from the affix *taga-* ‘from’ and the root word *ilog* ‘river,’ thereby ‘people of the river.’ Manila, a melting pot and fundamentally a Tagalog port city, is split into northern and southern halves by the Pasig River, a most beneficial river extending 25.2 km. The Pasig River connects upstream areas to Laguna de Bay (read as *de ba-i*), after which it flows to Manila Bay. This port boosted Manila to its status as the premier city during the Spanish colonial period. The Pasig River linked the city to the hinterlands through the lake, Laguna de Bay. Manila Bay is a shelter port for both local and foreign trading boats. Interior towns along Laguna de Bay, the largest lake of the country, supply the city and its inhabitants with produce from the forest and plains, and from the lake itself. As early as the 15<sup>th</sup> century, Manila was one emporium in Southeast Asia where monsoonal visits of Chinese junks, Arab and Indian *dhow*, and of course, Southeast Asia *prahu* came to exchange products using the beneficial Pasig River.

From the collection of prints left by Jose Honorato Lozano, the images inform us of how blessed the people are of the bounties of its waters, with images of fish traps being used, transported by small wooden boats, among others. One image shows a person who dropped a *salakab* into the river dated as 1851. Another picture dated 1847 presents a closer view of a half-naked man wearing a *buslo* (fish container) hanging on his waist, about to drop a big *nasang* or *salakab*. The collection also includes the iconic Lozano’s series of dug out boats on the lake carrying a *bubu* ‘fish basket.’

An image at the roadside shows two men: one standing holding a paddle, and the other seating down with *bubu* and a tray of fish beneath it. They must have just arrived from harvesting their *bubu*. They are ready to sell their catch. Finally, perhaps the largest *bubo* in Lozanos’ series shows a more than meter long *bubu* leaning on a standing man. According to the caption, the common livelihood in Taguig (now part of Metropolitan Manila) was trapping using *bubu*. From these paintings, we can infer the prominence of stationary fish traps such as *bubu* in the Tagalog-speaking area along the Pasig River and Laguna de Bay.

*Bubos* continued to be useful for collecting the main source of protein for Filipinos even beyond the end of the 19<sup>th</sup> century. From the 1930s until the end of World War II, *bubos* were reliable devices used to bring fish to everyone's table, especially *bubos* from Manila and its neighboring towns, which by then had increased in population because wars and revolutions ended with the American occupation. As one anthropologist noted, simple stationary artisanal devices continue to be observed.

(I)n the Philippines old techniques have not necessarily disappeared as new ones have been introduced. Fish corrals and other stationary methods are still widespread. Many small-scale, "traditional" devices can still be observed in use (emphasis mine). The gear profile of Philippine fishing technology continues to exhibit much diversity. For the country as a whole, gear diversity is greatest in the small-scale sector and least in the large-scale sector, where trawling and purse-seining dominate (Sphoer 1986: 33).

Inland fishermen use the classic cylindrical *bubos*, whereas fishermen from the coast often use rectangular ones. Therefore, among inland fishers, the most common type of fish pot is cylindrical, made from woven bamboo. Trappers of the Central Philippines, where the dominant landscape is the inland sea, are artisanal fishers using *bubo* in their everyday quest for food. *Bubos* can be had anytime because their material is readily available and affordable, if not entirely free.

The work of Umali (1950) reveals an interesting situation of existing fishing devices before WWII. Umali provides a glossary of native terms for fishing devices (1950: 97–162). Because the list was collected from works before the war, the fishery situation reflected that period. It is noteworthy that Philippine fisheries then were in pre-modern period. Boats were not motorized. Devices were constructed from what was available in the communities. After WWII, fishing gear slowly motorized and synthetic materials were introduced gradually. Consequently, fishing spots have expanded; *bubo* sizes have increased. War surplus made this possible.

This section presents some data reported by Umali (1950) to describe situations in three areas: Northern Luzon, which Umali fundamentally refers to as the Ilocos; Manila and its environs, including mostly the towns around the lake Laguna de Bay; and the islands of Central Philippines – the Visayas. These areas represent the distinctive uses of *bubos* as residents respond to their ecosystem.

## 2.2 Timeless Artisanal *Bubos* of Northern Luzon

*Bubos* are used in conjunction with barriers as important tools in river fisheries in Northern Luzon. They act as a catchment chamber of prey consisting mostly of young fry, *ipon* 'goby,' small shrimp and fishes, eels, and other organisms. These barricades have various names, sometimes reflecting their functions. The *Guide* listed several names of these barricades: *lellen*, *better*, *pingi*, *pataya*, *palayaw*, *palayaw-ambulante*, *palayaw-puwesto*, *sarep*, *sarap*, *paayas*, *padait*, and

*pamubuan*. *Pamubuan* derives from the affix *paN-* + root *bu(bo)* + *-an*, a locative affix, thereby, ‘a place where *bubo* (trapping) is being undertaken.’ One can take *pamubuan* as the classic example of *bubo* as an accompanying device for trapping with a barricade where Umali defines it as.

a barricade of *sawali* (webbed bamboo matting) for catching *ipon*. Placed across shallow rivers, it is designed with or without a center escapement, with the collecting device consisting of a series of large, cylindrical *bubos* (fish pots). Synonyms: *pingi* or *padait* (Ilk<sup>3</sup>) (Umali 1950: 126)

There are many methods used for constructing barriers or dams in rivers. Umali listed several materials used to build them, e.g. stones and bamboo mattings, banana stalks, *sawali* fences ‘woven bamboo,’ and *sinamay* ‘hemp cloth.’ The work of Blanco (1956: 47–52) presents a detailed plan and description of *pamuboan* construction, with specific indication of where to place *bubos* within the dam area to block the migrating *ipon*.

