The Centrality of Arrow Crafting and Hunting in the Agta Way-of-Life

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ABSTRACT

The Agta hunters-gatherers, or foragers, an ethno-linguistic society living in northeastern Luzon have until recently focused much of their identity and way-of-life on their bow and arrow complex. Their sophisticated arrow technology enabled them to successfully exploit the forests and littoral zones of the Sierra Madre range of mountains, to gain their own subsistence in wild game and to provision scattered lowland farmers. The bow and arrow complex is described as it existed until late in the twentieth century.

Keywords: Agta hunters-gatherers, Sierra Madre, Northeast Luzon, bows, arrows, Isabela, Cagayan

The Agta and their bow and arrow complex

Agta arrow crafting may be seen as a critical and central focus in the way Agta choose to live in their social and natural worlds. Without the elaborate and effective arrow points, they would not succeed in gaining the animal protein needed for their own sustenance nor in acquiring the provisions from non-Agta actors in their social world. A dominant focus in obtaining, consuming and exchanging meat comes from how arrows are fabricated, where the raw materials come from, and how both the social relations internal to the residential group and the exchange partners are structured. Agta may be seen as crafting their subsistence, organizational, and value systems through arrows. With the 21st century changes in the whole organizational framework, arrows again figure as markers. Indeed, looking at arrows back to early photographs and to Agta conversations about the oldest days suggests the crafting of the details of designs for living allows views of long term flexibility and adjustment.

This paper presents data on the "traditional" material culture used by Agta during the periods of fieldwork by the teams of

anthropologists who were guests of various Agta families between 1972 and 1995.[1] The bulk of our discussion of Agta material culture is drawn from the intensive research in coastal Cagayan and up the Nanadukan and Malibu (Ilang) Rivers. Visits were made to kin-related Agta in upriver Peñablanca, Cagayan. Comparative notes are from the 1974-1976 research among Agta host families far upriver of Palanan Centro, Isabela. Some material is drawn from visits to the remoter rivers of San Mariano and San Guillermo, Isabela. Bion Griffin, Agnes Griffin and Marcus Griffin lived with Agta family hosts for approximately four years between 1972 and 1995. Aside from long-term research stints, nearly yearly visits among Agta friends rounded out our stays.[2]

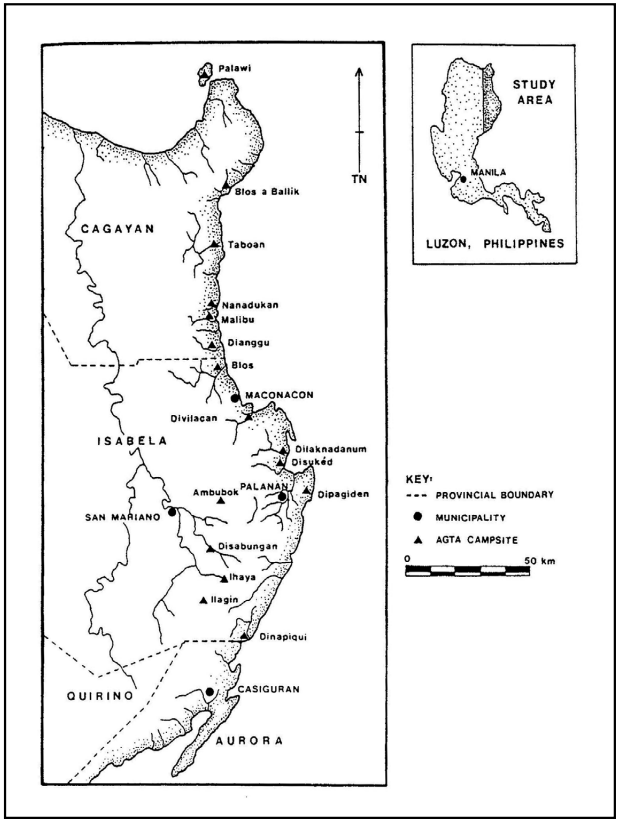

Figure 1. Map of Agta Territory.

Agta are, or were, hunters first and foremost. All men and some women hunted, fished in rivers and along the beaches, gathered shell fish, forest foods, and sometimes planted small plots of upland rice, sweet potatoes, cassava and others. Many gathered forest products for sale: orchids, rattan, tree resin, honey, and more. Those who were able, helped farmers in their fields and in assorted tasks such as house building, ocean fishing, and guiding as well as packing goods to and from the Cagayan Valley. The Palanan Agta, who are Pahanan speakers (the indigenous local farmers spoke Paranan, a similar dialect),[3] are among the most settled and in closest residential proximity to non-Agta farmers. They have ready access to the Centro where goods are available. They have experienced strong pressures disfavoring hunting and mobility for many years. The upriver Agta, who we have termed the Ihaya or Ebukid[4] Agta in earlier writings, resided at Pagsanghan and upriver, as well as on the western side of the mountains north and south of the Diwago river. Some could be grouped with Casiguran Agta of Aurora Province. These Agta were the "most traditional" hunter-gatherers among whom we lived. North in Cagayan, along the Malibu (Ilang) and Nanadukan Rivers, Dupaningan speaking Agta live, hunt, gather, plant fields, and work with loggers. Fully as much hunters as the Ihaya Agta, they differ in that they were the most successful horticulturalists among those with whom we resided.

