Introduction

The Angostura point is considered a Late-Paleo / Transitional / Early Archaic lanceolate projectile point made across multiple regions of North America. Angostura points are recognized the Rocky Mountains to the plains of Canada south to Mexico, and in notable quantities from the central plains to Texas. Technological variations across all these regions however, have led to confusion among researchers who can't seem to definitively agree on the type. As Buhta et al. (2013, p. 63) describe how the *"issue relates to the identification, or misidentification, of Angostura specimens in state databases and the casual, overuse of the term 'Angostura' in the archeological literature (see Thoms 1993). As Pitblado (2007:317) notes, after Wheeler's time, Angostura has frequently been used as a general 'wastebasket' typological label for any parallel obliquely flaked lanceolate point that could not be more precisely classified. Because of this, state files and databases likely abound with 'Angostura sites that may very well not be Angostura at all."* Furthermore, experts believe Angostura points are scarcely found in the Great Basin region (Pitblado 2003, p. 233), although there is a strong desire specifically to identify any Great Basin examples for study to advance a better understanding of the Angostura Complex (Buhta et al., 2013, p. 62). The purpose of this commentary is to address these issues, specifically exploring this type as it exists in central Nevada of the Great Basin. The starting point of this study rests on the definition of Angostura provided by Bradley and others, for the "Rocky Mountain" version of Angostura, first defined on the Northern Great Plains. The motivation to do this lies in a recognition that variations observed elsewhere (from California to Texas and beyond) are significant. Points identified by many as Angostura from these other regions diverge technologically from the original Rocky Mountain version, and in some cases are from completely different time periods. Examining all these aspects is useful in order to gauge how narrow the "soda-straw" is through which we view them, and to form a basis to discriminate potential ambiguities. The present analysis covers four general areas. First, is a review of the history and definition of the Angostura point to establish a baseline. The second area focusses on points from the Great Basin including Humboldt varieties and others from further west that are frequently misidentified as Angostura. The third section focuses on points from Nevada that are strong candidates for the Angostura category. Finally, a comparative look at Texas Angosturas and others from around the country. While identifying Angostura points is unexpected in the Great Basin, enough examples conforming with the Rocky Mountain standard have been found to conclude they were indeed made and used there.

A History of the Rocky Mountain Angostura Definition

The "Long" point was defined by Jack Hughes at the Ray Long site near the Angostura reservoir in the Northern Great Plains area of South Dakota in 1949. He described them as "*large lanceolate specimens with narrow, straight to concave bases, fine, sometimes oblique flaking; and ground edges near bases"* (Hughes 1949, p. 270). This point type became much more recognized in the Rocky Mountains and the type name was changed to Angostura by Wheeler (1954). Wheeler updated the definition in 1995 as "as large, slender, lanceolate specimens, with parallel diagonal rippled flake scars running from upper left (tip) to lower right (base), and thinned, straight or shallowly concave bases with ground lateral edges" (Wheeler, 1995 p. 415). This was not much different from the original definition from 1949, but it clearly emphasized the specific flaking pattern. Based on Angostura points from the Ray Long site, Bradley provided a very detailed description of Angostura flaking with the following observations, and illustration, see Figure 1 (from Bradley p. 6, 2013):

1. Pressure finishing was patterned, serial, and oblique
2. Frequent step fracture terminations occur on thin pressure flake removals
3. Removal of flakes in a serial pattern (flakes are removed sequentially adjacent to each other in one direction)
4. Flakes are diagonal to the midline, taking maximum advantage of the surface curve
5. Flake scar run from upper-left to lower-right and lower-right to upper-left, or "UL-LR / LR-UL"
6. Flake removal sequence is mostly from base to tip on the left side and tip to base on the right
7. Most pieces are evenly lenticular in cross section
8. Point margins from the greatest width to the base are ground smooth

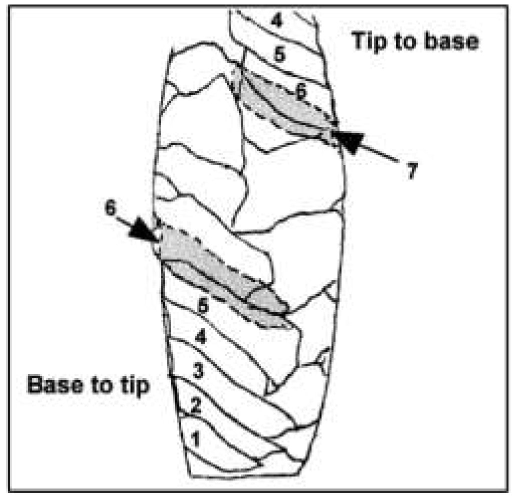


Figure 1 Idealized Angostura Flake Pattern


Figure 2 So. Dakota Ango

These flaking details are useful in comparing points to the Rocky Mountain definition. There are additional attributes however, seen regularly in points from other regions, that are not mentioned in the Rocky Mountain descriptions because they are NOT seen there. As part of this study, these additional constraints must be included in the Rocky Mountain Angostura definition to quantify attributes they *don't have.* Rocky Mountain Angostura points are not serrated, not beveled and they are not shouldered. An example of a Rocky Mountain-type Angostura from South Dakota is shown here in Figure 2 (from the Lithic Casting Lab website (http://www.lithiccastinglab.com/gallery-pages/2013marchpointimpactfracturespage1.htm). The point is un-resharpened with impact damage to the distal end. Also, Figure 3 includes drawings of three examples from the Long site (taken from Buhta et al. 2013, p. 8 & 9).

These very specific details that define the "Rocky Mountain Angostura" are used regarding the immediate goal of understanding if these early points occur in central Nevada. In general, roughly lanceolate-shaped and concave-base projectile points are found throughout the Far-Western US. Many are frequently identified as Angostura, but upon closer examination are clearly not. The following sections provide a review of the Humboldt Concave Base type as well as lesser understood points from further west that have confused many.

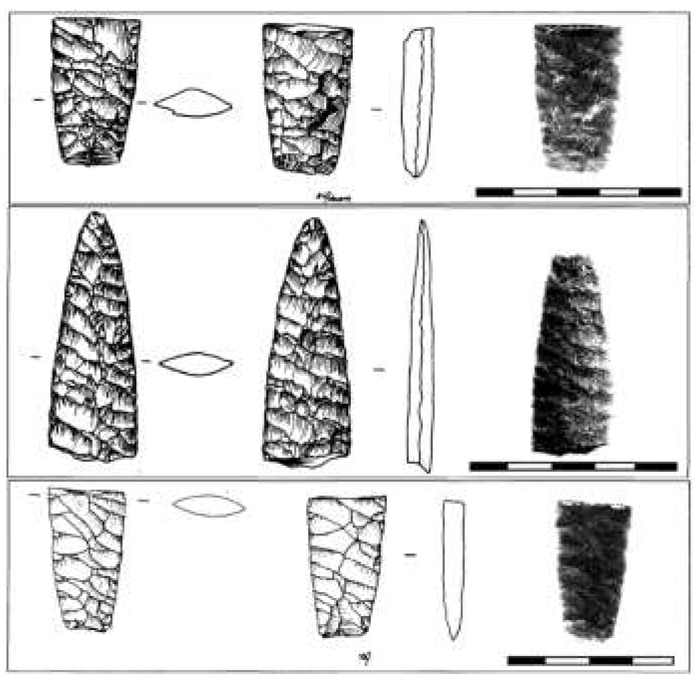


Figure 3 Long Site Angosturas

Humboldt Concave Base Points in the West

Humboldt, or Humboldt Concave Base projectile points have been documented across the far-west by the thousands, with many subtle variations. Humboldt points from California and Oregon are predominantly made from obsidian and basalt. Further east into Nevada, volcanic material still dominates but the use of various cherts becomes more apparent as expected. Hockett and Spidell provide the following definition (2022, p. 14) for Humboldt Concave Base as:

> *"Lanceolate preform with a relatively shallow concave base; relatively narrow blade that is also relatively thick and often diamond-shaped in cross section; some degree of parallel oblique flaking may be present; chert, obsidian, and FGV all commonly used as raw material"*

With no context given for what the repeated term "*relatively*" means in this description, it is hard to gauge similarities to, or differences from, Angostura. There are at least two major types of Humboldt points relevant here. Hughes (2022, p. 42) describes the difficulty in distinguishing the different forms referred to as Humboldt Concave Base and Humboldt Basal-notched (a.k.a. Humboldt Type 2.) Furthering the confusion, Hughes goes on to point out Elston (1982 p. 191–193) identified the "classic diagonal flaking characteristic" on Basal-notched points as one that distinguishes pre-Archaic from Early Archaic points in the western Great Basin. Hughes however determined (same reference p. 109) it did not exist until much later. Humboldt Basal-notched points from the South Fork Shelter with "finely executed, parallel or diagonal ripple flaking" (Heizer et al. 1968, p. 8) were recovered from below a level dated to 3,320 ± 200 BP (2,146 – 1,112 cal. BC). Humboldt Basal-notched points are presented in Figure 4 (Hughes 2022, p. 44). Layton (1970, p. 252 and Layton and Thomas, 1979) also defined this Humboldt #2 as 3,500 – 6,000 years old. The Humboldt Concave Base point is one with excurvate sides that taper to the base as can be seen in Figure 5 here from Hughes (2022, p. 45). Differences are more than minor aesthetics. Hughes determined that in the Humboldt Valley, the obsidian Concave Base variety were overwhelmingly identified to nearby sources from the north. But 43 of 44 basal-notched points came from Bodie Hills, Mt. Hicks and Queen, all sources in the far west central Great Basin more than 160 km to the south (2022 p. 97). This pattern may indicate procurement by different groups or movement through different exchange networks. The following pages highlight many different Humboldt variety points highlighting the variability within the type.