The barricades use natural materials that are locally available. These consist of stones and pebbles, banana sheathes, bamboo, *sawali* fences, and *sinamay*. The absence of concrete materials, metal wire and nylon fabrics is indeed refreshing. The barricades were made in the mid-1950s.

Upon verification of the current status from the field, evidence of two types was gathered from the internet that *bubo* and its related devices are still being used and that they continue to be preserved even in museums as items of intangible cultural heritage. The Museo Ilocos Norte webpage reports an exhibition entitled “*Alat*” in September 2009. *Alat* refers to ‘basket’ in the Ilokano language. At least 13 *bubos* and their related material culture were featured. Here are the 13 listed *bubos* and related devices for trapping and collecting both salt water and fresh water prey: *alát*, *balingáto*, *barekbék*, *bóbo*, *bukátot*, *dákko/gákko*, *karadikad*, *paring*, *saludan*, *saripot*, *talákib*, *tiklís*, and *udág*.

Further evidence of *bubos*’ enduring usefulness to fishers is presented in a brief essay describing Ilokano *alat* by Respicio who described *bubo*, *barebek*, and *pamurakan* (Respicio n.d.).

Finally, as distinct from Ilokano fisheries, *ipon* ‘goby’ is a most sought-after species for dinner. Then and now, rivers flowing from the mountains to the South China Sea along the long coast of the region have contributed to the development of fixed structures of barriers, all using natural materials from the environment of woven bamboos and hemp. As Montilla (1931: 64) observed, “(t)he most important of these traps are the *bobo*, *sarep*, *pingi*, *pamoboan* or *padait*, and *pamalibocan* or *burayoc*...”

### 2.3 Laguna de Bay: Catching *Dalag*, from Bare Hands to *Salakab* to *Bubo*

In rivers and lakes, for example in Laguna de Bay, *dalag* (*Ophicephalus* sp.),

also known as mudfish or snakehead, is the most common catch of lake fishermen. A skillful hunter can catch them with bare hands, especially during the dry season, when the water is at its lowest level in some parts of the lake. As the waters ebb, *dalag* are trapped in large quantities in grasses and water hyacinth. A simple *salakab*, common to any fishing household around the lake, provides extra help in trapping energetic fish such as the *dalag*.

*Salakab* is a Tagalog and Bisayan word for a conical cover pot (Umali 1950: 148) consisting of split bamboo, tied in a parallel series of loops or circular frames. It has a wider lower opening of about 2 feet in diameter, but only a small hole at the top. The latter is just sufficiently large to permit insertion of one hand for the recovery of the catch, after the device has been stuck in the mud by the other hand.

In the Philippine Archipelago, *Salakabs* are widespread as *tallakeb*, *asad* in Ilocos or *talakeb* in Pangasinan, and *taklob* in the Visayas, all are cognate terms meaning ‘cover.’ A cover pot is a simple gadget of bamboo slats that is exceedingly common among fishing households. Aldaba describes how the gadget is used: “... the fisherman holds it with one hand at the upper opening and drives it into the water vertically with sufficient force to embed the lower part in the mud. This performance is repeated until a fish is caught” (Aldaba 1931a: 2–3).

Trapping *dalag* occurs with many methods and forms. An example is a *bocatot*, which resembles an oblong crocheted gourd. It is woven with big eyes of rattan cane or net. *Bocatot* and *bobo* have similar functions. The former is positioned in a *dalag* nesting place, whereas the latter is positioned at the mouth of the paddy dam. Aldaba (1931a: 10) states the opinion that *bobos* work similarly to a *bocatot*. It is tapered so that the water current can flow faster as it passes through the *bobo*, thereby reducing chances for a *dalag* to escape. The apparatus is set at the opening in the dam of rice paddies or pools.

Verification of the current fisheries in the lake indicates to us that prominent devices continue to be passive, used similarly to fish corrals and fish cages. It is unfortunate that fish kills often occur in the lake because of the large number of these permanently set-up structures.

Evaluations of fishery resources of Laguna de Bay have specifically examined the eight major stationary fishing devices: gill nets (*pante*); fish corrals (*baklad*); drive-in-nets (*seket*); push nets, both motorized (*turo*) and manual (*sakag*); shrimp brush shelters (*bonbon ng hipon*); drag seines (*pukot*); and snail dredges (*kaladkad suso*). Accordingly, all were for sustenance and were not commercial in nature. The census of 1963–1964 described 6,511 fishermen (or households?) operating with fishing devices of 41 types that totaled 9,740 units, both stationary and non-stationary/mobile. Of the total, 2,136 units, or 20%, were mobile. Of these 2,136 units, 472 units using *bubos* and related devices were identified (Delmendo 1976: 228): *bakikong* ‘fish trap’ – 7 units; *bicatot* ‘fish trap’ – 103 units; *bubo* ‘fish pot’ – 52 units; *panaklob* ‘fish trap’ – 2 units; *pugad-pugad* ‘fish shelter or trap’ – 93 units;

*salakab* ‘fish cover’ – 66 units; *siid ng hito* ‘fish trap’ – 12 units; *takilis* ‘fish trap’ – 72 units, and *talabog* ‘baited shrimp basket’ 8 units. The 472 units were identified by dividing the year into three periods, i.e. 3 month-period, 6 month-period, and 12-month period, and then summing each period’s number of units used. It is noteworthy that all the non-stationary fishing described here are listed in Umali (1950): *bakikong* (Tagalog), *bikatot* (Tagalog), *bubo* (Pilipino), *panaklob* (Tagalog), *pugad-dalag* (Tagalog), *salakab* (Tagalog, Bisaya), *siid ng hito*, *siid* (Tagalog, Pangasinan), *takilis* (Tagalog), and *talabog* (Tagalog).