Agta of the eastern portions of northern Luzon, the Philippines have not been isolated from non-Agta ethnic groups for several thousand years, not since the arrival of the Proto-Austronesian speakers sailed into and through the archipelago as many as six thousand years ago. Ancestral Agta may have arrived from mainland Southeast Asia as part of the original dispersal of humans well before 50,000 years ago. They moved into an island chain with a somewhat impoverished fauna compared with the continental mainland, yet rich for hunters-gatherers. The environment was highly varied, given over 7000 islands, with mountain ranges, disparate beaches and littoral environments, large and small rivers, inland valleys, and rich flora habitats. The original populations subsisted by hunting wild pig, deer, monkey, civet cats, monitor lizards, crocodiles, fruit bats, birds and smaller game. The rivers teemed with fish. The coastlines were abundant in shellfish. Wild yams and taros, the Caryota palm for "sago," and fruits provided nutrients. Seasonally wild pig fat was an important diet component. Contrary to the once popular "wild yam hypothesis" that Philippine forests lacked adequate wild starch producing plants for forager life before the availability of horticulturally produced carbohydrates, the islands sustained humans for tens of millennia.[5]

Agta bows and arrows

Since our argument concerning Agta subsistence success in recent decades demands a cultural crafting of a design for living that necessitates metal tools, a digression is relevant concerning the earliest foragers living in a pre-metal subsistence design. Iron is known only over the last two thousand years. Archaeologically observed metal arrow points similar to Agta style cannot predate iron. No bronze points are known. Arrow points, therefore, had to be adequate, even if less sophisticated than today's. Early 20th century photographs and the information offered by interior dwelling Agta forty years ago hint at the diversity of styles and functions of non-metal arrows. In fact, the only striking difference between the styles of circa 1900 and 1972 was the earlier presence of bamboo-sheathed poison arrows in the hands of Agta men.[6] Rare types found among the Palanan and Ihaya Agta will illustrate this point below.

Bows

Bows are made of carefully selected *anaw* (*Livistonia* sp.) palm wood. Not any palm will suffice. The best palm trunk is recognized as having adequately dense and strong wood. Grain is important. Other palms would tend to break under pressure. Agta men know the micro-environments where the best trees are located. The Nanadukan men know of a grove of high quality palm near the Malibu River where they and nearby Agta go to replace an aging bow. Once a mature tree is selected, it is cut with a machete, split into two-meter long pieces, and returned to the residence for processing. Shaping takes place over several days. The front side is rounded and the back, facing the archer, is flat. The bow is thickest where the hand grips it. The blank is shaved with a machete then with a knife. The bow wood must be kept "humidified" during shaping and ever after throughout its useful life span. The bow is often dipped into flowing water as it is carried about by its owner. When not in use, it is kept in a shaded area of the dwelling.

The bow ends are notched for the bowstring to securely tie it down. Bow strings were once made solely of the inner bark of a *Ficus* vine, although nylon braided line has been sometimes used in recent years. Bows vary primarily by "pull" weight, which is how much strength is needed to draw the bow string back for casting an arrow. Women's bows tend to have lighter pulls than those of men in their prime. Youths have light bows. The exception in bow construction is limited to "toy" bows that children make or have

made for them. Boys and some girls engage in play with bows and arrows from a young age. Puppies are especially sought as targets, but an unobservant friend, fallen fruit, an unwary bird, or a stray anthropologist will do as a target. Damage inflicted is minor. As the hunters grow, birds are the usual prey.

Arrows

In analyzing and reporting Agta arrows, one might arrange by "old fashioned" versus common during the study period, by variation in the three different study locations, by the best types of arrows to kill various prey, or by arrow morphology. The latter is arguably the simplest and clearest, with reference possible to areal differences as appropriate. In any case, the bulk of this report draws on the Nanadukan Agta data.

Arrows in general are of two types. The reed shaft *bigew* (*Miscanthus* sp.) with a non-detachable point predominates in an Agta suite of arrows. The solid sapling shaft, or *bugwan*, is made of saplings of *gisgis* (*Ixora* sp. or *bilanaw* (*Calophyllum* sp.); detachable metal points should always be present since these are best for killing large deer and pig at close range. In a few specialized cases this division fails, since several of the "older" styles have small detachable points on reed shafts. These will be described in turn. Concerning areal and Agta group distribution, the presence of the greatest diversity in styles used correlates with distance from non-Agta settlements and dependence on hunting. Men who hunt frequently are interested in their arrow technology, both because they depend on it and because therein lies their passion.

The *bigew* reed shaft is ubiquitous among Agta. The reed is ideal for arrow shaft use. Seasonally it is extremely abundant, being found along stream and river banks. While the shaft may break easily, it is equally easily replaced. Before a hunt, it may be straightened by lightly heating and bending and twisting by hand. The length and circumference of the shaft varies according to weight of the attached point. As will be described below, some points are very heavy, and are launched from strong bows. The shaft must be sturdy enough to bear the pressures of the launch.

Figure 2. A range of *pangal* arrow points.

The basic arrow and arrow point is the *pangal* (Fig. 2). In fact, Agta often use the word for any arrow and verbalize it when telling of shooting an arrow. In some contexts, Agta in both Isabela and Cagayan use the term *pana* for all arrows. Specific types of arrows may be named in telling a story when such is relevant to action. A *pangal* has a *bigew* reed shaft. As with all arrows, the notched terminal end has fletching of three or four feathers.

Non-detachable points

The *pangal* and its many named variants may also be termed "single component" arrows. The point is attached directly into the front of the shaft. The narrow posterior spine of the point is smithed in such a fashion that it slides into the center pith of the reed and is then tightly bound with a plant fiber. As noted, *pangal* are common among all Agta from Baler, Quezon to Palaui Island, Cagayan. The *pangal* is the simple first style attempted by a youth beginning to learn blacksmithing. His early efforts usually fall far short of shaping a decent *pangal*, instead resulting in a crude *pattak* point. Any regular hunter would own about six single component arrows, or more, and several would be *pangal*.