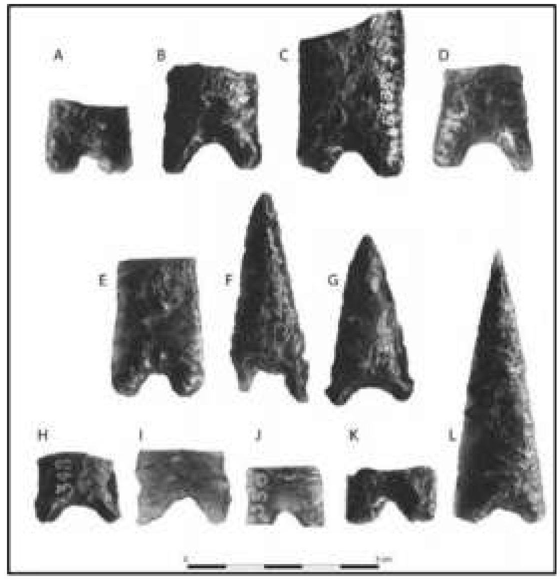


Figure 4 Humboldt Basal-Notched Points

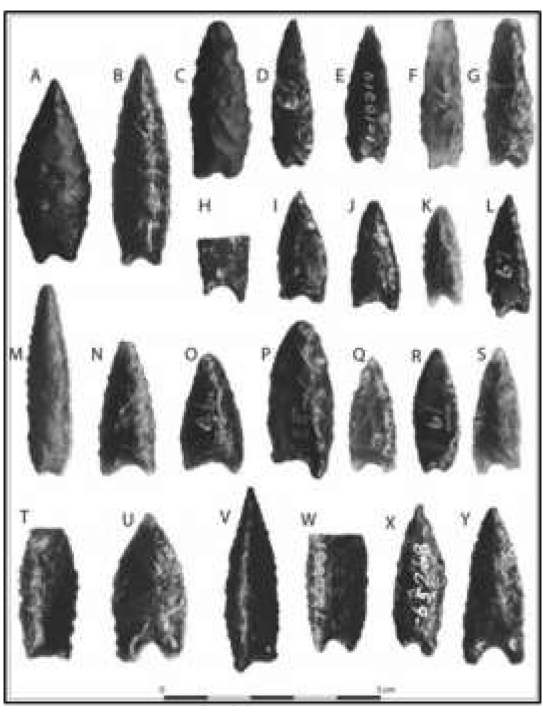


Figure 5 Humboldt Concave-Base Points

Figure 6, from P. 49 of Hockett & Spidell (2022) includes "Early Middle Archaic Humboldt points" from the O'Malley Shelter in Lincoln County, NV.

Figure 6 Lincoln County (O'Malley) Humboldt Points

Figure 7 W. Great Basin Humboldt Points

Figure 7 presents Humboldt points from Bodie Hills and Bridgeport, CA (Hughes 2022, p. 64). Figure 8 points are from Floating Island Cave, in northwest Utah (Hughes 2022, p. 44). Figure 9 is from Kramer Cave in the Winnemucca Lake Basin of Nevada, and Figure 10 Humboldts are from Elko County, NV (Hughes 2022, pp. 69, 73). Figure 11 from Hughes p. 69, illustrates a cache of 10 Humboldt points with hafting remains, also from Kramer Cave.

Figure 8 NW Utah Humboldts

These Humboldt points occasionally appear comparable to Angostura points in some respects. Some varieties have stems that taper to a concave base like Angostura points. They occasionally have oblique flaking. Most are narrower than Angostura although there appears to be some localized examples that are wide and some are quite flat. Variation within the type is extensive. The one universal characteristic is they are not laterally ground.

Figure 9 Winnemucca Lake Point

Figure 10 Elko County, NV Humboldt Points

Figure 11 Hafted Humboldts from Kramer Cave, near Winnemucca Lake, NV

A relatively large and thick basalt Humboldt Concave Base point from central Nevada, depicted in Figure 12, has steeply tapering stem edges. It also shows slight upper-left-to-lower-right (UL-LR) and lower-right-to-upper-left (LR-UL) oblique flaking. Many flakes have step terminations near the mid-line akin to Angostura flaking. No evidence of grinding is present however. This point is comparable to the top-left point in Figure 5 above as well as Figure 9 from the Winnemucca Lake Basin.

Figure 12 Central Nevada Point with Steeply Tapering Stem

The Humboldt Basal-notched point was also flaked obliquely in many cases, but was manufactured differently. These are predominantly made of obsidian from the Mono-basin area sources (Bodie/Hicks/Anchorite/Casa Diablo/Lookout/Truman/Queen.)

The flat-ish cross-section and non-tapering edges contrast from the thicker, narrower and tapering Concave Base form, which also may have parallel oblique flaking. The two subtypes are compared below in Figure 13, which also highlights the significant variation in sizes for the concave base version.

Figure 13 Humboldt Comparison: Basal-notched vs. Concave Base

Most importantly, the radiocarbon record for all these Humboldt points indicates a long gap in time after the Angostura phase before the earliest Humboldt points were made. Typological errors and ambiguities abound in the far-west. Authors have continuously confused Humboldt points with Blackrock Concave Base points in the earliest timeframes, Pinto points in the Early to Middle Archaic, and on to a variety of later points. Some would argue the point depicted in Figure 12 might be a Pinto Basin. Because of this, dates for Humboldt points in the Great Basin are very inconsistent. Warren et al. (1980, p. 21) report Humboldt points carbon dated variously from 4560 B.C. to 1060 A.D. Ragir reports carbon dates on Olivella shell beads associated with "the Humboldt Culture" between 5694 and 7038 B.C. (1972, p. 135). It is not reasonable to accept the Humboldt type were made for over 10,000 years. Notable sites with more clearly associated actual Humboldt points include Huffaker Springs, Bonneville Estates Rock Shelter, Floating Island Cave, the O'Malley Shelter, Spooner Lake, Triple-T Rock Shelter and Camel's Back Cave. These sites have reliable dates in the broad range of 4,000 – 6,000 calibrated years before present (Hockett, et al. 2022). More than 2,000 years separates the latest Angostura dates and the earliest Humboldt dates, indicating there was no connection between the two.

More Confusion from Further West

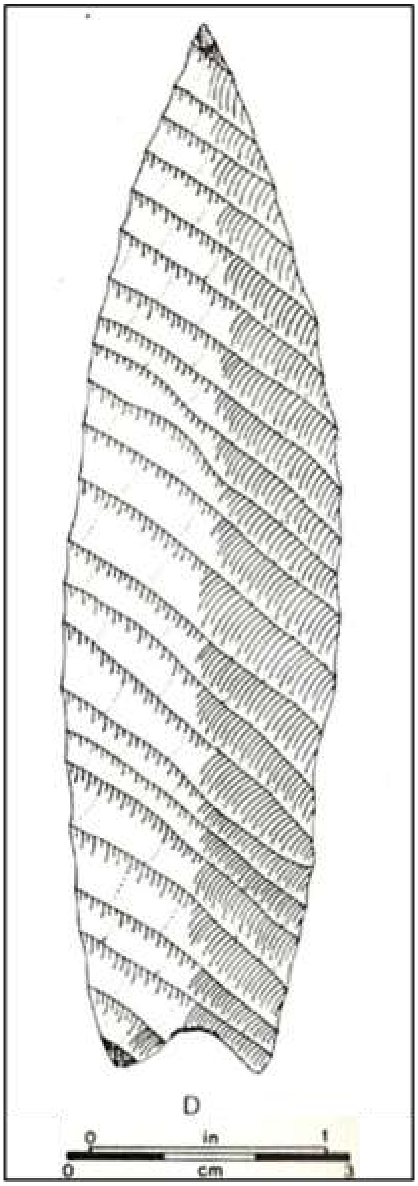


Figure 14 Cosumnes Point

In the far northern and western regions of the Great Basin, to the Cascades and Sierra Nevada Mountains, numerous examples of projectile points and knives have been mis-identified as Angostura. With the rich diversity of cultures, traditions and technologies throughout the archaic prehistory of California, there is little doubt connections to the Great Basin were made many times. In the Middle archaic, going back to 4,000 - 5,000 years, during what is known as the *Windmiller Phase* in California, “large leaf-shaped and stemmed projectile points” were made (Antioch, CA Draft Environmental Impact Report, 2009, p. 3.6-1). During what is referred to as the “Middle Horizon” which started around 3,500 years ago, the related Berkely Pattern (1,300 – 2,500 Cal Years BP) included “projectile points with distinctive diagonal flaking across their faces”. The subsequent Augustine Pattern (from 1,500 Cal years BP) included “large spear points, often with serrated edges” (Antioch, CA Draft Environmental Impact Report, 2009). Moratto (1984, p. 183) also points out “foliate and lanceolate concave-base types” dominated the Middle Horizon and noted large spear points with “distinctive diagonal flaking of large concave-base points” (p 210).

Projectiles uncovered near the Klamath Basin at the Nightfire Island site included obsidian pressure-flaked points that exhibited parallel oblique flake scars across the entire face of the point. Some authors speculate these ovate and/or stemmed/shouldered points may be related to the earlier Old Cordilleran/Cascade points of the region (Nisbet 1981) but little evidence supports that. The more localized Cosumnes tradition in central California that began after 3,000 years ago developed a rich obsidian trade with neighboring regions. One of the lithic technologies they used involved the very careful diagonal oblique flaking on obsidian (Chartkoff and Chartkoff, p. 169). Figure 14 is from that source (p.170). Hughes (2022, p.109) states “diagonal/collateral ribbon flaking” did not occur in California prior to 3,000 years ago. This all suggests the technique of parallel oblique flaking on California projectiles significantly post-date Angostura, and therefore are unrelated. Further, claims of great antiquity of these obliquely flaked points, based on edge-grinding on lateral margins, deserves investigation. Examples of such cases, from within the Great Basin are shown here in Figures 15, 19 and 22. Superficially, these points share some attributes with Angostura, including UL-LR parallel oblique flaking, and bases that are straight to slightly concave. Figure 15 is an example of an Angostura-like projectile that was apparently ground. Upon closer inspection however, the lateral smoothing, or dulling, on the edges does not appear to be intentional grinding as was the case on most paleo projectiles where a smooth