Leaving the larger picture of 13,000 fishermen exploiting fresh water lake areas of 90,000 hectares, with fishing devices of 41 types constituting 9,740 units of various devices, we now specifically examine the situation of artisanal fishermen, whose numbers appear to be much less than the 20% of *bubo* fishermen, with related devices numbering only 472 units. However small but diverse, the nine devices point to the resilience of these artisanal fishing devices because all are found in Umali (1950), sources of which were obtained from field work undertaken during the first quarter of the last century until just before WWII. They were used for more than half a century to the present day.

More than three decades later, an assessment of the major fishery resources of Laguna de Bay was undertaken during 1995–1996 (Palma et al. 2002: 139–146). It included *sukob*, *salakab*, *bubo*, and *saklet* ‘fish pot’ as major fishing devices. The fish pot measures 50 cm long, with 25 cm diameter in the middle, and 9–10 cm diameter at both ends. It was learned that there were 3,840 fish pots installed in the lake, with 3,780 fishermen undertaking such endeavors.

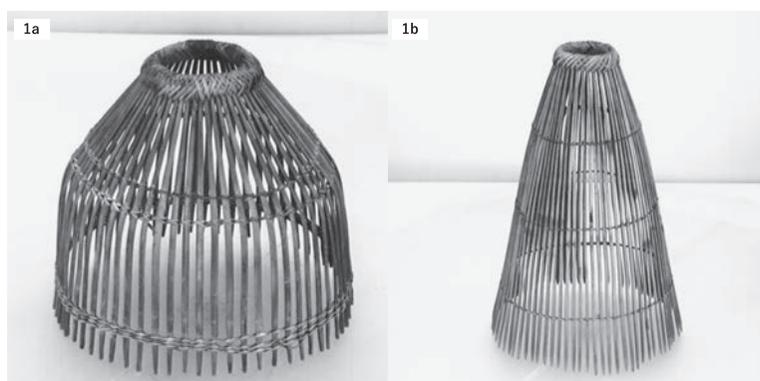
The diversity of *bubos* and related devices decreased greatly as the decades passed. The author’s field surveys some years back revealed more fish corrals, fish cages, and stationary fishing devices. The traditional artisanal mobile fishing devices are gone together with the ageing trappers that used to be a common site along the shores of the lake. More thorough field research is necessary to ascertain how much has been lost in terms of *bubo* trappings and other simple devices that developed along the *bubo* fishery.

#### 2.4 *Bubo* and *Bubo*-Related Specimens at the National Museum of Ethnology, Japan

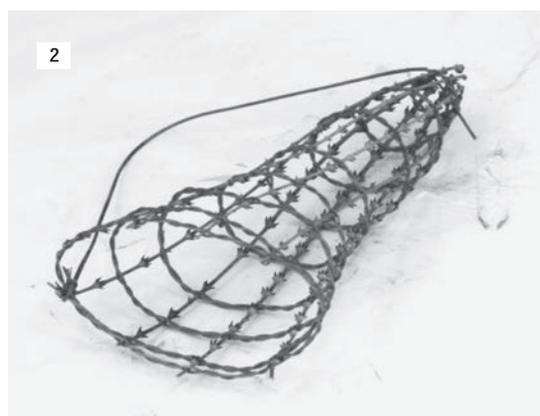
At this point, it is appropriate to mention the current collection of the National Museum of Ethnology, Japan where all collections of *bubo* and *bubo*-related fish traps are for rivers and wetlands. These specimens were mostly from Northern Luzon, except for one. Based on their available descriptions, three sets of data were combined into three figures including the following. Figure 1 contains the specimens for cover pots. These four cover pots were all from Northern Luzon: 1a. *slakab* (probably a mistake in transcription should be *salakab*) or cover pot with cognate words such as *salakab*, *salakag*. No further data are available. 1b. *tatak* is a

cover pot from the Ibanag people of Cagayan Province of Northern Luzon.

The next dataset is a single specimen that can be understood in association with related material culture culled from the existing literature. This particular specimen is the only one not originating from Northern Luzon, but from Mindanao Island. Figure 2 which is an unidentified specimen is said to originate from the Ata people of Dugbatang and Tugauanum, Santa Fe, Agusan del Sur Province in the island of Mindanao. Examination reveals that it resembles a rattan *bucatot*. A *buka-*



**Figure 1** Cover pot specimens collected by the National Museum of Ethnology, Japan  
1a: *Salakab* (Specimen No.: H0063314. Photo courtesy of the National Museum of Ethnology, Japan)  
1b: *Tatak* (Specimen No.: H0063072. Photo courtesy of the National Museum of Ethnology, Japan)