One might argue that all the other named metal pointed single component arrow points are simply variants of the *pangal*. They may fulfill perceived functions better than a simple *pangal*, or they

may reflect the smith's exuberance for variation. Agta take pride in their smithing skills and enjoy the style variations they fabricate. A *pangal* is widest close to its base where it attaches to the *bigew* reed. It has a pleasing fat shape that curves smoothly down to the point tip. A slight concavity is often found near the tip. While a *pangal* always has its maximum width near the back of the point, other styles differ markedly. Length, width, and their ratios reflect the purpose to which the arrow is designed. Long-distance flights of arrows demand a light point. This would be the case when taking a "long shot" at a monkey or even pig and deer when the chances of a good hit were uncertain. Should the game animal flee with the arrow embedded, it would not be a great loss. Or, a hit might cause enough bleeding to leave a trail to follow. When the hunter plans for and subsequently selects a larger, heavier *pangal*, he or she is almost certainly in a position to get a close-in shot. A big, wide point makes a large, damaging cut and has the power to shock. The idea is to capitalize on being close to usually unsuspecting animal. I might note that Agta men claim to be able at times to get close enough to touch the animal in the rainy season when they can stalk without sound.

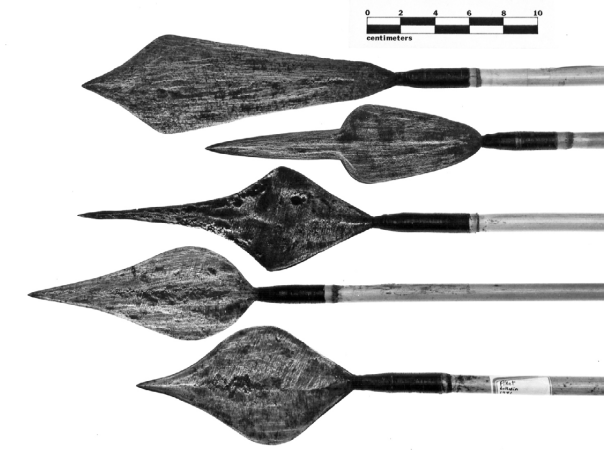

Figure 3. Diversity in non-detachable single component arrow points: top to bottom: *gungot a palataw, palsok, negtiked, dinalopani, rebuteneg.*

Figure 4. Diversity in non-detachable, single component arrow points: top to bottom: *sinahik, gungot, palsok, pangal, gungot.*

The second most popular single component arrow among the Nanadukan Agta is the *daguyos*. The Ihaya Agta prefer the *palsok* or *gungot*. (Figs. 3 and 4) Agta do not agree on separating it from *pangal*. The disagreement comes from some men being less interested in and less conversant with style variation and from variation over space. As with the language and its dialects and sub-dialects, or simple variation from river drainage to river drainage, names change. What may be a *pangal* around the Blos a Dakkel River may be a *daguyos* by the Blos a Ballik River. In far-away upriver Palanan, among the Ihaya Agta, few might even use the term *daguyos* or might name the *daguyos* style differently. The *daguyos* tends to be in the smaller *pangal* range and to have the maximum point width well ahead of the *pangal* imperative. The *daguyos* is also seldom wide compared with length. If the width is considerable compared to length, some Agta call it a *naglapendek*. Even within one group of co-resident men, they debated whether the point was a *pangal*, *naglapendek* or *daguyos*.

The *palataw* is simply a huge *pangal* or *palsok*. The name comes from the Agta term for an old, dull and expendable machete/bolo. The machete (or another large piece of flat stock) is smithed into a *palataw a pangal* or a *palataw a palsok*, being too identical to those types yet long, wide and heavy. They are rare. *Palsok*, *gungot*, and *sinahik* are three popular styles and indeed are attractive points. Once one has mastered the basic smithing of a *pangal*, making their styles is not difficult. Their uses are the same as the regular *pangal* in all its size

variations. The *palsok* is determined by its maximum width being somewhat mid-way along the length of the point. A downward curving concavity begins shortly after the anterior of the maximum width, then the curve may decrease the speed of the constriction, or it may not, resulting in a snub-nose effect. Posterior of the maximum width, the concave curvature cannot be as great as the front portion since the metal would otherwise be weakened. The *gungot* has the maximum point width near the front, the anterior end of the point and a gentle concavity extends back for the maximum width to the posterior where it enters the *bigew* shaft. Its close relative the *sinahik* has a narrower posterior base but must have a straight edge, no concavity, running back from the maximum width near the tip.

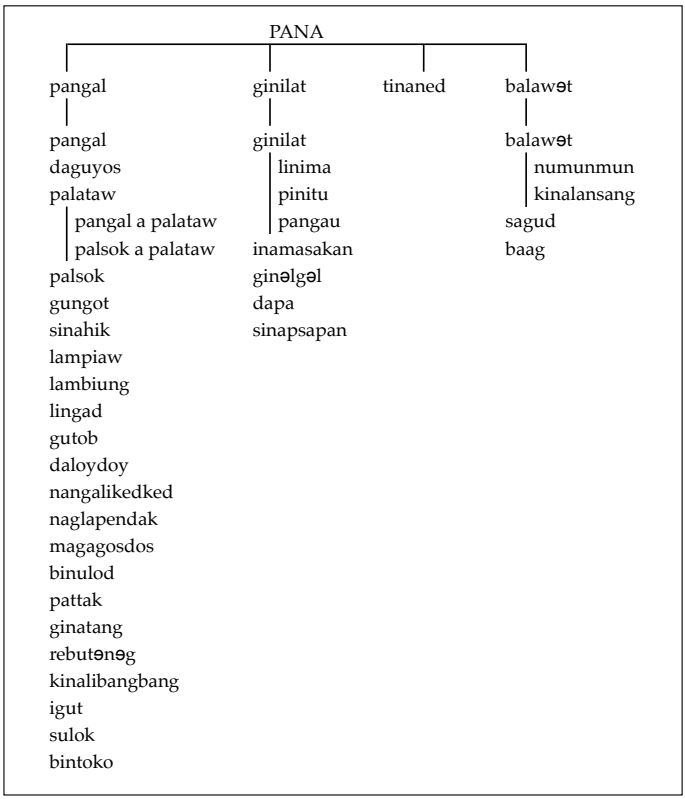

Table 1. A Dupaningan Agta etic classification of named arrow styles after Estioko-Griffin (1984).

