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Bows and spearthrowers in southern Peru and northern Chile: Evidence, dating, and why it matters

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It is generally accepted that people in the New World have used spearthrowers from a very early date, probably bringing spearthrowers with them when they moved into North America from Asia in the terminal Pleistocene. Some time later, the bow and arrow was adopted, becoming the prevalent projectile technology in much of the New World. Archaeologists working in North America have envisioned this change as one in which the bow proved to be categorically superior to the spearthrower, and largely replaced it in a rapid, revolutionary fashion. Numerous investigators have argued that this shift from spearthrowers to bows had a profound impact on North American societies. They suggest that bows increased hunters' efficiency, permitting larger, more stable populations; that adopting the bow gave some groups the upper hand in conflict; and that proliferation of bows raised the general level of interpersonal violence sufficiently to bring about changes as drastic as the decline of Hopewell society (Shott 1993).

If the introduction of the bow and arrow was such a pivotal event in North America, perhaps those of us who work in South America, particularly the Andes, should consider similar models. Specifically, when did Andean people start using bows? Did a bow and arrow revolution sweep through the Andes? Was the adoption of the bow associated with economic changes? Did it have an impact on military events, perhaps on the expansion of Tiwanaku, Wari, or Inka polities? And finally, can the well-preserved evidence from the Andean desert coast suggest any methodological conclusions that might bear on the lithic-based studies in North America?

There is plenty of evidence in the Andes that spearthrowers were in widespread use from an early date, and continued to be widely used up to the time of European contact (Focacci 1974:63-64; Focacci 1990; Focacci and Chacón 1989; Focacci and Ericés 1971:49, 52-53). On the northernmost coast of Chile, several well preserved wooden spearthrowers have been found in burials of the Chinchorro tradition, dating between 5050 BC and 1720 BC (Muñoz, Rocha, and Chacón 1991; Uhle 1922:52-3). On the Peruvian coast, spearthrowers are clearly illustrated on Nazca and Moche ceramics, and many spearthrowers are known from Nazca and Moche tombs, confirming their continuing use in the first 600 years or so of the modern era (Alva 1994, *Dib.* 42; Donnan 1978:46-47, etc.; Uhle 1907, 1909). Wari iconography is less literal, but in some renditions, the "Staff God" appears to hold a spearthrower in his right hand and what may be a fletched spearthrower dart in his left (Morris and Von Hagen 1993: figs 99, 90). Spearthrowers were still a favored and effective weapon of the Inka army when the Spanish arrived, as we hear from Garcilaso de la Vega, who wrote that the Inka spearthrower was

"...of wood two-thirds of a yard in length, and is capable of sending a dart with such great force that it has been seen to pass completely through a man armed with a coat of mail. In Peru, the Spaniards feared this weapon more than any others the Indian possessed for the arrows there were not so fierce as those of Florida." (cited in Hamilton 1972)

This quotation alone should make us question the supposed general superiority of bows and arrows and their revolutionary replacement of spearthrowers. It also alerts us to the possibility that the bow technology of the Andes may not have been as good as that of North America.

Establishing the long spearthrower tradition in the Andes is easy. The question of when bows were added to the arsenal is more difficult. Surprisingly enough for a weapon that is supposed to have been clearly superior, bows are much less common in the archaeological record than spearthrowers. A good place to look for direct evidence of this largely perishable technology is on the coast of southern Peru and northern Chile.

In 1922, Max Uhle (Uhle 1922) reported finding a bow *inside* a Chinchorro mummy he excavated near Arica, Chile. The bow had been used as part of the framework that supported the mummy. The context of this artifact could hardly be more secure, and a recent review brackets the Chinchorro mummification tradition between 5,050 BC and 1,720 BC (Arriaza 1995).

The problem is, is it actually a bow? Uhle identifies it as such, saying that it is similar to those still used by people living along the Ucayali river. Unfortunately, the Chinchorro example was not strung, it had no grooves or shoulders for attaching a string, and it differed from the modern bows by being squared off at one end and more pointed at the other. Uhle's description is not very convincing, and his photos are no help, either. I do not discount Uhle's considerable insight lightly, but this is not strong evidence. Uhle (1922:52-3, Lam X) also illustrates a spearthrower from a Chinchorro cemetery.