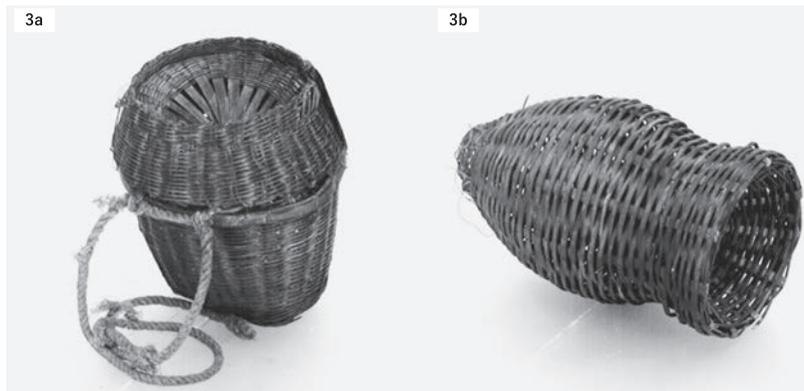


**Figure 2** Barbed cone fish trap specimen collected by the National Museum of Ethnology, Japan  
Unidentified (Specimen No.: H0008262. Photo courtesy of the National Museum of Ethnology, Japan)

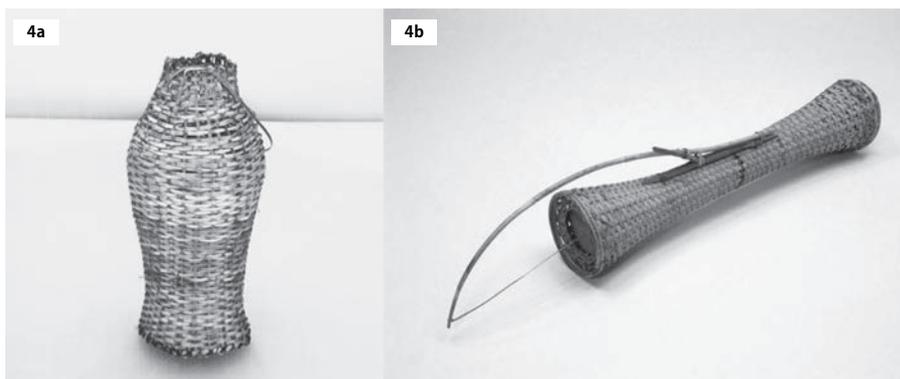
*tot* is for catching *dalag* ‘mud fish’ in lakes and rivers. It has various names: *bikatot*, *bukatot*, *bukatot-no-oway*, or *barrebek* in Northern Luzon respectively (Umali 1950: 103; 105; 207). *Bukatot* has the following characteristics: fish trap with no non-return valve, has a single entrance, used in rivers or streams just like the *bubo* for catfish used in the Tagalog rivers and lakes. The idea of setting it against the stream resembles that of the *bubo* of the Ilocos Provinces.

The final set comprises two subsets of data: three specimens of *bubo*-type fish traps from Ifugao, and three specimens of fish baskets and containers from Cagayan Province used by Itawis and Ibanag speaking people. The *bubo* type fish traps are known as *gubu*, actually a cognate term for fish pot. *Bubo* and *gubu* semantically mean the same: fish pots. These three specimens are the following: Figure 3a. *gubu* is a trap place in a paddy field to catch a fish. It might come from the same place as Figure 3b. *Gubu* is a trapping device that is set up in a paddy field. A loach that goes in cannot go out. Originally from Kiangan, Ifugao. Figure 3b. *gubu* used for catching crabs with rice bait are much larger than the preceding device. The trap is positioned against the river current.

Finally, the fourth set (Figure 4) comprises two specimens closest to the classic *bubo* shape, i.e. elongated fish pot. These are employed in rivers: 4a. *balantak* is a fish pot for catching fish in the river by Hanunóo Mangyan of Barangay Panaytayan, Mansalay, Oriental Mindoro. The device uses banana leaves and cogon grass (*Imperata cylindrica*) to cover the smaller end of the device. It is laid into the river following its flow. The catch is then retrieved by removing the grass and leaves. 4b. *udal* fish trap originated from Kiangan, Ifugao. It is used to trap eels in the river. The opening is set against the river flow.



**Figure 3** *Gubu* specimen collected by the National Museum of Ethnology, Japan  
 3a: *Gubu* (Specimen No.: H0063258. Photo courtesy of the National Museum of Ethnology, Japan)  
 3b: *Gubu* (Specimen No.: H0063130. Photo courtesy of the National Museum of Ethnology, Japan)



**Figure 4** *Balantak* and *Udal* specimens collected by the National Museum of Ethnology, Japan  
4a: *Balantak* (Specimen No.: H0063626. Photo courtesy of the National Museum of Ethnology, Japan)  
4b: *Udal* (Specimen No.: H0063120. Photo courtesy of the National Museum of Ethnology, Japan)

## 2.5 The Visayas: *Bubo*, *Taun* and *Panggal*

In the Central Philippines, the inland sea dominates the panorama of the Visayas. It is the homeland of most fishermen of the Philippines. Talavera and Montalban (1932) compare the trapping mechanisms of *bubos* to a rat trap. They provide a glimpse of popular production of *bubos* in the 1930s. These examples later serve as a template for sorting out the many types and functions of *bubo* in the Visayas.