The myriad of named types cannot be discussed in detail in the present brief paper. The Cagayan Agta nomenclature is named in Table 1. The unusual Ihaya Agta types will be noted below, following a discussion of multiple component, detachable point arrows. For further elucidation, see Estioko-Griffin (1984) and Griffin (1997). Many of the types are rare, are local creations, and are subject to disagreement. For example, the *kinalibangbang* is, to the anthropologists' eyes, an exuberant and pleasing point, comparatively wide at its greatest width with a concave sweep to the tip of the point. Large or small, the *kinalibangbang* retains this shape. In the present paper minimal discussion of the names of Ihaya points that are similar or identical to Dupaningan Agta points will be the case for brevity's sake.

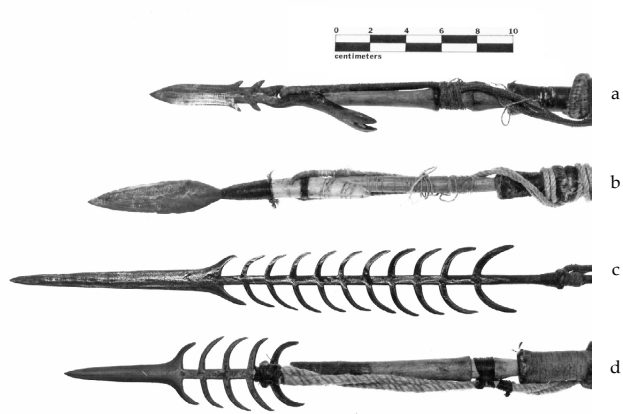

Figure 5. Detachable multiple component arrows, top to bottom: *balawɔt, sagud, ginilat/gahaygay, tinanɔd*.

Detachable points

Note in Table 1 three categories of arrow types that have arrow points that detach from the arrow shaft: the *ginilat*, the *tinaned*, and the *balawɔt*. All of these arrows have wooden sapling shafts and have the arrow point detaching from the shaft to play out on a line after penetrating an animal's body. Beyond these principles, the structures and functions of the points differ. The *ginilat* (Fig. 5c), with six plus named sub-types, is a common single head attached to a shaft by a

line. The *tinanɔd* (Fig. 5d) resembles the *ginilat* in its barbs and principle of operation, but has two components. The most complex type is the *balawɔt* (Fig. 5a), which operates on a rotating harpoon principle, and, like the *tinaned*, has a foreshaft that connects to the main arrow shaft.

All detachable arrow points in southeastern Cagayan, unlike in most of Isabela, have hardwood shafts, sturdy lines of *Ficus* inner bark twine (or nylon) and barbed metal heads. All are designed to kill deer and wild pigs, hence are unusable on monkeys and lesser game. They are difficult and expensive to make, but due to their advantages in killing game, they are especially prized.

The shafts are carved or "whittled" from pieces of wood saplings of *gisgis* (*Ixora* sp.) and *bilanaw* (*Calophyllum* sp.). A straight sapling of over one meter in length is selected. Using a hunting knife, the wood is trimmed and the surface is smoothed as it is reduced to the desired shape. The anterior end, the *bangat*, is left large, since it must house the socket (*ulu*) for the terminus of the point's stem as well as be a support for the line attachment.

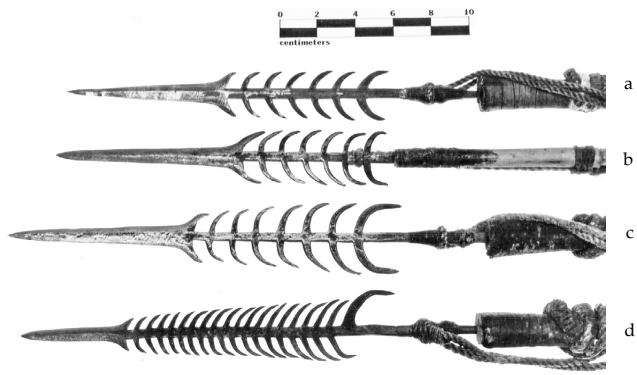

Figure 6. Top three: *ginilat*/*gahaygay*, bottom: *ginɔlgɔl*.

The lines, either bark twine or nylon, measure about 110 cm and are always doubled. The lines must be strong since upon penetration of an animal by the point, the shaft disengages, falls, and the lines play out. The fleeing animal drags the shaft, which catches on vegetation. The lines then snap taut, and the point restrains the prey, much to the animal's detriment. The point itself is a central part of the technology

since it should not be dislodged. Much of the design principles is based on effectiveness and the inability of the point to exit the wound.

The *ginilat* and the similar *gahaygay* to the south is a metal point which is placed directly into a socket in the shaft head. The main characteristics of a *ginilat* is in one or more barbs that are placed along a lengthy metal stem in back of the cutting tip and the two opposite small barbs that terminate the tip. The main barbs protrude well above the tip's cutting edge, curving backwards and ending in sharp tips.

Names of *ginilat* sub-types are based on the number of barbs or upon special characteristics of the barbs. Generally a *ginilat* is a multi-barbed point. Most have two rows of five or more barbs per row. A few have no barbs posterior of the tip's barbs. Some have only one line of barbs. Usually multiple barbed *ginilat* have a special, larger terminal pair of barbs called *anggəd* (Fig. 6c) which do most of the hooking or catching as backward pressure is exerted on the point. While the amount of "catch" of each barb is partly determined by the matrix of the embedded point (muscle, bone, innards, etc.), the larger posterior barbs may be most critical in the prevention of withdrawal of the point. The basic *ginilat* can be broken into sub-types based on the number and placement of the barbs, as noted above and displayed in Table 1.