Muñoz, Rocha, y Chacón (1991) report a bow from a burial at the northern Chilean site of Camarones 15. This bow has its string, made from animal hair, still wound tightly around one end, and was found with arrows. Although they do not describe the bow or arrows in detail, the identification seems convincing. The problem here is dating. Most of the site was disturbed, and no specific provenience is given for the bow and arrows. One radiocarbon date from a burial in the same sector of the site falls at 2840 ± 100 BP, or about 990 cal BC. Some additional thermoluminescence dates agree, while others are later, but TL as a source of precise dates is still unreliable. The occupation of this site could be quite long. Nevertheless, this find certainly suggests the presence of bows in north coastal Chile in the first millennium BC, during a long, conservative period during which agriculture and ceramics were gradually adopted by mixed marine and terrestrial foragers. Muñoz et al. also found a spearthrower in the same area at Camarones 15, possibly used to propel a harpoon.

Focacci (1974) gives us not only a well-described, definite set of bow and arrows from a good tomb context at the site of Playa Miller 7 (El Laicho), but also four other tombs with miniature model bows and arrows. The identification of the bow and arrows is definite. The bow is 1.25 meters long, slightly flattened in cross-section, curved, and grooved to attach the string. The two wooden arrows are 60 cm long. The point of one is a cactus spine, while the other is sharpened bone. The best preserved model bow is 35 cm long, curved, has a bit of cotton string tied on both ends, and, like the other models, was found with wooden sticks taken to represent arrows, some of which have cactus spine points.

Again, the problem is dating. Focacci estimates that the site was occupied from 500 to 300 BC, based on reasonable typological arguments and the absence of maize in an extensive sample. Still, this bow and the models could easily be as late as the beginning of the modern era, or even later.

Muñoz (1987) mentions a bow recovered from the Azapa valley burial mound site of AZ 70, but the source he cites (Focacci and Erices 1971) does not mention it, and Muñoz does not give a description himself, so there is some uncertainty about the identification and provenience of the artifact. We have one radiocarbon date from AZ 70 that falls at 2440 ± 100 BP, or about 550 cal BC. Unfortunately, this site could have been used for much or all of the Alto Ramírez period. Rivera (1985) assigns 13 radiocarbon dates for the Alto Ramírez culture, several of which fall outside the traditional limits for this period. Conservatively excluding only the single most recent date as a possibly flawed outlier, the dates are fairly evenly spread from about 1150 cal BC to about 665 cal AD. So, if a bow really was found there, it might date to the first millennium BC, but it could also be as late as, perhaps, 665 AD. Focacci and Erices (1971) do describe a complete spearthrower and fragments of at least four spearthrower darts from this site.

By the first part of the Late Intermediate Period, from about 1000 to 1350 AD, people on the coast of southern Peru and northern Chile were definitely using bows and arrows. Focacci (1990) reports three Cabuza tombs from the Azapa valley site of AZ 6 with sets of 3 to 5 arrows, one with arrow fragments, and one with bow fragments. Dating the Cabuza style in Chile is a little problematic, but it is unlikely to predate Tiwanaku V, around 700 AD in this region. In the Osmore drainage of southern Peru, my data suggests that the Cabuza style appears later yet, after 1000 AD, and lasts until around 1250 AD (Owen 1993). Jane Buikstra's Chiribaya Project excavated a tomb at Chiribaya Alta that contained a definite bow and set of arrows, two of which have hafted stone points, now on display in the Museo del Sitio de El Algarrobal. I have dated Chiribaya from about 975 to 1375 AD, while Buikstra would push it earlier, to maybe 700 AD.

To review this evidence, despite the amazing preservation of perishable bows and arrows on the coast, problems of identification and dating preclude a positive determination of when the technology first reached the area. I would say that the balance of the evidence suggests that the bow was adopted during the first millennium BC, and maybe as late as 500 AD. It is possible that the bow was adopted after 500 AD, but the weight of the evidence favors an earlier date.

This dating puts bows in the southern Andes several centuries, and possibly over a millennium, before people in eastern North America began to use them between 450 and 750 AD (Shott 1993). Bow and arrow technology probably arose and spread independently on the two continents.

More importantly, the evidence from the coast of southern Peru and northern Chile indicates that both bows and spearthrowers were known and used by the same people for at least 500 years, and possibly as much as 1500 years. This suggests that neither technology was better than the other across the board, but rather that each was useful for certain tasks.