As described by Ushijima and Zayas (1994), two reports (Calderon-Hayhow and Mascuñana 1994; Zayas 1994) help verify the current usage of *bubo* as fishing devices. It is unfortunate that it is dated. However anthropological studies of fishing villages are scarce. To supplement this limitation, two other sources were consulted: social media, and the survey done by the Southeast Asian Fisheries Development Center (Ruangsivakul et al. 2004) in Panay Island, the Philippines. In the social media sector, the author chose two bloggers with *bubo* as their emphasis, i.e. *bubo* as a hobby or sport and as a promotion of local tourism.

To review, Zayas presented examples of *bubo* from three places: Gigantes Island in Iloilo, Panay province, Antique in Panay Island, and Southern Palawan. From Gigantes Island, four shapes of the device were: 1) *bawok*, a squarish type with prominently displayed curvature in its frame, is meant to trap squid; 2) *kwadrado*, as the name implies, is a square-type of a *bubo* for trapping fish; 3) *panggal* is the classic frustum for trapping fish as well; and 4) *panggal sa kasag* is the classic rectangular *bubo* for trapping soft shell crabs (*Portunus pelagicus*). All these are meant for seasonal work based on the monsoon winds. For example, *pundasyon*, a pole with coconut flowers tied to it and supported by a buoy and a

weight, is submerged to serve as a fish aggregating device. The goal is to attract squid so that they lay eggs on the flowers tied to the pole. These squid-roe-wrapped flowers will then be used as bait for a *bubo* when it is tied to a pole.

*Pundasyon* is a kind of fish aggregating device (FAD). It comprises a buoy to which a flag is attached, with a long nylon line with a weight tied to one end. The line is tied with several branches of guava or coconut flower called *gangaw*. The *pundasyon* is dropped in a corner of a *takot* or shoal where squid abound. Squid are believed to be attracted to the scent of these branches and flowers. They lay eggs on them. When the branches are filled with squid eggs, a *bubo* trapper will raise the line to collect branches to be used as bait for squid. *Gangaw* is then placed inside a *kwadrado*: one type of *bubo*. The *bubo* is tied to a *pundasyon*, devoid of branches, to be dropped in a fish spot.

*Bubo* fishery is a specialized endeavor. A fisherman simply specifically examines *bubo*, seldom changing devices.

*Taun* is one classic use of *bubo* as a collecting chamber of weirs, barriers or barricades in the same manner as the use of *taun* in Antique as a collecting pot for an *atob* ‘stone tidal weir.’ *Taun* is a catchment device placed at the mouth of a stone tidal weir, *atob*. It is made of bamboo woven to form a cylindrical shape. It has one opening with a non-return valve. It is placed at the lowest part of the *atob* where the water ebbs. Its name is similar to other *bubo* of similar shape and function. In linking *bubo* and *atob*, it is noteworthy that *atob* from other parts of the Pacific builds an ebbing mouth in such a way that it functions as a non-return trap. *Taun*, just like other *bubo* in Northern Luzon, functions as a series of bamboo used as “catchment chambers” in barriers of many types set up in rivers.

Fishermen of Antique not only engage in shore trapping: they undertake deep sea *bubo* just like a *bubo* with a special trap of nautilus shells. Apparently, it is common bait, as reported below.

The nautilus trap is operated by small-scale fishermen to catch nautilus (*Nautilus pompilius*) in deep waters. The nautilus shell commands a high price in the export market; its meat can be sold in local markets.

Twenty to thirty traps can be set in one night. The traps are set 200–400 m deep. All traps are provided with bait such as eel, suckerfish, sliced shark and stingray in the center part (Ruangsivakul et al. 2004: 249–250).

A *bubo* used by the Palawan people from Rio Tuba is used to trap mangrove crab. It resembles that of a *taun* from Antique. It is used as collecting chamber for a stone tidal weir.

*Panggal* are of various sizes based on data of 2014 (de la Cruz et al. 2018: 79), e.g. 1) square, made of bamboo and PE (Polyethylene) netting with a pair of slit openings at opposing sides, 2) rectangle, made of a wooden frame and PE netting with a pair of slit openings at the side, and 3) frustum, made of bamboo and PE netting with a single opening at the top. de la Cruz described crab pots of two

kinds: The *panggal* and *ming* types. Fish pots and traps are indeed for *bubo* artisans, especially in inshore fisheries in the Visayas, where the undulating sea bottom and the presence of corals are conducive to laying traps.

According to Calderon-Hayhow and Mascuñana (1994), the practice of *bubo* fishery is, without doubt, flourishing. The Sibulan, Negros Oriental *bubo* assemblages, i.e. 1) (big-size) *bubo*, 2) (small-size) *bubo*, 3) *panggal timbungan*, 4) *panggal pamalawis*, and 5) *panggal-panggal pangikitong* are surviving. However, in 2022, *bubo* fishery is threatened now that the local government in nearby Dumaguete City is planning to reclaim the seashore close to the Sibulan fishing grounds. Destruction of the coral reefs in Dumaguete City will affect the condition of the Sibulan fishing spots.

An important contribution of work by Calderon-Hayhow and Mascuñana (1994) is their discussion of related devices: *balantak*, *panibod*, *panapok*, and *pangatob*. Understanding of these methods demonstrates how meticulous these researchers are. Many fieldworkers gloss over this simple albeit ancient mode of fishing, directly or indirectly touching on the *bubo* origins. The author discusses the significance of this material culture in the conclusion section of this report. Future studies must validate these methods of fishing in the field and elucidate simple ways of using baskets to gather prey.

*Bubos* have been popularized in social media. For netizens to create a blog solely on the theme of *bubos*, they must enjoy the thrill in “easily” catching giant, luxurious fish.