Figure 7. Cuttting barbs on a *ginəlgəl* point using a machete.

The *ginəlgəl* (Fig. 6d) is a *ginilat* with many barbs, usually twelve or more per side. This type has a specialized construction technique, permitting more barbs. The metal pre-form is cut or sawed into parallel lines, using an old bolo or machete, or flat stock (Fig. 7). The *dapa* is the opposite extreme. Like its cousin the *kayapa* among the Ihaya Agta, it has no barbs on the metal shaft, but has the barbs at the tip enlarged and expanded to the size or greater of "regular" barbs (Fig. 8d). *Dapa* vary in size, but do serve the same function as multiple barbed points. The *sinapsapan* is a frequently seen *ginilat* and is unique in its restriction of barbs to one side of the stem (Fig. 8a). The number of barbs is irrelevant to this type. One barb or a dozen, it is still a *sinapsapan*.

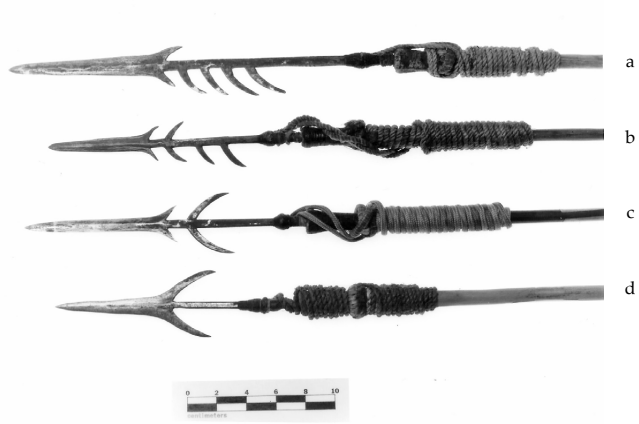

Figure 8. Detachable, multiple component arrow points: top to bottom: *sinapsapan, ginilat/pinatlo, gahaygay, kayapa.*

Two types of detachable, metal point, multiple component arrows are also present. These are the *tinanɔd* and the *balawɔt*. While the *tinaned* has no sub-types, the *balawet* may be divided into named variants. These two types have two or three components, disregarding the shaft and the line. Generally there is a metal point and a wooden foreshaft, the *patolan*. The foreshaft attaches to the rear of the point stem and the front of the main shaft, as it is inserted into the socket (*ulu*) of the *bangat*.

The line that runs from the shaft to the point is attached to the foreshaft by binding at two points along its length. The foreshaft is a bit thicker than a standard pencil and has both ends rounded; it functions to connect and support the point to the main arrow shaft. It is also useful in tangling up inside an animal, further restricting exit

of the point and damaging the animal. The wounded prey is doubly restricted from getting away by pulling the point out of its body.

The problem, or disadvantage, of the *tinaned* and *balawet* types rests in maintaining proper alignment. By this we mean that keeping the metal point, the foreshaft, and the arrow shaft all tightly fit together in a straight and secure alignment, ready for nocking and casting, is no mean feat. The pieces come apart easily as the hunter runs through the vegetation. These points are most reliable and effective for close-in ambush shooting. For a longer cast at a deer or pig the *ginilat/gahaygay* may be the best option. But, once inside an animal, they can result in catastrophic internal damage (which is the point of it all).

The *balawet* point, in front of the foreshaft, is a "tailed" point that works like a rotating harpoon (Fig. 5a). *Balawet* can be divided into types according to style and construction details. Two basic types are metal and a combination of metal and horn or antler. The latter is named *sagud*. The *sagud* (Fig. 5b) is an "old fashioned" type according to our Ihaya and Dupaningan hosts. It is most likely found among remote dwelling hunters and especially in situations where access to metal and metal working tools is lacking. The cutting blade of the point is small, not unlike a small *pangal*. The tail of the point curves up and over the foreshaft is carved from antler tine or the tip of a carabao horn. The hole through which the line (*lubid*) passes is drilled through the antler or horn at a location prime for inducing the harpoon rotation effect once the line is pulled back as an animal runs.

The *balawet* class of metal points has two divisions, one subdivided into two. The *baag* is a *balawet* on which the upcurving tail does not follow the longitudinal axis and plane of the blade, but is rotated ninety degrees. Also, the *baag* tail is split into two spatulate portions. The remaining *balawet* types are *nimunmun* and *kinalasang*. The difference lies in the style of the tail. The *nimunmun* is "whole" (*munmun*), while the *kinalasang* tail is split or notched into two little tips. Most Agta, when asked the names of these two types, only call them *balawet*, confessing sub-type names only when further queried.[7]

The *balawet* may best be characterized as harpoon types in that they are designed to rotate ninety degrees after penetration and tightening of the line. As the foreshaft is uncoupled and rearward pressure is exerted on the point, the tail, which rises off the longitudinal axis, is caught and forced away from the line of pull. The only hope the animal has is to break the line attached to the arrow shaft and point complex. While *ginilat* points have been known to be broken by a large boar while internally lodged, the *balawet* stays in. The points must be cut out of the carcass by the hunter; extraction by pulling is impossible.

Balawet are not used by all hunters since they are difficult to fabricate. Only a few senior men have the skills to forge such a point.

On the other hand, a *sagud* is easy to make, but is less desirable since the antler or horn tine may, under pressure, separate. Most hunters, however, regard the *sagud* as an excellent point.