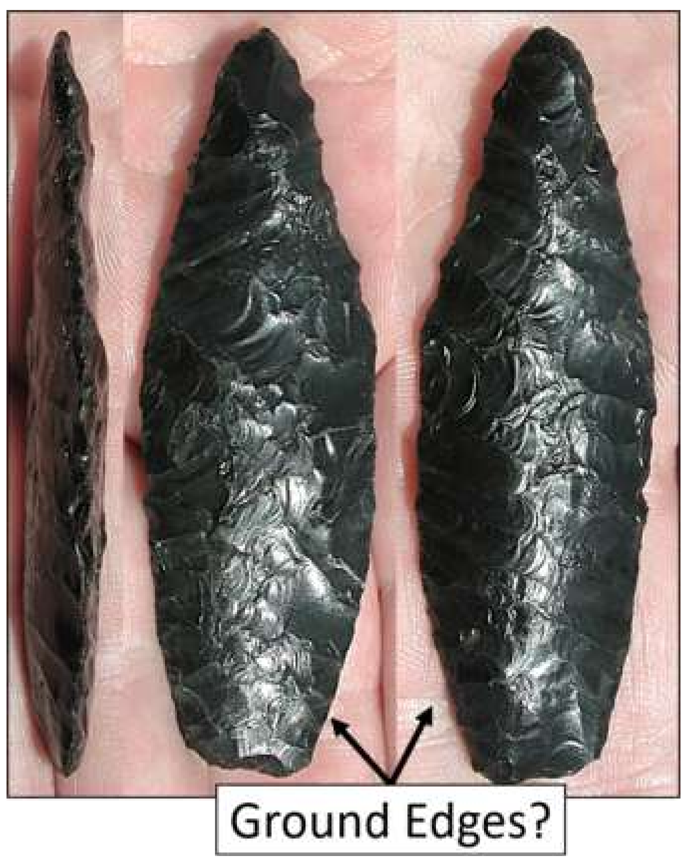


Figure 15 California Point Mistaken for Angostura

edge topography removed small imperfections. Rather, haft-wear on the brittle obsidian is indicated. Under magnification, this haft-wear is revealed as micro-flaking, or crushing that is uni-directional. In other words, force exerted in the direction of one face causes very small flakes to be driven off from the edge on the opposite face. Figure 16 points out this effect on both stem faces of the point from Figure 15. Green arrows indicate the edge that appears un-damaged and the blue arrows indicate the edge where forces caused the edge-crushing. This uni-directional haft-wear is in opposite directions on opposing faces, indicating drill-like rotational forces were applied while the point was in the haft.

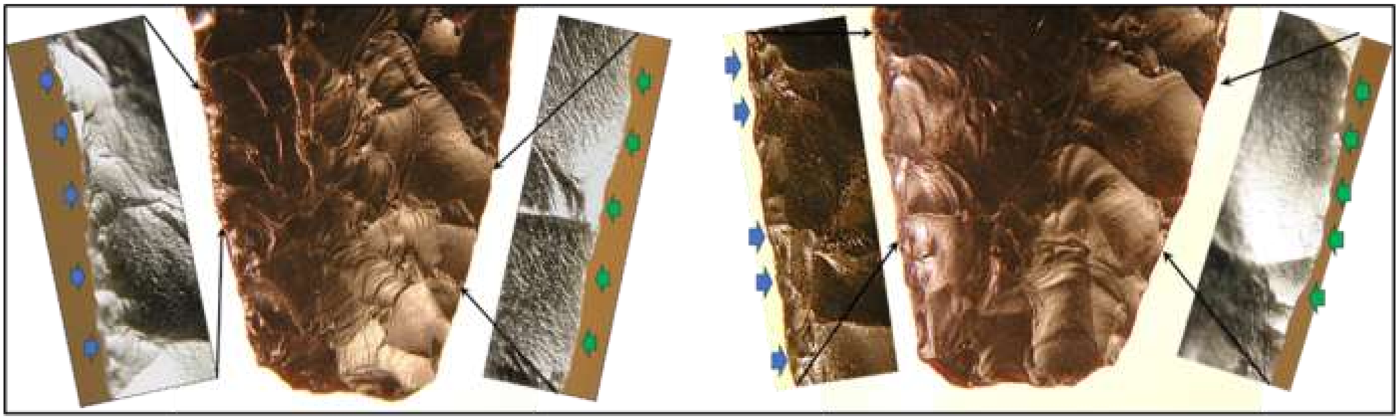


Figure 16 Evidence of Haft-wear from Twisting Motion

Keeley describes this form of uni-directional haft-wear on a hafted "borer" (Keeley 1982, p. 806). In Figure 17, the "large dark arrows indicate reconstructed force vectors associated with clockwise rotation while large light arrows indicate vectors associated with counterclockwise rotation. The distal/clockwise, proximal/counterclockwise damage pattern is best explained by the proximal portion being inserted into a jam haft where torque forces were transmitted to the edges while the whole implement was rotated in a clockwise fashion." With this, one would expect to see edge-damage on the distal edges of the obsidian tool in the opposite direction as the haft-damage in the stem. This is clearly visible in Figure 15 above as well as the close-up in Figure 18 here.

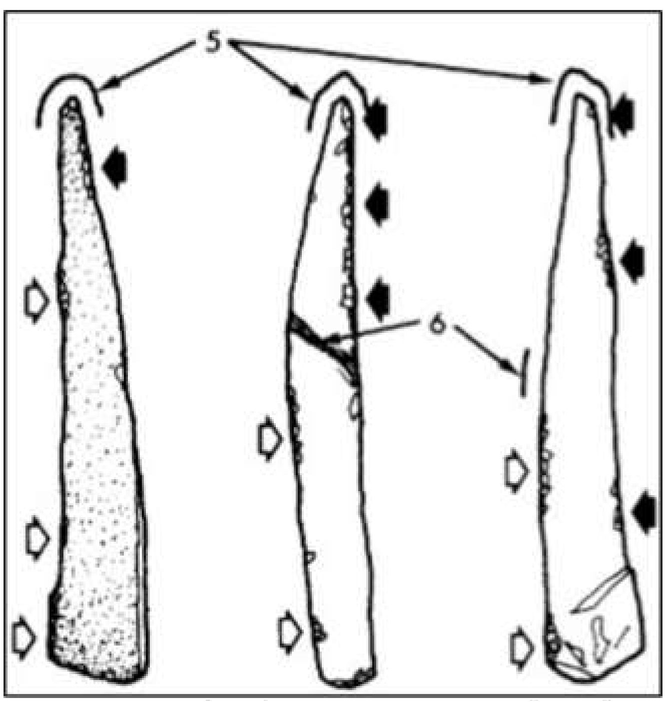


Figure 17 Haft and Use-wear on Twisting "Borer"

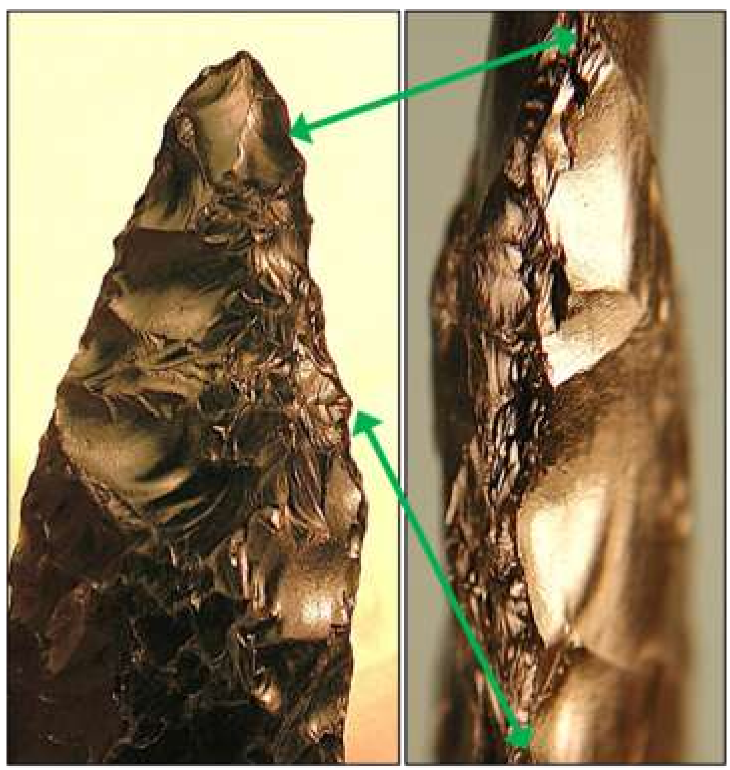


Figure 18 Distal Edge from Point in Figure 15

Two more examples resembling the previous are included here. The point in Figure 19, mistakenly identified as an Angostura point, is a relatively thick, diagonally flaked lanceolate point that likely had a slightly concave base initially. Rotational haft-wear contributed to the stem having edges that superficially appear ground (Figure 20.)

Figure 19 California Angostura-like Lanceolate

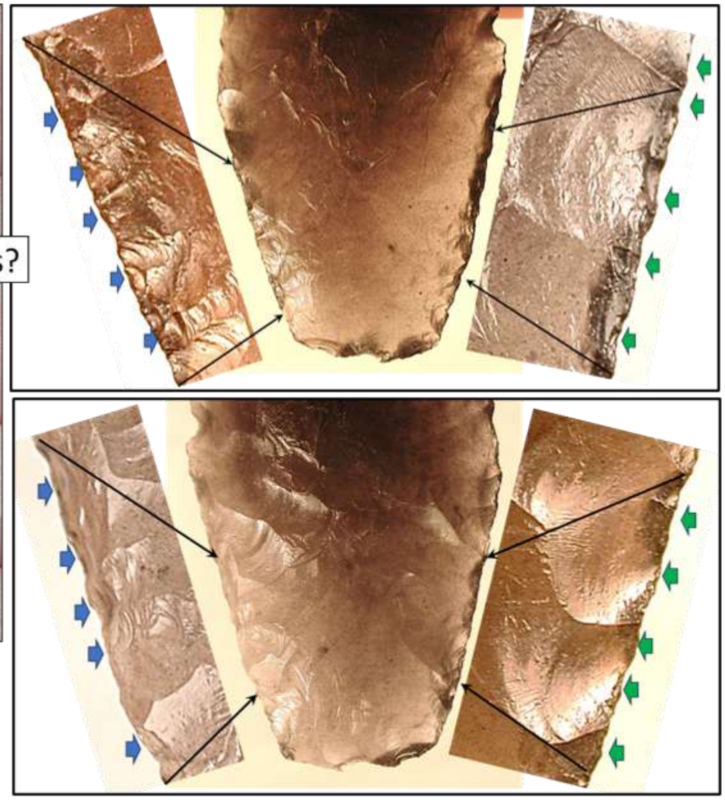


Figure 20 Evidence of Uni-directional Haft-wear

Figure 21 below provides a close-up of a section of a proximal edge that highlights the dramatically different edge-wear from opposite faces. Viewing from either face, it clearly is not edge-grinding. A smoothed, uniform topography for hafting was not created by the maker of this point.

Figure 21 Opposite Faces of the Same Edge of Point in Figure 19

The following example in Figure 22 (next page) illustrates a slight variation of this haft-wear. As can be seen in the subsequent close-up in Figure 23, the uni-directional haft-wear originates from the <u>same direction</u> on both faces. The edge-crushing was the result of the point rocking forward/back in the haft rather than rotating. This is consistent with the very thin cross-section and pronounced serrations of the point, suggesting it would have been more suitable for cutting or sawing than drilling or boring.