Finally, a good sampling of *bubos* from the Philippines has been provided by the undertakings of SEAFDEC (Southeast Asian Fisheries Development Center). A good sample from inland and inshore fisheries totaled 34 items. Thirty-four items of SEAFDEC certainly add to the enduring use of this device in many forms, shapes and sizes. Here is evidence of the multiplicity of *bubos* in this country. Indeed, *bubos* have a long life. They have changed in appearance and composition, but they continue to provide protein to people.

## 2.6 Understanding *Bubos* as Practiced in the Central Philippines

These observations were based on the author’s field data and colleagues’ studies, all undertaken on Negros Island. The author’s study of *bubos* provided insight into the relatedness of functions of other fish trapping devices. At least four sets of devices are related to fish trapping: (1) *panihod* and *atob-atob*, (2) *taklob* and *bubo* or *taun*, (3) *panapok* or *pangatob*, and (4) *atob* and *taun*. These four sets have similar utility, both on land and in water.

*Panihod* and *atob-atob* function as fish aggregating devices (FAD), where stones are piled up during low tide on the shore,<sup>4)</sup> only to be dismantled when the tide recedes. The difference between *pahinod* and *atob-atob* is that a wicker basket called a *sihod* is positioned between the legs of the trapper while he removes the

stones one-by-one in a way that the species sheltering in it swims to the basket (Calderon-Hayhow and Mascuñana 1994: 431). However, with *atob-atob* as FAD, the trapper removes the stone and plucks prey from crevices and places them in a bucket (Zayas 2009: 24–23).

*Taklob* ‘fish cover’ and *bubo* or *taun*, have similar structure, except for the fact that *bubo* or *taun* has a funnel and or a non-return valve. Earlier, the author pointed out that catching *dalag* must have originally developed from catching prey with bare hands to catching prey with hands added with *taklob* or *sakalab* to simple placement of the trap in a strategic location, leaving the trap from the hands trapping it in the *bubo*. In Umali (1950: 118; 156; 161), fish cover and *bubo* or fish pot are synonymous, i.e. *tabon*, glossed as a ‘fish pot,’ synonymous to *bubo*, *tungkob* and *lambonin*, described as a shallow water fish pot without a bottom or floor resembling that of the fish cover. The former term is Bisaya, whereas the last two are Samal and Taosug, which indicates that, in Central and Southern Philippines, the fish cover is also a *bubo*, or perhaps, a *bubo* is regarded as generic for a bamboo basket fish trap, including fish cover. All three devices are indeed fish pots because all three are bottomless devices or fish covers.

A *panapok*<sup>5)</sup> or *pangatob* is a trap laid out below the water surface at about 2–2.5 fathoms. Divers build a shelter of rocks and corrals in which fish can take refuge. The FAD is 200 cm high, with 254 cm diameter. After a week, the fisherman returns to lower a double fishing net. Divers plunge into the water to scatter the stones outside the net causing the fish to scatter. When all the rocks are thrown out of the net, the fisher now pulls up the net and gathers the catch. Stones thrown out of the net are reassembled at a nearby spot to build the FAD again. It is noteworthy that the names *panapok* (from the instrumental affix *paN-* + the root word *tapok* ‘to assemble, pile up’) and *pangatob* (from *paN-* + *atob* ‘stone weir’) have similarity with *atob-atob*, where stones are piled up then scattered such that those inside escape out into the open. Then the encircling net is depicted in close, thereby trapping the fish inside.<sup>6)</sup>

Of *atob* and *taun*, the former is a stone tidal weir, whereas the latter is a device made of bamboo woven to form a cylinder. *Taun* has one opening with a non-return valve. It is placed at the lowest part of the *atob*, where the water ebbs. Its name is similar to those of other *bubo* of the same shape and function. In linking *bubo* and *atob*, it is noteworthy that *atob* from other parts of the Pacific are built with an ebbing mouth such that it functions as a nonreturn trap. *Taun*, just like other *bubos* in Northern Luzon, functions such as a series of bamboos used as “catchment chambers” in many types of barriers set up in rivers.

*Panihod* and *atob-atob* are both FADs. Except that *atob-atob* has no catching device. The same idea of FAD is replicated in *panapok* or *pangatob*. In combining two ideas, 1) collecting chamber (i.e., *panihod*) and 2) FAD (i.e., “*atob-atob*,” “*tapok*,” and “*atob*,”) it can reproduce a simple but gentle trap: the *atob*.

### 3 Discussion and Conclusion

A limitation affects the writing of this article. The Philippine *bubo* reference collection was the author's initial goal in doing the study of *bubos* as fishing devices and as cultural artifacts mirroring the history of fishing technology and local knowledge in the Philippine Archipelago. Results reported by colleagues and the author's own past field work, as well as available literature, have organized my thoughts and observations. Some suggestions have indicated what should be done to continue such work for future studies.

#### 3.1 Behind the *Bubo*, A Cultural Artifact

*Pamuboan*, a barricade *ipon* trap of *bubos*, is a community-based fishing unit popular in the Ilocos provinces. It comprises 16 fishermen who have contributed materials and equipment to the group. The fishing outfit is headed by one who has the hereditary rights over the trap site. When he retires, his son takes over this right from him. All operators agree with this practice, thereby avoiding conflict of headmen of *pamuboan* outfits. The headman is responsible of paying the fishing permit to the local government treasurer. The fee is computed by the number of *bubos* in a sequence of fives.