Although the vagaries of preservation only allow us to directly observe bows in coastal settings, it is difficult to believe that bow and arrow technology could have been limited to the shoreline. Inland groups must have known of bows if their coastal neighbors were using them for centuries.

So, by some time around 500 AD at the latest, it is unlikely that any group would have had a monopoly on bow technology. If bow technology was part of everyone's cultural repertoire by 500 AD, explanations of military success in the Middle Horizon, Late Intermediate Period, and Late Horizon cannot depend on the superiority of bows as weapons of war.

Turning to methodological issues, the southern Peruvian case provides some insights that might be useful to people analyzing projectile points in places where perishable bows and arrows are not preserved.

First, the earliest stages of bow and arrow technology on the coast of southern Peru and northern Chile involved no lithic parts at all. Arrow points were made from cactus spines or bone. The possibility that lithic analysts might be missing the initial uses of bows and arrows is more than a hypothetical concern; it is a demonstrable fact in the southern Andes.

Second, in eastern North America, archaeologists argue that stemmed points were used on larger projectiles such as spearthrower darts, while triangular points with straight bases were used for smaller arrow points. The southern Andean data indicate that these formal point types are in no way required by the launching technologies. In fact, the pattern is precisely the opposite in southern Peru. The earlier point form, predominant in the millennia prior to the Middle Horizon, has a slightly concave base, analogous to the North American triangular points. These points must have been used on spearthrower darts, and were probably also used on early arrows. The later point form, by far the most common form associated with local Middle Horizon and later societies, has a stem. The two hafted arrows from the Chiribaya tomb mentioned earlier are tipped with these stemmed points. Since these were virtually the only points used at the time, they were probably used for the later spearthrower darts, too. The North American relationship of point form to launcher technology may well be correct, but it would be a stylistic matter, not determined by the technology.

In fact, the very same points were used on projectiles for both types of launchers. On the coast, we know that the Chiribaya people used narrow, stemmed points on their arrows, because we have the two complete examples from Chiribaya Alta. As a rough guess, this type of point may comprise 90% of the points on Chiribaya sites. Several of us working in the coastal Osmore drainage casually referred to these as "Chiribaya points". The points shown here are actually from a Tumilaca phase site, close to and contemporary with Chiribaya settlements, but even to an experienced eye, they are indistinguishable from the Chiribaya type.

Tiwanaku people, living further inland near Moquegua and slightly earlier in time, definitely used spearthrowers. They probably used bows, too, but bows are not likely to be preserved around Moquegua. Spearthrowers, on the other hand, have characteristic hooks that are often made of stone or copper. We found this copper spearthrower hook last summer on a single-

component Tiwanaku IV (Omo phase) site near Cerro Baúl. This is not the only example. Goldstein (1989 fig 71) illustrates a stone "puma-headed snake amulet" from the Tiwanaku V (Chen Chen phase) site at Omo that is probably a spearthrower hook. Kolata (1993:121 fig 5.16) illustrates a "miniature copper fox figurine" from Tiwanaku that is also probably a spearthrower hook. Since the Moquegua Tiwanaku colonists made narrow, stemmed points virtually to the exclusion of any other form, these points must have been used on their spearthrower darts. Paul Goldstein, working around Moquegua, called these "Tiwanaku points".

Imagine our surprise when we discovered that the "Chiribaya" points used on arrows are formally indistinguishable from the "Tiwanaku" points used on spearthrower darts. Most of them are even made of what appears to be the same white silicate material. Clearly, the very same point form can be, and was, used on projectiles for both launching devices.

There *is*, however, a subtle metric difference between the two Chiribaya hafted arrow points and other points of this type. Based on rough measurements from photos and drawings, it seems that the hafted Chiribaya arrow points are unusually narrow. They fall just outside the range of variation of the other points, which could have been used on either type of projectile. I doubt that, in the absence of the perishable arrows, anyone would classify the Chiribaya arrow points in a different group from the others, and the apparent difference may have to do with the poor data sources and the very small sample. Nevertheless, with a larger sample, it might be possible to distinguish between arrow and spearthrower points on metric, not formal, grounds.

I would argue that the virtual identity of the points used by the Chiribaya and Tiwanaku people suggests that the two groups shared the same projectile point tradition. If so, it seems plausible that they shared other aspects of their projectile technologies, that is, that the Chiribaya also had spearthrowers and the Tiwanaku also had bows.