Specialized and old-fashioned points

The Ihaya and Palanan Agta made a variety of prey specific points that were not seen in Cagayan. These we consider traditional or old fashioned types. A few were fabricated especially for the anthropologists, who asked about arrows that were made in the "old days." They tend to be either made entirely from non-metal materials or to use only a small *pangal*-like point combined with plant materials. The *bigew* reed shaft is ubiquitous since none of the points have the weight of *ginilat* and *gahaygay*. Interestingly, both detachable and non-detachable points are known. Discussion, however, is best approached by noting the function or prey selection for the points.

Figure 9. "Old-fashioned" arrow types: top to bottom: *bahe, sabhit, dimlol, albig, banglag* with bamboo sheath.

The *albig* is a single component arrow similar to a *pangal* except the point is a shaped bamboo (Fig. 9d). A thin, mature, hard-walled bamboo is split into longitudinal pieces, after which the piece is whittled by a knife into a long, narrow, *pangal*-like point ready for attachment to the reed shaft. This arrow is often made by pre-adolescent youth since it is easy to do and costs nothing in terms of "imported" materials. And, last but not least, if lost through a bad

cast or by a wounded and fleeing animal, the loss is minimal. One suspects that this arrow and the ones discussed below once made up the bulk of a hunter's assemblage. The *bahe* (Fig. 9a) is similar and is also intended to shoot deer and pig, but has a unique feature in that the point itself is designed to separate from the shaft once penetration of an animal occurs. A small, round piece of deer antler is carved into a segment with a longitudinal hole that runs its length. The front of the piece is wider than the rear. The stem of the point inserts into the front of the hole. The rear fits onto and over the *bigew* reed shaft. The arrow, upon striking an animal, cannot enter beyond the point since the antler segment along with the shaft, is separated then falls on the ground. The animal, assuming the hit was non-lethal, retains the bamboo point inside, hopefully causing bleeding and eventually fatal loss of blood. The shaft is recovered by the hunter, who inserts another point into the antler, and on he goes.

Arrows designed specifically for killing monkeys are widely known in Palanan and south among the Ihaya Agta. Monkeys are usually shot while they are in trees and can make fast escapes. Most importantly, a monkey can easily grab an arrow and use its hands to pull it out of its body, making a get-away easier. The arrows specifically for monkeys make pulling out an arrow difficult, painful and damaging. But, the heavy metal *ginilat* and *tinaned* must be adapted for monkeys. Most of these arrows are multiple components, featuring a light point with a long stem or a *patolan* and a light *lubid* connecting the point to the shaft. In addition, small barbs usually exist to retard point removal by the wounded monkey.

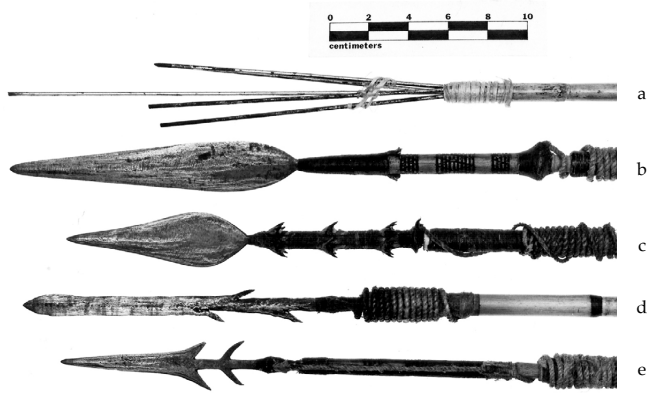

Figure 10. Fish and monkey arrows: top to bottom: *sigangat, bigel, sabhit, binuhog, binuhog*. The *sigangat* is for shooting fish, the *bigel* is for monkeys or any small game, and the bottom three are for monkeys.

The *bigel* (Fig. 10b) is the most basic. It has a *pangal* point, either of metal or bamboo inserted into a thin pencil-like shaft that in turn inserts into the *bigew* shaft. This is not a *patolan* since the pointposterior stem is not tied on but inserted into the shaft for greater stability. A short *lubid* line is bonded to both the wooden shaft and the reed shaft. The *sabhit* (Figs. 9b, 10c) is the most frequently used monkey arrow and likely is an ancient type. It is like the *bigel* but has rattan thorns bonded to the wooden shaft anterior to the *bigew* shaft. These tough little thorns are a nightmare to extract from a body. Just getting caught by them while walking brings one to a halt. The *sabhit* often has a light *pangal* point but use of bamboo is often seen in boys' arrows. The *inunay* and *binuhog* are similar to the *bigel* point, but instead of a *pangal*-like point, they have small metal points with equally small protruding barbs. The *binuhog* (*buhog* is the Agta word for monkey) looks like a miniature *ginilat* or *tinanɔd* (Figs. 10d, 10e). We should note that in recent years most arrows cast at monkeys are just small *pangal*. The ease of procuring metal and metal working tools has perhaps led to the decrease in use of old-style arrows.

The *dimlol* (Fig. 9c) and the *sigangat* (Fig. 10a) are interesting but seldom seen arrows, the former for shooting fruit bats or birds, the latter for fishing. The *dimlol* is a multi-pronged bamboo point with the barbed prongs spread apart to the front. When hitting a fruit bat, they do not fall out but cover a wide area of the bat's body or wings, forcing it down. The *sigangat* nowadays is preferably made with discarded umbrella wires, sharpened at the tips. Like the *dimlol*, the wires spread to make multiple entry points in a fish. The archer, who is standing looking down into water, judges the angle and simply shoots the fish. Agta say that this form of fishing was once important before home-made goggles (*antipara*), rubber bands (*goma*) and metal spears (*bahot*) were obtained and when fish were abundant. The final specialized point is the *banglag* (Fig. 9e) which is always stored inside a narrow bamboo sheath. The *banglag* is rather like a long pencil in shape, being carved and whittled from *anaw* palm. The finished point is smeared with a poisonous tree sap. This arrow is only for shooting humans. Agta no longer make these points nor do they engage in raiding, or *ngayaw*. We hold two specimens in our collection.