Another way of acquiring a trap site is by auction, as it is done in Caoayan and Santa, Ilocos Sur. Unlike the practice in Ilocos Norte, the municipalities of Caoayan and Santa do not prescribe the number of *bubos* to be set up with barricades. Auctioning the trapping sites is not only for barricades with *bubos*. It is also done for those setting up *bubos* in the river without barricades, similarly to the *sarep*. Like other *bubos*, a *sarep* is cylindrical, 1 m long and 25 cm in diameter. Its shape tapers to 5 cm in diameter at its mouth, which is plugged with a cork. The sites for setting up *sarep* are fixed and classified as first class and second class.

One helpful article that the author has used to date is the work of Blanco (1956). This article induced not only observations of fisheries *per se*; it included anthropological information related to *pamuboan* social organization and rites. Most of all, Blanco captured the Ilocanos' earnest manner of building dams in a river by comparing these men to beavers, which are natural engineers: dam-builders that constantly repair their creations. Blanco, similarly to the beavers, pretty much appreciated the Ilocanos' ingenious use of local materials, consistent with their hydrological knowledge of the river system. Blanco expresses the point in the following words.

Although the *bubo* fishermen are unschooled, their experience in setting barricade in *ipon bubo* traps in strategic locations in the trunk of the river and meanders, above or below a river delta, sandy or gravelly bar, swift flowing and other places is unsurpassed. *Bubo* fishermen are human "beavers" or "*bubo* engineers" who build river dams of

bamboos, pegs, banana sheath, sand, stones and *bubos* (Blanco 1956: 43–44).

### 3.2 Some Clever Ideas from Trappers

What is in the mind of trappers? They refer to knowledge of preferred baits, strategies of deceiving and luring *dalag*, and finding locations at sea to set the *bubos*. Here are some ideas of *bubo* fishermen to illustrate the expertise they have acquired with the device.

Knowledge about prey is reflected by the kind of bait used. For *kinaban square bubo*, beef, dead fish, squid, or roasted copra are used as bait. Non-organic baits are also used, i.e. white rags, tin, or figures. Trappers think that prey animals prefer strong but not foul odor baits. Prey animals also like shiny or attractive objects (Talavera and Montalban 1932: 455). In everyday Filipino life, pork is preferred as a meat over beef. Many think that beef gives an unpleasant odor while roasted copra emits a lingering smell of oil. The author has seen many large *bubos* with broken figures used as bait in Negros Oriental. Prey animals are attracted by strong odors and shiny objects in salt water conditions. Fresh water baits are usually *lumut* ‘algae.’ Sweet smelling flora are also food for fish.

Earlier, the author described the engineering prowess of barrier workers. Their knowledge of currents and materials for making *bubos* is ingenious. Where to set up the barriers is remembered according to the notion of triangulation as manifested in the following way: “deep sea *bubos* are set at the intersection of two straight lines formed by four fixed points on land. Conspicuous landmarks, such as mountain peaks, tall trees, and church towers, are usually selected for this purpose” (Talavera and Montalban 1932: 455).

Some clever method of trapping the prey is demonstrated by *dalag* trappers using rattan *bocatot* and *salakab* (Aldaba 1931a: 18–19). Here are two anecdotes:

The use of *bobo* for catching *dalag* on a different principle is found along the river draining Lake Calibato into the Laguna de Bay. There is practically no soil in this river. Dams of rocks are built enclosing a rectangular space on the side of the river, its rocky bank forming one side. The enclosed space is covered with coco-palm leaves, thus providing a place of retreat for *dalag* which are free to come in and out of the in closure through openings between the rocks, with the funnel toward the inside of the dammed space. The coco-palm leaves are then taken away. The *dalag* being thus deprived of the protection offered by the leaves, come into the *bobo* as a last resort (Aldaba 1931a: 18–19).

*Salacab* is held in the upper opening with one hand. Once the *dalag* is detected, it is plunged into the water or mud. This plunging is repeated until the prey is caught.

Fishing with the *salakab* on a *carabao* [water buffalo] ... *Dalag* is not disturbed or

frightened by a *carabao*, so the fisherman taking advantage of the fact, mounts a *carabao* and with a *salacab* in hand rides around looking for *dalag*. A shallow place with grass or other kind of growth is chosen for such fishing. When the exact location of the *dalag* is determined by the movement of the water and plant growth or by the appearance of its head on the surface of the water, the fisherman promptly dismounts from the *carabao* and covers the *dalag* with the *salacab*. Sometimes the fisherman uses the baited hook to tempt the *dalag* to show its head (Aldaba 1931a: 18–19).