Figure 22 Thin Obsidian California Example with Haft-wear in Same Direction

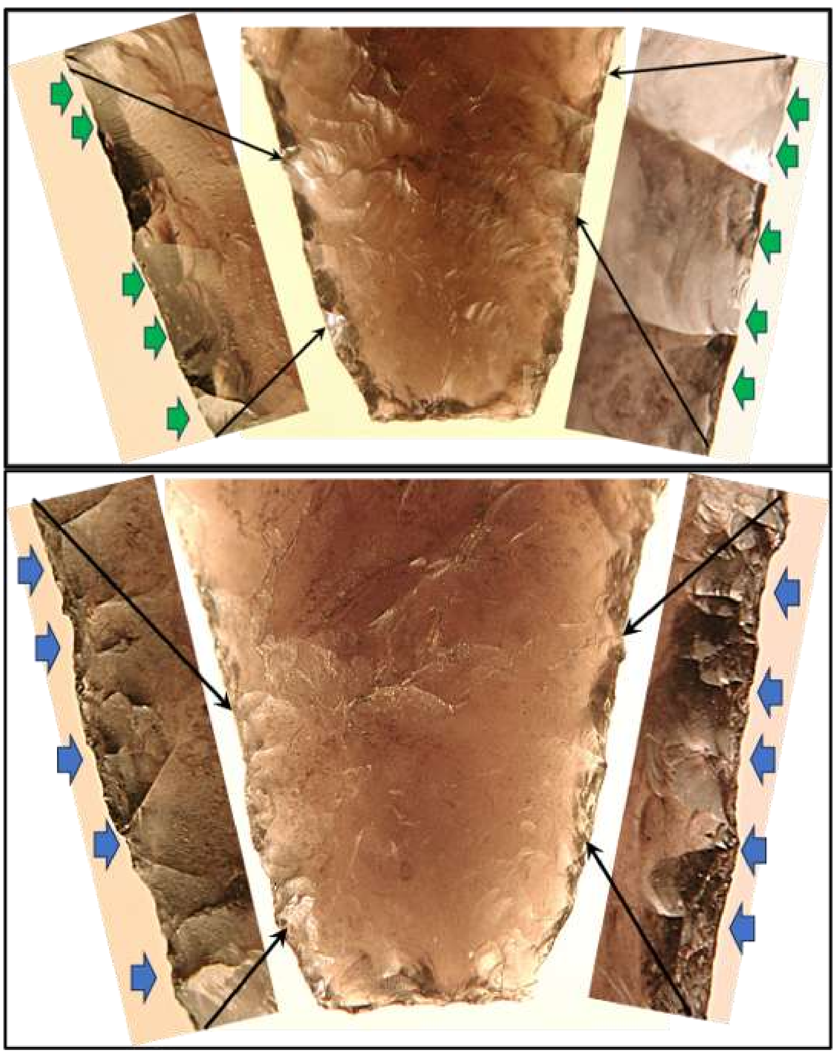


Figure 23 Haft-wear on the Same Face – Both Edges

These obsidian points from California and adjacent areas of the Great Basin were made with similar diagonal flaking techniques. This possibly indicates an inherited practice from the earlier Humboldt traditions as the carbon record suggests they follow directly in time.

Having been described as large lanceolate and foliate (Moratto 1984, p. 210), and concave base points with diagonal flaking (Baumler & Carpenter 1982, p. 9), it is not unusual for them to be mistaken for Angostura. Some were likely made close to 4,000 years ago, but most were actually made much later during the "Middle Horizon" generally considered to be in from 1,500 – 2,500 calibrated years before present, and in some cases even later.

Videos of the stems of these three points can be seen here:

[Cal Obsidian A]

[Cal Obsidian B]

[Cal Obsidian C]

Angostura Points in Nevada

This section illustrates seven Angostura points found in central Nevada that all conform with the Rocky Mountain attributes. A small yellow circle indicates the thickest location of the point. Brackets denote extents of edge grinding. All measurements are given in millimeters.

AN-01

Figure 24 depicts a resharpened central Nevada example, with classic Rockies-Angostura attributes. This point was made from a local material not uncommon in the Toquima, Toiyabe and Monitor Mountain Ranges and valleys in between. The margins are extensively ground, to the point of being polished as can be seen in Figure 25. Flaking is diagonal upper-left-to-lower-right (UL-LR) and lower-right-to-upper-left (LR-UL). Yellow arrows reflect the orientation of major flake scars (Figure 26).

AN-01
L = 43.2
MW = 18.54
MT = 6.81
BW = 8.70
CD = 1.43
W/T = 2.72
Total Haft Angle = 24.6°

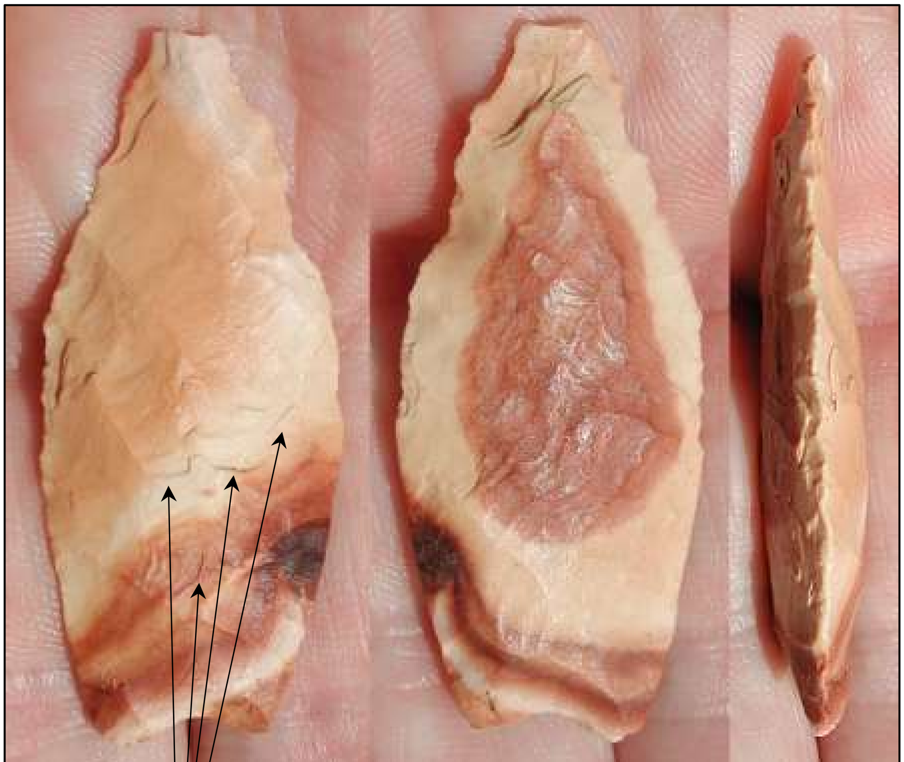


Figure 24 AN-01 Angostura

Examples of step fracture terminations from thin pressure flake removals as described by Bradley