So, what have we learned, and why does it matter? First, bows were probably adopted on the coast of southern Peru and northern Chile in the last millennium BC, or possibly in the first half millennium AD, although a later date cannot be ruled out. This is enough earlier than the spread of bows and arrows in North America that the two events are probably not historically related.

Second, the same people used both bows *and* spearthrowers for centuries, even millennia. Bow technology was *not* superior across the board, and it did not sweep through Andean groups, replacing the spearthrower in a revolutionary wave of advancing technology. Instead, the bow was probably adopted for some tasks, while the spearthrower continued to be used for others. The coastal cultures that adopted the bow do not appear to have experienced any rapid change in subsistence, settlement, inter-group conflict, interpersonal violence, or anything else. The long period of complementary use, and the failure of the bow to prove radically superior to the spearthrower, suggests that economic and military impact of bow technology might not be so profound as has been suggested.

Third, if the coastal people had bows this early, their inland neighbors presumably knew of them, too. This suggests that, from at least 500 AD onwards, we can't explain military

expansions by imagining that the successful group had bows and the losers did not. Most groups would have been familiar with both types of projectile technologies.

Fourth, determining projectile and launcher technology from lithic analyses will be extremely difficult. "Triangular" points may be used on spearthrower darts as well as arrows, and stemmed points may be used on arrows, as well as spearthrower darts. There is no necessary linkage between point type and launcher technology.

Finally, the earliest arrows in this region had cactus and bone points, so the entire launcher and projectile system was perishable. In a more humid environment, the entire early bow and arrow technology would leave no trace in the archaeological record. A lithic analysis would miss the introduction of bow and arrow technology entirely. This is more than a hypothetical concern; it is demonstrably the case on the coast of southern Peru and northern Chile.

So, why does this all matter? On a methodological level, it matters because the south Andean case confirms the fears of lithic analysts. Identifying bow and arrow technology from points alone really is problematic. On a substantive level, it matters precisely because it *does not* matter. The adoption of the bow in the southern Andes was early, gradual, and anything but revolutionary. The bow and arrow may be an important factor in North American prehistory, but archaeologists may want to question that conclusion. In the Andes, we will definitely have to look for explanations elsewhere.

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Figure 1. Points from surface collections at Loreto Alto, in the coastal Osmore Valley, which was occupied by contemporaries of the Chiribaya who used Ilo-Tumilaca/Cabuza style ceramics. All but the concave-based point on the lower left are of the typical “Chiribaya” or “Tiwanaku” stemmed form.



Figure 2. Copper alloy spearthrower hook from surface collections at La Cantera, on the northwestern flank of Cerro Baúl, near Moquegua.