Figure 11. Men making arrow points: front left, cutting out a blank using a hammer and chisel; center, filing a *ginilat*; right, shaping a *bugwan* shaft with a hunting knife. The fire for heating iron is to the front right. Nandukan, Cagayan.

Figure 12. Filing a *ginəlgəl* after roughing out the barbs.

Figure 13. Filing a *ginəlgəl* with a triangular file.

Figure 14. Fletching the arrow with *kalaw* feathers. Note the multiple component point, a *sagud* made of deer antler tine. Nandukan, Cagayan.

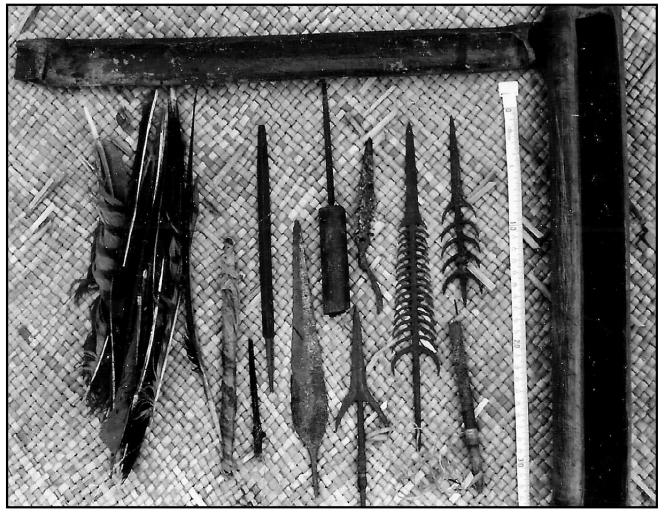

Figure 15. Contents of a bamboo arrow "tool kit" container. On left, feathers for fletching, followed moving right by a *patolan,* two files, a *pangal* , a file, a *kayapa, ginəlgəl, balewət*,a *patolan* and a *ginilat*. Lastly on the right is the open bamboo storage unit with its cover at the top of the photograph. Nearly all men would own such a tool kit.

Fabrication of arrows

Metal for arrow point blacksmithing must be secured from external sources. These tend nowadays to be fairly common. Scrap metal from old knives purchased from farmers, loggers, and others is usually possible. The presence since the 1960s of logging companies has been a bonanza of metal. Large spikes are especially sought since they may be easily shaped into a variety of points. Flat stock is scavenged when possible. The stray anthropologist has been known to bring in requested straps of steel for arrow point manufacture.

Blacksmithing and subsequent steps in arrow point making is largely, but not exclusively a rainy season activity. During this cold, wet time of year of the northeast monsoons, October through January, Agta often live in small houses with raised floors. Fires are built under the edge of the house for cooking and for heating metal. Fine grained basalt river stones are placed by the fire as anvils. Men gather to work, talk, and plan (Fig. 11). When making metal arrow points, a smith begins with a piece of metal and heats it in the wood fire near where he sits. The red-hot metal is initially beaten with a steel hammer to flatten it. Then, again with heat, a hammer and

cold chisel are used to cut the metal into a rough shape. For a single non-detachable point such as a *pangal*, the blank is roughed out and smithing ceases. For the barbed points, the chisel is used to remove the excess metal between the planned barbs. Again, with a rough shape the hammering stops because too much thinning of a point by hammer weakens the metal making it prone to breaking in use. The next step begins the long and tedious filing into the next to last stage (Fig. 12). This is also expensive, since files are costly and difficult to find. Flat files are needed for *pangal* type points. Half round files are needed for *ginilat*, *gahaygay* and other barbed points. Rat-tailed and triangular files are often needed for complex shaping as in the *balawet*, *baag* and *ginəlgəl*. The *balawet* and other harpoon points present more problems. Since hole through the metal is necessary for the line to pass through, a punch or drill is needed. When antler or horn is used, an arrow point tip or a knife may suffice to gouge out the hole, but metal needs metal. Needless to say, production of these points is limited not only by lack of skill in the maker but by scarcity of files and punches of good quality.[8] A large flat file is good for getting the shape nearly finished. The smaller files do the close-in work (Fig. 13). The rat-tail file enables the fine shaping of nicely curved barbs, while the small triangular file does the delicate work on a *balawet* or *baag*. The *ginəlgəl* is different yet. This point with its many small, closely spaced barbs is literally cut into shape by an old machete/bolo, which saws its way to the stem between each barb. (See Figs. 7, 12, and 13 for each of the above actions.)

Aside from point fabrication, other steps are necessary but relatively easy to accomplish with local resources. As mentioned above, reeds are widely available. A few Agta have claimed to have "planted" or replanted high quality reeds into the best growing conditions in order to have the best arrow shafts at hand. Agta claim that the selectively cultivated variety produces the best shaft. The reeds are cut when alive, mature and fully grown. Maturity brings a strong shaft, unlikely to crack easily, and able to resist lateral pressures. It is also the most amenable to retention of straightness and accepts heating from low fires as hunters straighten slight warping resulting from the shaft getting wet. Collected shafts are dried under a roof for a few days. A culling occurs, wherein some are rejected. Nodes are examined, cracks scrutinized, and balance and flexibility checked. Ends are trimmed to the wanted length, which varies according to the size and weight of the planned point. Each node of the reed is trimmed with a knife so that the shaft will not get a bumpy ride as it flies from the bow. Accuracy of the cast demands a smooth launch. The saplings for *bugwan* shafts are also found easily within the forest. *Bugwan* shafts are likewise carefully examined, trimmed, straightened, and checked and rechecked. Flaws are

tended to and, in some cases, the specimen is given up as hopeless. Senior men seldom, however, initially choose poor quality pieces.