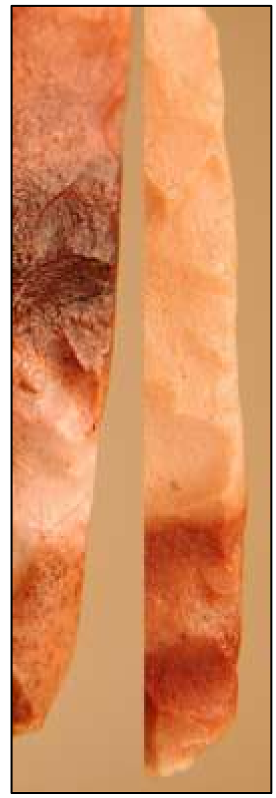


Figure 25 Edge-polishing

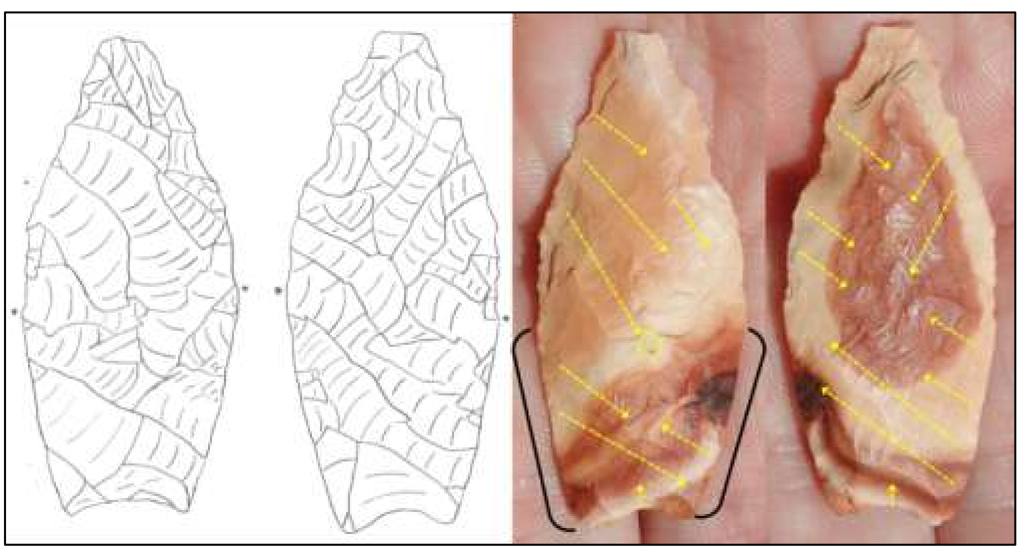


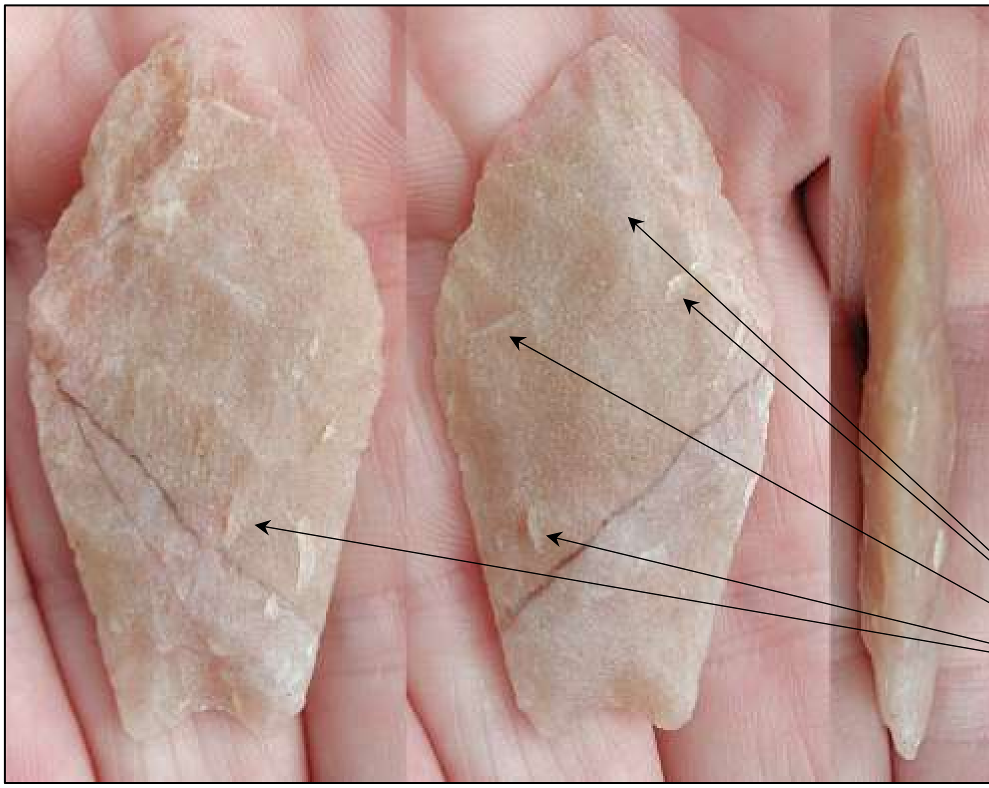
Figure 26 AN-01 Flaking

Video of AN-01 can be viewed at AN-01

AN-02

Made from fine-grained quartzite, this Angostura (Figure 27) is also resharpened. Although difficult to see due to the material this example does exhibit the Diagonal "UL-LR / LR-UL" flaking. Lateral margins are very heavily ground. Many Angostura points from the Long site (Angostura Reservoir) were made from Dakota orthoquartzite. Fine grained quartzite was not unusual throughout the Great Basin as well however. Examples as can be seen in Figure 28. It is difficult to determine where the material originally came from. Flake scars are annotated in Figure 29.

AN-02
L = 47.27
MW = 23.62
MT = 6.51
BW = 8.27
CD = 2.07
W/T = 3.63
Total Haft Angle = 29.7°



Examples of step fracture terminations from thin pressure flake removals as described by Bradley

Figure 27 AN-02 Angostura

Figure 28 Central Nevada Quartzites

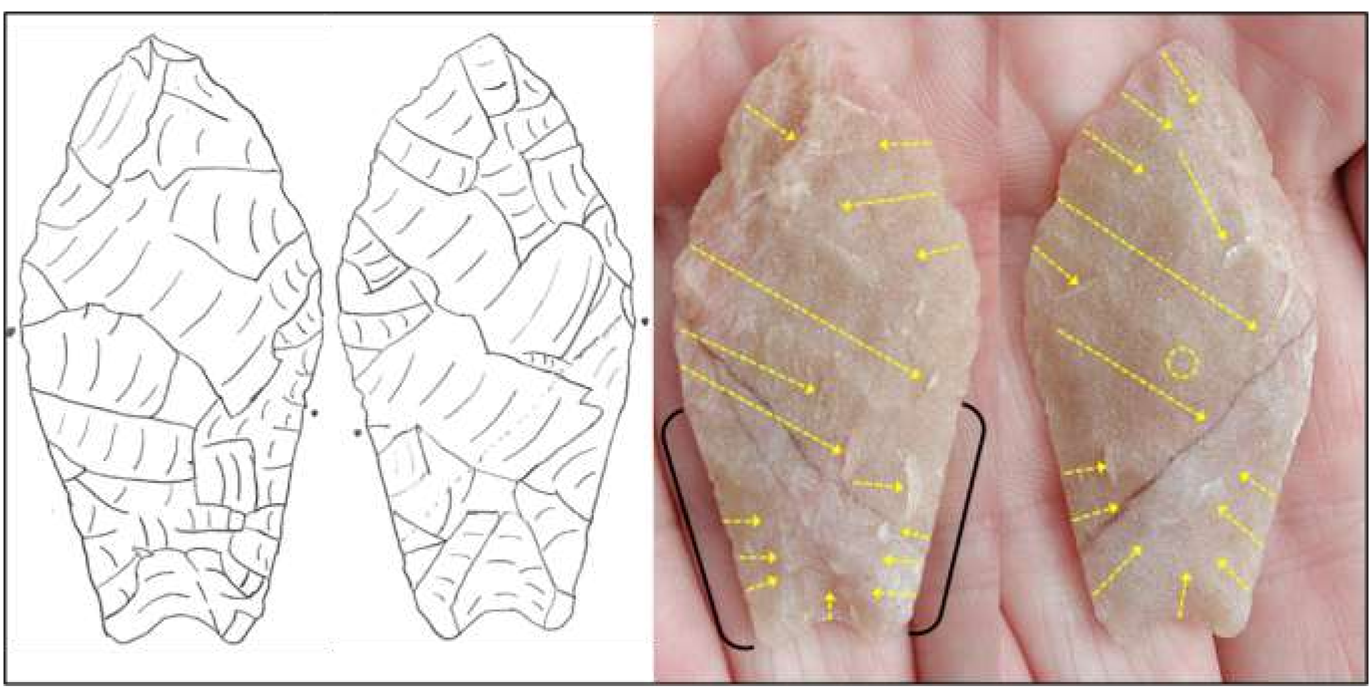


Figure 29 AN-02 Flaking

Video of AN-02 can be viewed at [AN-02]

AN-03

Figure 30 shows a well-made basalt Angostura point with a lenticular cross-section. The haft margins are extensively ground with slight grinding/crushing on the proximal base. Much of the flaking is secondary and orthogonal to the edges, while some UL-LR and LR-UL flaking remains. Flake scars are annotated in Figure 31.

Figure 30 AN-03 Angostura

AN-03
L = 39.15
MW = 20.70
MT = 7.16
BW = 11.61
CD = 2.80
W/T = 2.89
Total Haft Angle = 23.7 °

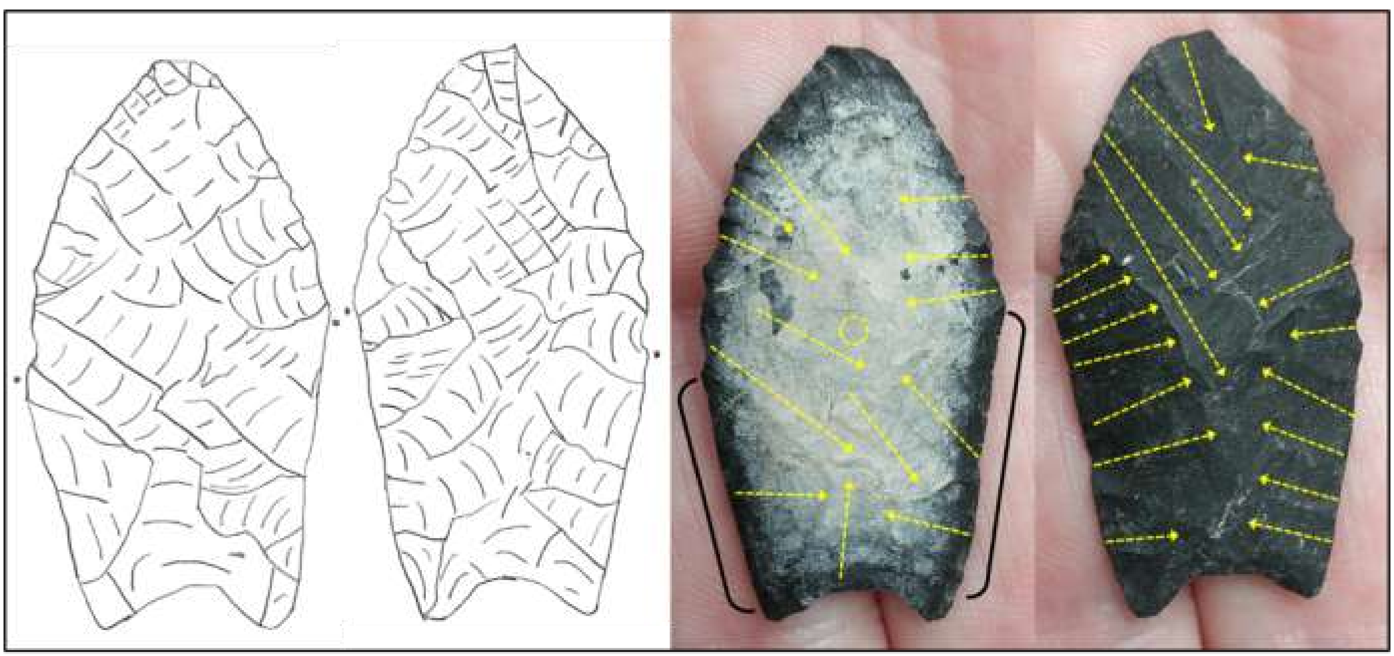


Figure 31 AN-03 Flaking

Video of AN-03 can be viewed at [AN-03](AN-03)

AN-04

Like AN-03, the point in Figure 32 is a slightly larger, well-bade basalt example with a lenticular cross-section. Some UL-LR and LR-UL evidence remains. Most flaking is secondary, orthogonal to the edge. Haft margins are heavily ground. Flake scars are annotated in Figure 33.