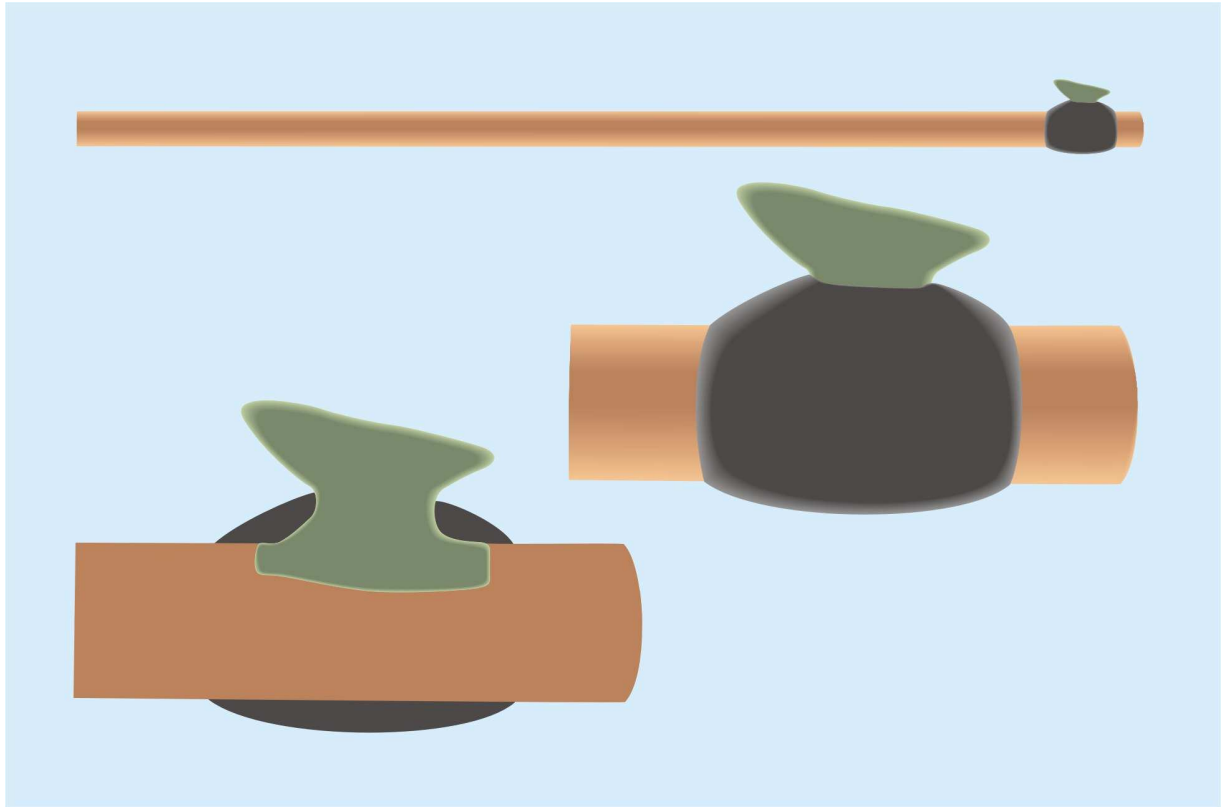


Figure 3. Reconstructed hafting of copper alloy spearthrower hook from La Cantera, by analogy to complete Nazca spearthrowers at the Museo de la Nacion, Lima.