Binding fibers and *lubid* lines made of *Ficus* vines are found in the forest. *Sɘggit* is the sticky sap of the Narra tree (*Pterocarpus indicus*) that is always used to adhere components to the shafts. The *lubid* line must be strongly glued to the points, *patolan*, and shafts. Feathers for fletching are also glued and bound to the shaft (Fig. 14). The feathers for fletching (*alad*) are those of forest birds. The best feathers are those of the *kalaw* (*Hydrocoraxhydrocorax*). The *Sɘggit* glue is rubbed on the shaft, alternating with a fine ash from the fireplace. This dries and hardens the sap into a long lasting bond that is impervious to the elements, although it is touched up now and then. Sometimes damaged fletching must be replaced with new feathers.

The hunter usually has a tool kit at home with the necessities of arrow care (Fig. 15). Replacement feathers, files, cordage, binding fiber, point blanks and finished points may be present. On the hunt, none of this is carried. The hunter is armed only with bow, arrows, and a knife. The knife enables any emergency repairs, if necessary.

Final thoughts

The future of Agta arrow naming, fabrication, use, and certainly enjoyment does not have a bright future. As we write, few young men share the knowledge and enthusiasm of now aged seniors. The plentiful deer and wild pig populations of the 1980s is now diminished by overhunting for trade to growing numbers of in-migrants, loggers, and others. The forests have been devastated by logging and by clearing by peasant farmers following the logging trucks. While commercial logging by big concessioners is now illegal, carabao logging has flourished illegally. Rattan has been stripped wherever reachable. Without game to hunt, arrows are not needed; shotguns or rifles are preferred to bows in the 21st century. Many young men, who a generation ago would have been enthusiastic apprentices of hunting and blacksmithing, now understandably seek to join the modern world of cell phones, the internet, and gainful employment. We hope that one day they will appreciate the superb skills and knowledge of their ancestors. *Ewan den*. No more.

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Over the last forty two years we have incurred so much *utang na loob* and received so much help that listing here is impossible. For the present paper, we thank Dr. Analyn V. Salvador-Amores for encouragement and advice. The paper in a far different PowerPoint presentation was given at the 1st Regional Conference on Material Culture of the Cordillera, University of the Philippines Baguio on May 30, 2014. The help and friendships of Galpong and Taytayan Taginod of Nanadukan and Mudi and Payto of Ihaya are valued. As ever, Mr. Alfonso (Sonny) Lim, Jr. and Mr. Nick Cerra, formerly of Acme Plywood and Veneer, are thanked for immeasurable help and interest in our work. To those few remaining hunting friends of ours, we say *salamat* and *dios ti agngina.*

NOTES

1. Dr. Robert Fox visited Palanan, Isabela and the Agta of Disuked and Dimolitin in 1954, early in his career. His student, Ponciano Bennagen, wrote his MA thesis in Anthropology (1976) from the 1968 ethnographic field school taught by Fox. Dr. Jean Peterson completed her Ph.D. in Anthropology focusing on the same area and families. In 1972 P.B. Griffin imitated the Hawaii-based research program, also first in coastal Palanan but then expanding to upriver mountain interior Palanan and to coastal Cagayan south of Valley Cove. Agnes Estioko-Griffin wrote her MA thesis in Anthropology (1984) at UP Diliman as part of this research. Their son, Marcus Griffin, wrote his Ph.D. dissertation based on fieldwork in Palanan (1996). A number of students associated with the Hawaii program completed MA theses and Ph.D. dissertations on Agta researches. These include Headland (1986), Rai (1990), Clark (1990), and Mudar (1985) The Agta research is most widely known for its contributions concerning women as hunters of large game (Estioko-Griffin 1986) and Headland's population dynamics studies (Early and Headland 1998). A collection of papers summarizing Agta research is found in Griffin and Estioko-Griffin, eds. (1985). See also Griffin and Estioko-Griffin (1986). Tessa Minter (2010) is an important and comprehensive contribution.
2. Research was funded by the National Science Foundation (USA), the National Endowment for the Humanities (USA), the Wenner-Gren Foundation, the University of Hawaii, and by personal funds.
3. See Griffin (1985), "Population Movement and Socio-economic Change in the Sierra Madre," for a discussion of the various ethnolingustic groups in the Sierra Madre of Isabela and Cagayan.
4. The Fox and Flory map (1974) of Philippine ethnic groups puts the location of the Ebukid Agta, based on our information, as roughly the mountain interior south of Palanan until Dinipique. *Ebukid* means "of

the mountains" but might be used pejoratively by more settled Agta.

5. The wild yam hypothesis suggests that tropical forests produce too few starches for hunter-gatherers to have a viable subsistence base (Headland 1987; Headland and Reid 1989). Given the archaeological presence of humans in the Philippines since the late Pleistocene, the wild yam issue is moot, unless we markedly restrict where people lived.

6. For lengthy discussions of Agta arrows and hunting see Estioko-Griffin (1984), Griffin (1997), and M. Griffin (2000). The present paper draws heavily on the unpublished thesis of A. Estioko-Griffin. The Griffins also have a large collection of representative arrows collected between 1972 and 1982.

7. Agta in general find the anthropologists' interest in arrow strange, intriguing, and amusing but positive. Most men are "into" arrows and enjoy discussions and displaying their knowledge. An occasional humorist can cause consternation by making up names for pulling the unwary anthropologists' legs.

8. The anthropologists were requested to buy an assortment of files whenever they departed the field location. Agta even named brands, wanting European or American manufacturers, claiming great durability. Since we were gifted many arrows, we readily provided files and chisels. Otherwise, loggers were asked or trips to the Cagayan Valley made.

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