Figure 32 AN-04 Angostura

<u>AN-04</u>
L = 48.64
MW = 21.60
MT = 7.71
BW = 11.5
CD = 1.88
W/T = 2.80
Total Haft Angle = 20.6°

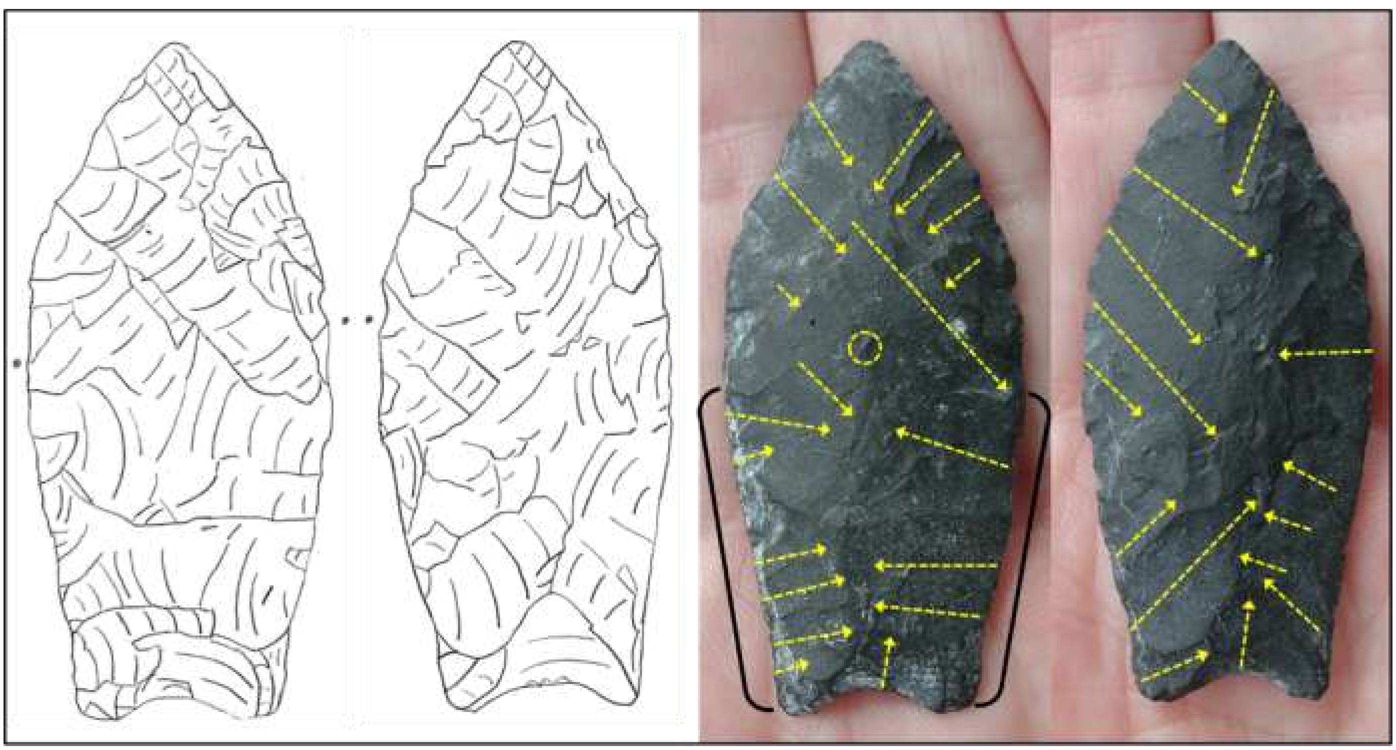


Figure 33 AN-04 Flaking

Video of AN-04 can be viewed at [AN-04]

AN-05

AN-05, in Figure 34 is an extremely patinated point, possibly altered by heat. An underlying darker material is evident in spots. The haft margins are ground and parallel UL-LR and LR-UL oblique flaking is very clear. Flake scars are annotated in Figure 35.

AN-05
L = 50.83
MW = 18.71
MT = 7.12
BW = 9.20
CD = 1.84
W/T = 2.63
Total Haft Angle = 14.6°

Figure 34 AN-05 Angostura

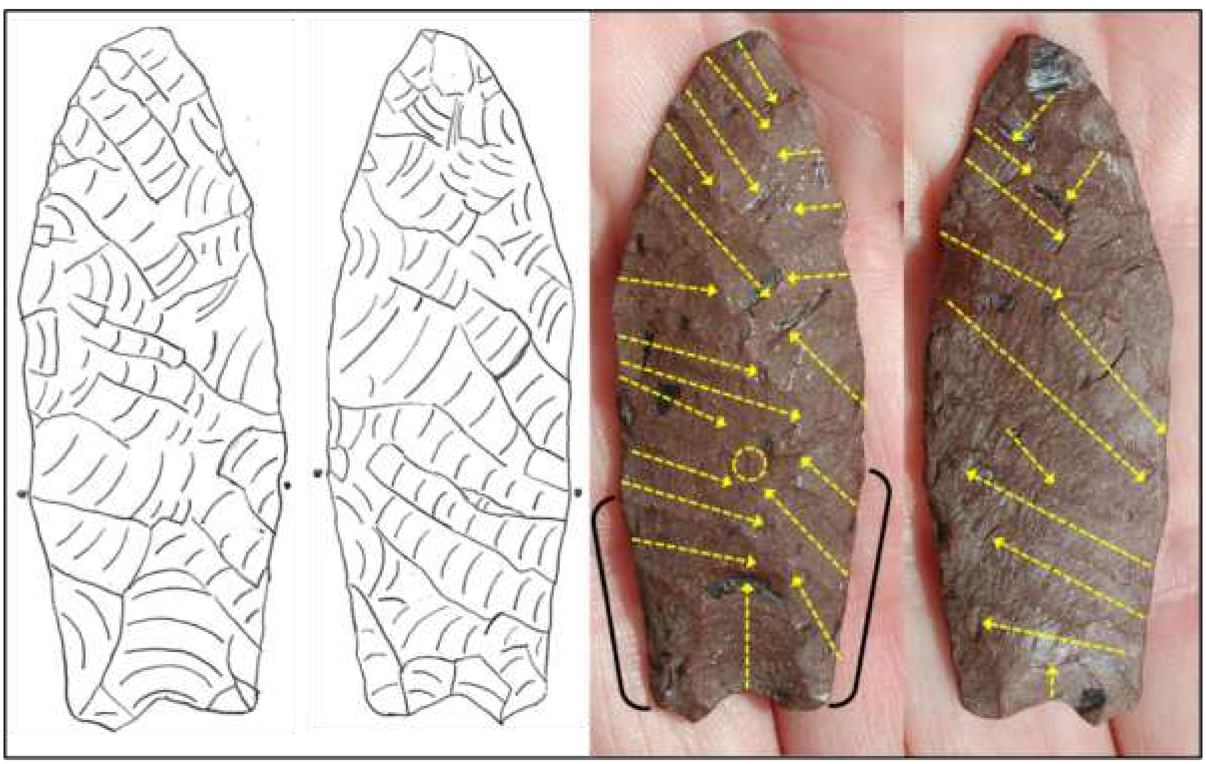


Figure 35 AN-05 Flaking

Video of AN-05 can be viewed at [AN-05]

AN-06

Figure 36 is a large (>2.8 in), thick/lenticular example with very well-made example of high-quality material, with fine parallel UL-LR and LR-UL oblique flaking. This point was resharpened in the haft. Heavy grinding (polishing) is evident on one lateral haft edge. The opposite edge was not ground but was likely re-worked from the base to fit a narrower haft. Flake scars are annotated in Figure 37.

AN-06
L = 71.63
MW = 26.23
MT = 9.41
BW = 9.04
CD = 1.10
W/T = 2.79
Total Haft Angle = 39.8°

Figure 36 AN-06 Angostura

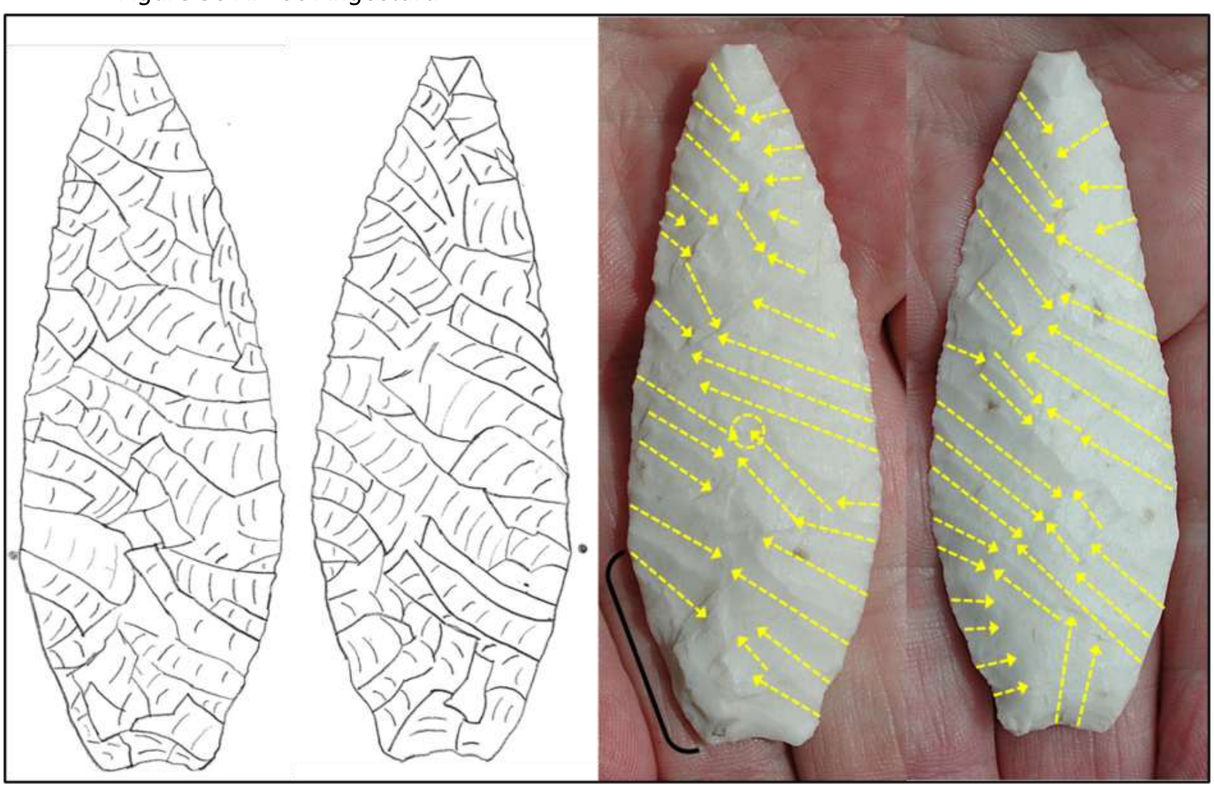


Figure 37 AN-06 Flaking

Video of AN-06 can be viewed at [AN-06]

AN-07

AN-07 in Figure 38, is a very well-made example with fine parallel UL-LR and LR-UL oblique flaking. This point was also re-sharpened in the haft. Grinding/polishing in the lateral haft edges and base is evident and depicted in Figure 39. Flake scars are annotated in Figure 40.