### 3.3 Overview of Results of Observations from the 1930s to the Present

The author has examined the state of *bubo* in the Philippine Archipelago for almost a century based on articles published in the 1930s to *bubos* of the present day. For the past century, the fishing spots frequented by *bubo* trappers have become contentious spaces sought by other non-fishery users, as well as by urban redevelopment interest. Within that century of *bubo* usage, the author has recorded five observations: First, *bubos* as fish traps are within reach of all artisanal fishermen. The construction materials are all available locally, e.g. everyday material culture such as palm mats, container baskets, *sawali* walls, etc. The technology of weaving and basic knowledge of creating a *bubo* is shared with others. In other words, it is technology friendly; everyone can access it. Second, a *bubo* is place-specific. In some islands, *bubos* are introduced by sojourning fishers. For them to be viable, the *bubo* trapper must fine-tune the trap construction to suit the conditions of the sea bottom and the kind of prey one wishes to trap. Third, *bubos* are assemblages combining other devices. The manipulation of this device is often accompanied by other devices, as discussed earlier. A river barrier or a stone tidal weir without a *bubo* or *taun* is useless. Great rivers of Northern Luzon are the site of barriers for catching freshwater fish. In Laguna de Bay, fish aggregating devices lure fish to a nest or shelter, only to find that its exit is through the *bubo*. In the Visayas, the practice of *pundasyon*, a pole tied with coconut flowers stuck into the sea is used. Squid lay eggs on coconut flower. Flowers laden with roe are used to bait squid to enter the *bubo*. Stone tidal weirs also use *taun* to sift organisms as the tide ebbs. Of course, *bubos* can also stand alone. With stone weights in their four corners, large *bubos* are dropped into the sea and are kept stable by sinkers. Small *bubos* are set up where the water exits from dams or paddy fields. Fourth, in naming a *bubo*, trappers label their devices in a very simple and logical way. Names represent shapes, i.e. round, square, rectangle, etc. The naming also reflects the target prey of the trap. Finally, its functions are stated, i.e. as catchment for a barrier and a trap turned into a container of bait. To summarize, three important names must be remembered: a *bubo* is the classic proto-form word in the Austronesian world, is used to catch fish; a *taun* is a trapping device for barriers, barricade or weir; and a *panggal*, often cylindrical and flat, is used for catching crustaceans and small fish. A *bubo* is not just a material object, but a well-crafted basket. It is

remarkable for its very fine finish and cylindrical body. The body has a sturdy inner framework through which innumerable fine strips are neatly interwoven to form a symmetrical outer body. The flat thick strips forming the inner frame are gathered around a circular opening that is lashed with fine strips of rattan at the tail end and plugged with a wooden stopper when the trap is set in a river. At the opposite end are small rounded entrances that engender a funnel-shaped, one-way valve interior where bait is placed.

Finally, the enduring quality of *bubo* is that it is easy to transform, very local and mostly appropriate technology in terms of material availability, traditional manufacture by trappers, and easily adjusted to the needs of the time for artisanal fishermen.

### 3.4 Way Forward for *Bubo* Studies

As a way forward, a need exists to improve the continuing *bubu* reference collection. The following five items are some recommendations: (1) Continue compiling a database of *Bubo* Reference Collection on the Philippines, with later expansion to Southeast Asia and the Pacific. (2) When the condition permits, undertake field checks of *bubos* currently in use. Much later, collaborative field research with other scholars of Southeast Asia and the Pacific should also be undertaken. (3) Study the development of *bubos* from the perspective of design, materials used, and preferred shapes and sizes, especially the current status of openings, funnels, slits, etc. In relation to this, *bubos* should be analyzed in the context of other trapping techniques, i.e. weirs, barriers, barricades, fish covers, and baskets. (4) An important limitation is that the author has not ventured into the field simply to study *bubos* as a single material culture, but has instead looked at *bubos* as an important part of fisheries and fishing communities. For field study, folk hydraulics is a possible topic for the study of barriers, barricades and weirs in Northern Luzon. Finally, (5) what is most lacking in the study of *bubos* is its absence from anthropological literature. For future field work, there should be some ethnography of *bubo* trapping as a family enterprise, how knowledge of their manufacture is shared, and techniques of finding the most suitable place(s) to set up devices, i.e. fishing spots.

*Bubos* are imbued with cultural memory. The artifacts remind us of our roots as maritime people who were once connected through the seas in the vast world of Austronesian-speaking people. *Bubos* are simple and organically handmade from locally available flora. Yet, they are storehouses of the trappers' enormous knowledge about flora and fauna of the seas, rivers, and lakes. From *bubos*, one can learn the precise engineering of how the barriers will intercept the prey straight to the *bubo*. It is surprising to know that fish have sense of smell, and that they are attracted to glimmering light, and so on. The more one can be intimate with the workings of *bubos*, the closer one can get to learning the ancient ideas of dealing with our environment and living with what nature has offered us. *Bubos* are like an

encyclopedia: dying to be read and appreciated.

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## Notes

- 1) In the FAO catalogue, a pot is classed as a subtype of a trap. It is noteworthy that fish pot is a technical term, finding its “reality” in artisanal fishing in Bangladesh where the pot is a real terracotta both small and large. Please refer to YouTube videos with such titles as “Trapping Huge Country Fish Using Big Pottery Pot” and “Do you believe this fish trap in pottery pot?”
- 2) The \* before b in *bubo* signifies that the word is a proto form.
- 3) Ilk is Umali’s abbreviation for Iloko, denoting the provinces of Ilocos Norte and Ilocos Sur. It could also mean that the language of the people spoken in these provinces. Therefore, the term Umali listed is in the local language.
- 4) *Panihod* is derived from (< paN- instrumental affix + *sihod* ‘catch’). However, the *atob-atob*, or miniature *atob* ‘stone tidal weir’ is a pile of stone left to make a fish shelter during high tide.
- 5) *Panapok* is derived from (< paN- instrumental affix + *tapok* ‘pile up, assemble’).
- 6) Elsewhere, I have reconstructed the etymology of *atob* as a metathesized form of *bato* ‘stone’ (Zayas 2004: 55–70).

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Appendix: Map of the Philippines Showing Places Mentioned in the Text



(Created by the author)