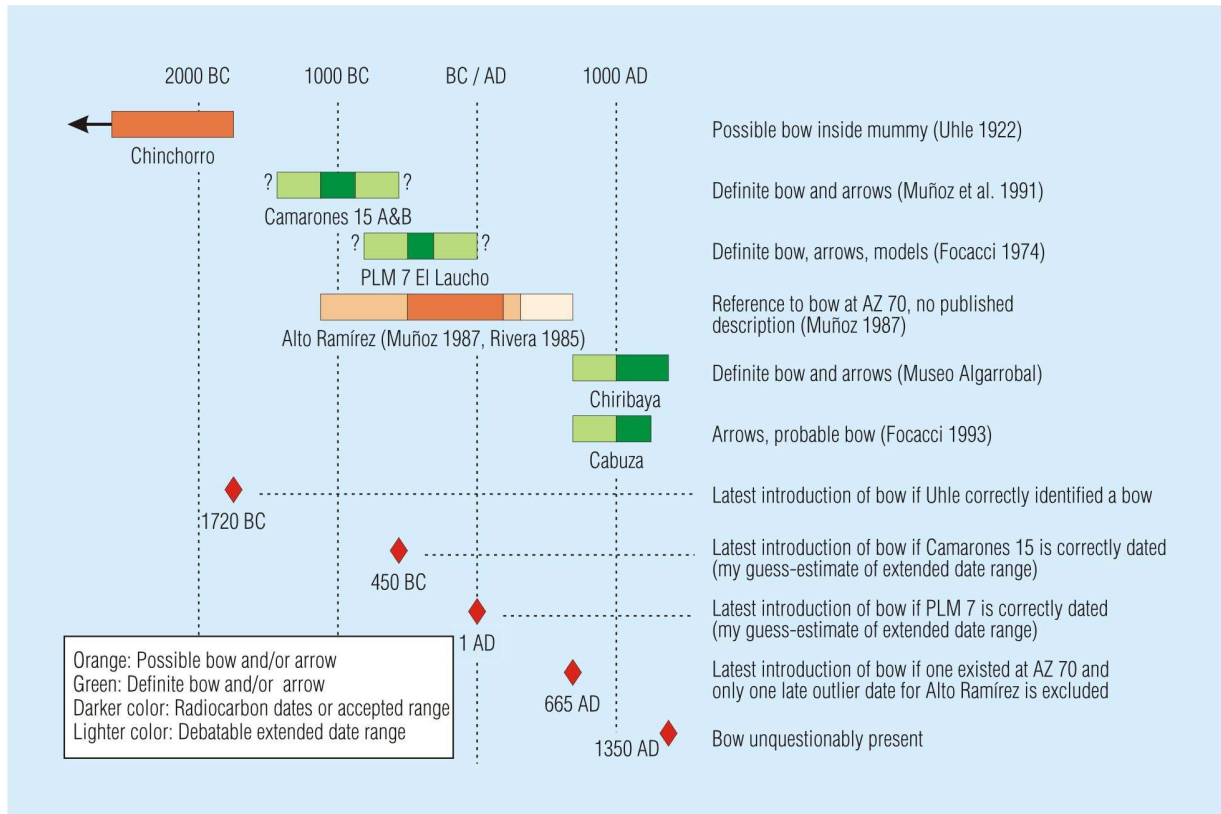


Figure 4. Dating of possible bows from far south coastal Peru and northern coastal Chile.

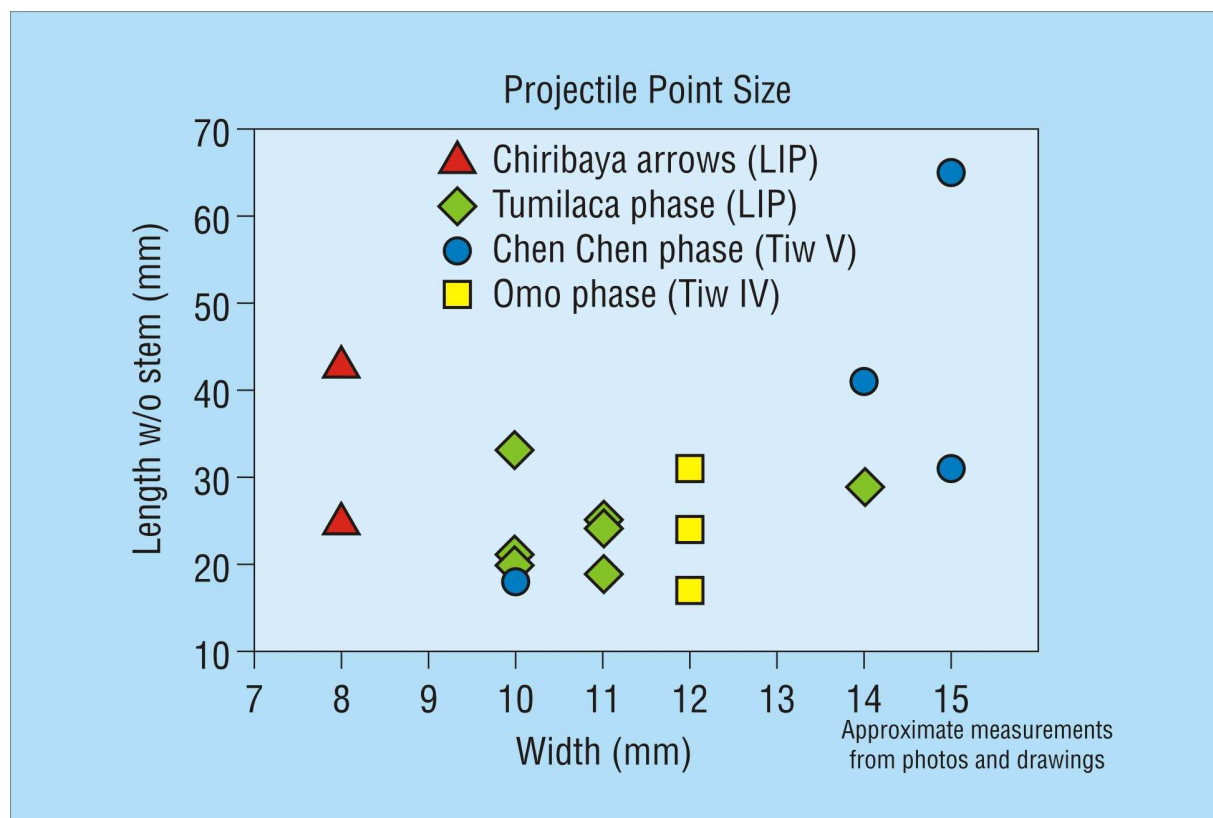


Figure 5. Length and width of stemmed white silicate points from known Chiribaya arrows compared to formally very similar points of unknown use from Omo, Chen Chen, and Tumulaca (Ilo-Tumulaca/Cabuza) contexts.