Figure 38 AN-07 Angostura

AN-07
L = 53.78
MW = 19.51
MT = 5.97
BW = 9.30
CD = 3.42
W/T = 3.27
Total Haft Angle = 28.8°

Figure 39 AN-07 Edge-polishing

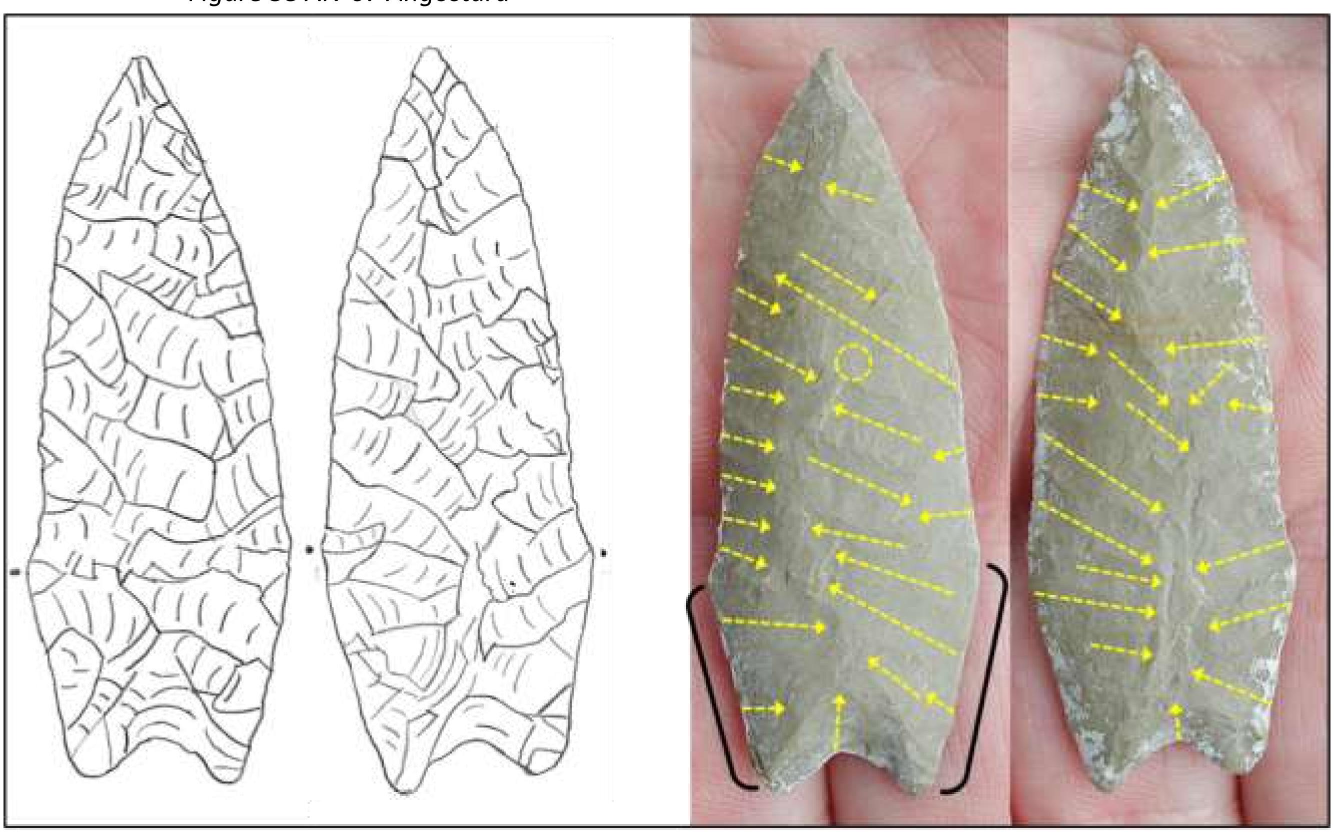


Figure 40 AN-07 Flaking

Video of AN-07 can be viewed at [AN-07]

The View from Texas

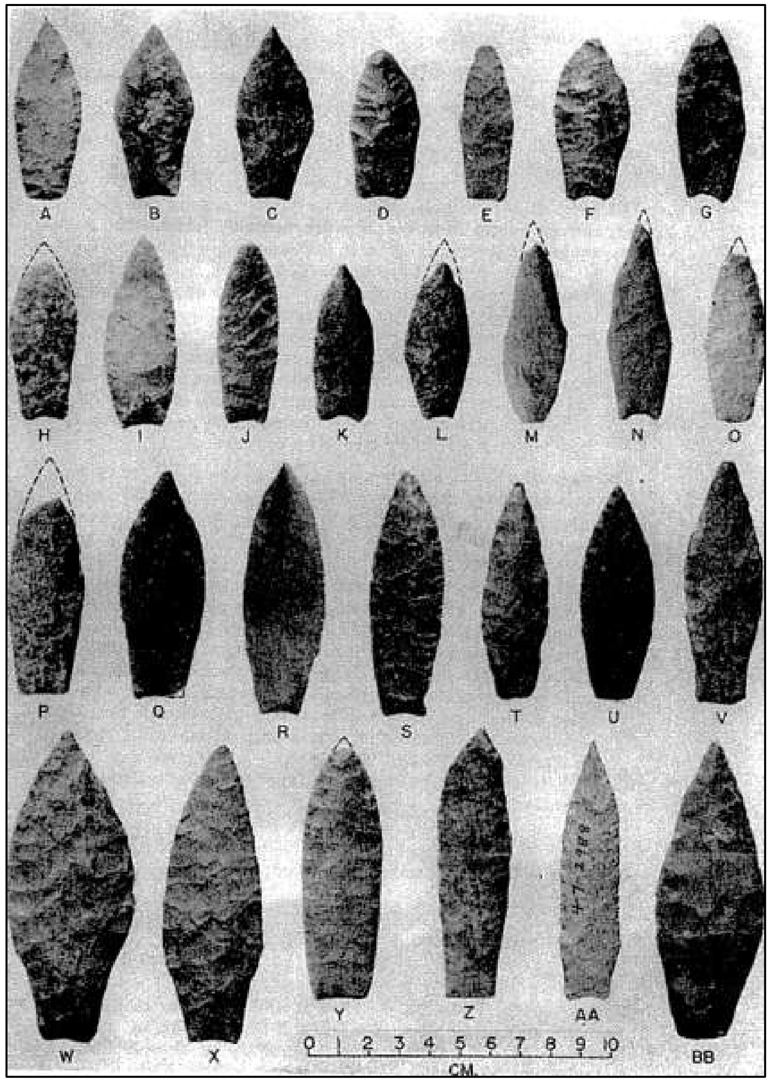


Figure 41 "Texas Angosturas" from Suhm et al.

Many projectile points resembling Angostura have been documented across Texas and published by many authors. Suhm et al. provided a very early description of various Texas examples in the highly regarded 1954 *Introductory Handbook of Texas Archaeology* (see Figure 41 from Suhm et al., Plate 80, p. 403). The type-identification of these points relied on the description "narrow leaf shape with convex edges and base considerably narrower than in other early, lanceolate forms" (p. 402). However, individual descriptions continue (referring to Plate 80) with the following details:

1. "A distinct inward curve below the mid-section (B-D, F, H, V, WW)"
2. "A very faint shoulder below which the smoothed stem edges are quite straight as they converge toward the base (L, O-R, X)"
3. "The broadest part is usually approximately at mid-section but may be slightly above or below" but "may be well toward the tip (Y, Z) or near the base (AA)"
4. "Not known to include beveled edges, but specimens K-O have been included in Plate 80 to show how closely some beveled specimens resemble the unbeveled ones."

Jack Hughes, who provided the original Angostura definition in 1949, agreed they were all Angostura except for the two that are beveled (K & O), and Y for unspecified reasons (Suhm et al., 1954, p. 402). In 1995, Wheeler rejected all but one of these specimens illustrated by Suhm et al. "on the basis that they did not conform to the 'true' Angostura type of the Great Plains." He also acknowledged this "long-standing disagreement between Plains archeologists and those in Texas as to what actually constitutes an Angostura point" (Crook 2020, p. 130). Recognizing the high variability of these Texas points, Anderson (2013 pp. 3-6) summarized the confusing history:

- "Suhm, Krieger, and Jelks (1954:402) published a description of the Angostura type in Texas, emphasizing size, shape, basal morphology, and proximal, lateral edge grinding." This definition ignored flaking patterns and technologies.
- "Wormington (1957:139-140) cautioned that the term Angostura 'should be applied only to points that have the same shape and general thickness and the [oblique] parallel flaking that characterizes those from the type station.'"
- "Thomas C. Kelly (1983) stepped away from subjective morphological typologies and used a quantitative analysis to assess the Angostura type in Texas. Recognizing that the Texas specimens differed from the Plains specimens, Kelly (1983) proposed the use of regional subtypes: 'Texas Angostura,' 'Victoria Angostura,' and 'Zella Angostura.'"
- "Kerr and Dial (1998) found that despite the considerable variability that existed within the type, it all fell within the general range of a single Angostura type."

- "Wheeler (1995:415) described the Angostura type as large, slender, lanceolate specimens, with parallel diagonal rippled flake scars running from upper left (tip) to lower right (base), and thinned, straight or shallowly concave bases with ground lateral edges. His description emphasized a diagonal rippled flaking pattern over shape and size." And, "he discounted the validity of the remaining specimen (Suhm et al. 1954: Plate 80j) because the parallel oblique flake scars ran in the wrong direction, from upper right to lower left."

So, where does that leave us now in regards to Texas Angostura-ish point forms? Wheeler's 1995 definition was not much different from the original definition from 1949, but it clearly emphasized the specific flaking pattern. This view effectively excludes a very large number of the Texas points. Deferring to Wormington's guidance, with descriptions provided by Bradley (2013, p. 1) and Wheeler (1995, p. 415) regarding "UL-LR / LR-UL" flaking, it is clear the Angostura point type is based on a specific technology. This should be seen as a discriminator from those that are manufactured with different flaking techniques and patterns. Many Texas examples correlate well with the Rocky Mountain Angostura points in some respects, but it is difficult to ignore something as fundamental as flaking. The following are examples of typical Texas points considered to be Angostura by many people, along with descriptions of the similarities and differences. Over the years, additional Texas point types have entered the literature in an attempt to further define the Texas varieties, including Thrall and the similar Early Stemmed Lanceolate (ESL). Bousman described the Thrall type as "a newly defined type that is characterized by very thick, heavily ground, contracting stems with slight basal concavities, and wide, sometimes flaring, blades. The bases are usually ground. Flake patterns range from subparallel, collateral, and random" (Bousman 1998, p. 171). These points are similar to some of the points in Suhm's photo from 1954. Figure 42 includes a Wilson-Leonard site Thrall point on the left (Bousman et al., 2004 p. 25). To its right is are two similar points found together in Bandera County, Texas. Figure 43 below depicts Thrall points (taken from Texas Beyond History, https://www.texasbeyondhistory.net/plateaus/prehistory/images/stemmed.html). All these Thrall points exhibit random flaking, including percussion, and have slight shoulders. These Thrall points have some superficial similarities to the Angostura definition used here. But these attributes distinguish these points from the Rocky Mountain definition, and rightfully deserve a separate category. The next point, in Figure 44 (next page), is a well-made Texas example that shares many attributes with the Rocky Mountain version. This heavily resharpened 2.1-inch example has margins that are ground to the point of being polished. Serial parallel diagonal flaking is annotated on the right, but the flaking is in the opposite direction as the Rocky Mountain definition. According to Bradley (2013 p. 6), the directionally dependent oblique flaking was for reasons beyond handedness. On Rocky Mountain Angosturas, the flaking pattern is upper left to lower right, suggesting the sequence of removal is tip to base on the right side and base to tip on the left.

Figure 42 Thrall Points from Texas

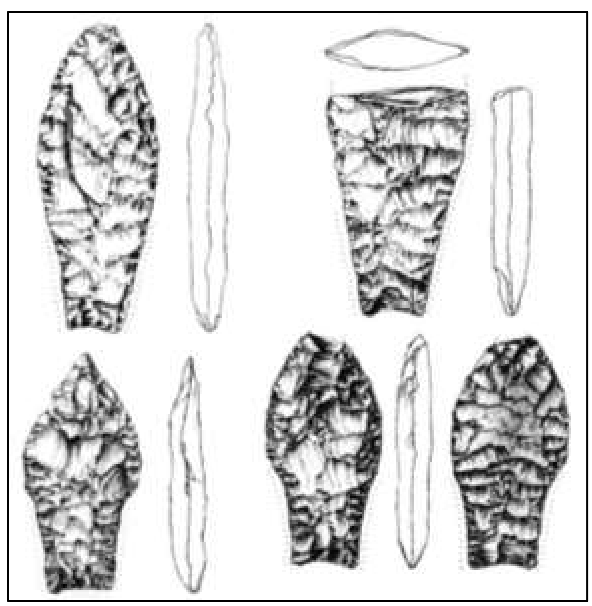


Figure 43 Texas Beyond History Thrall Points

Figure 44 Obliquely Flaked Texas Point

This facilitates guide-ridges for subsequent flake removals and is key to the manufacturing technique. According to Bradley if the sequence was reversed, the subsequent guide-ridges tend to result in non-diagonal flake scars. In Figure 44, the flakes sequence from the tip-to-the-base on the left and base-to-tip on the right side. This deviates from Bradley's logic. Furthermore, the flakes on this Texas example are much wider than Great Basin or Rocky Mountain examples, and they created a much more plano-plano cross-section than the more western counterparts. This possibly indicates different flaking strategies and techniques. Regardless, it is different from the definition used here. Anderson's analysis (2013 p. 183) also confirms the Texas versions "most commonly exhibited oblique flaking that ran from the upper right (top) to the lower left (bottom)". Three additional examples of Texas Angostura points are shown in Figure 45 (Courtesy B. Burrer). These three examples highlight multiple expanding thinning flakes that travel well past the midline. Some of the flakes terminate beyond the opposite edge, resembling intentional overshots. Another variety from Texas is depicted in Figure 46. Two similar artifacts are presented, one complete and one broken. They are both strongly beveled and serrated, unlike the Rocky Mountain versions. The proximal stems of these sometimes flare out near the base. The broken example, repeated on the right with close-up views, highlights the peculiar wear that was clearly the result of some activity after the point was broken. Whether this was the result of some tool use-wear, or grinding/abrading on the corners for re-hafting as a projectile, this point clearly had a use-life after a significant bend-break in the stem.

Figure 45 Typical Texas Examples

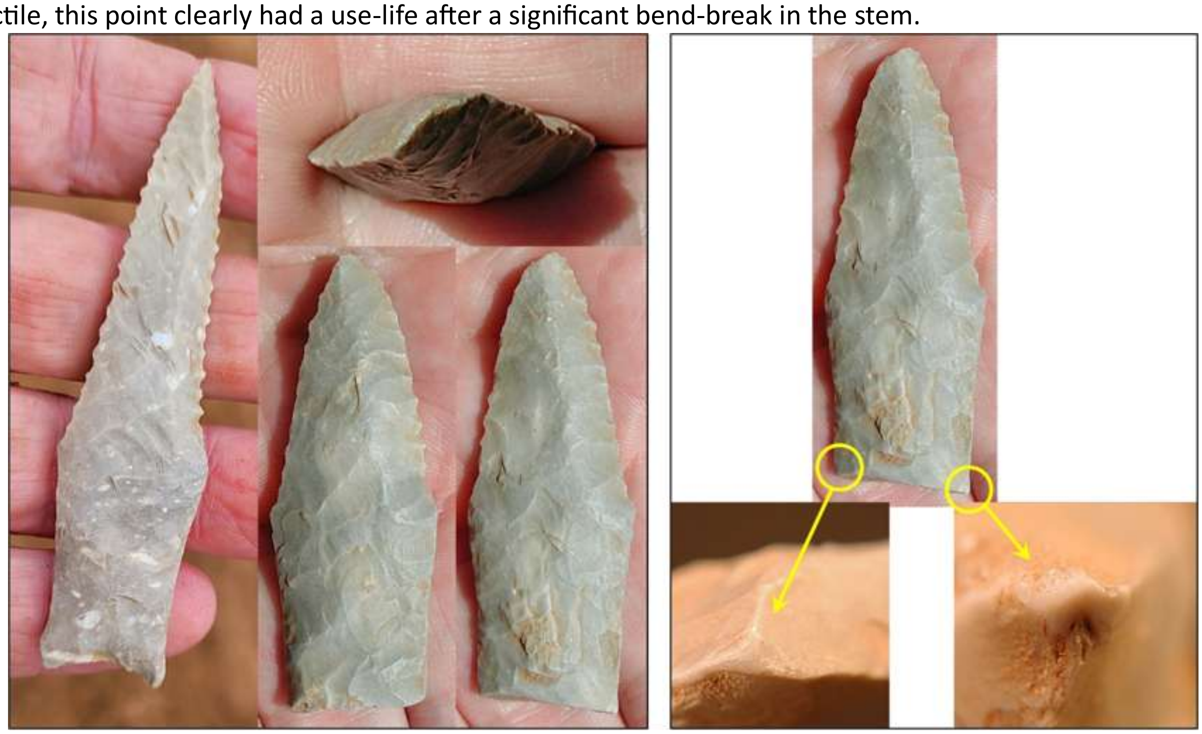


Figure 46 Texas Bevels and Serrations

Two points below in Figures 47 are considered by many as Texas Angostura points. Both are randomly flaked with evidence of percussion reduction, and completely lack lateral grinding. Figure 48 (left) shows a small randomly flaked

Figure 47 Two Non-ground Texas Examples

Texas Angostura with edge-polishing. On the right is an early-stage point highlighting random across-the-face percussion flaking, including a large thinning flake taken from the base. No grinding is present in this piece that was possibly discarded in manufacture.

Figure 48 An Edge-polished, and an Early-stage Texas Example

The variety of point forms found in Texas is significant. Typologically discriminating all these Texas examples from each other is beyond the scope of this study. Rather, the goal here is to determine if points based on the Rocky Mountain Angostura standard exist in Texas. This non-exhaustive search indicates they are rare to non-existent in Texas. The most striking differences observed between the Texas versions and the Rocky Mountain versions (along with Great Basin examples) are:

A. Percussion-flaking with wide "across-the-face scars" that feather-terminate well past the midline, instead of parallel oblique pressure flakes that terminate in steps in the middle of the face
B. Shouldering in the stem (incurvate sides) instead of straight tapering margins
C. Resharpening techniques that resulted in beveling and/or serrated edges

Many Texas examples also lack lateral margin grinding, which could suggest a later archaic influence (speculation). This is similar to the Great Basin Humboldt situation; however, the Texas examples were made significantly earlier in the archaeological record. Anderson (2013 p. 196) reports an age range of 8,880 to 9,880 calibrated years before present (based on infrared stimulated luminescence and radiocarbon methods). A majority of those dates fall in the 8,500-9,500 years ago as can be seen in Figure 49 (adapted from Anderson, 2013 p. 199). These dates fall within the span for Angosturas in the Rockies.

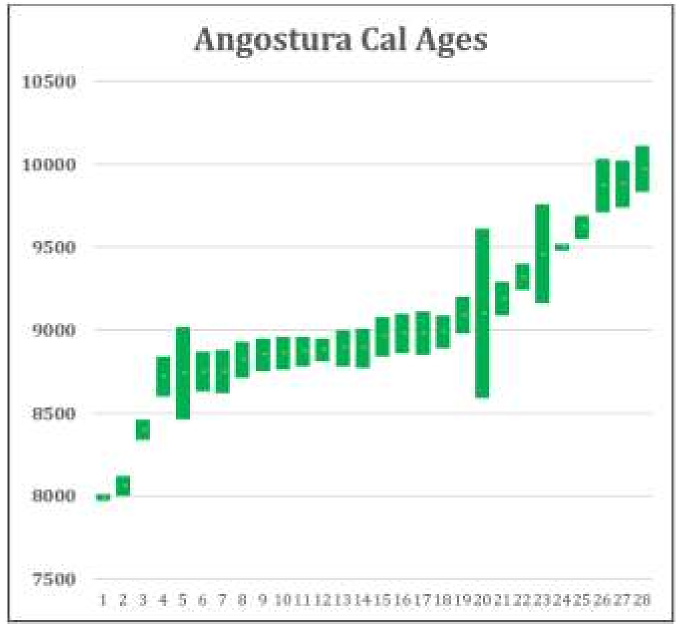
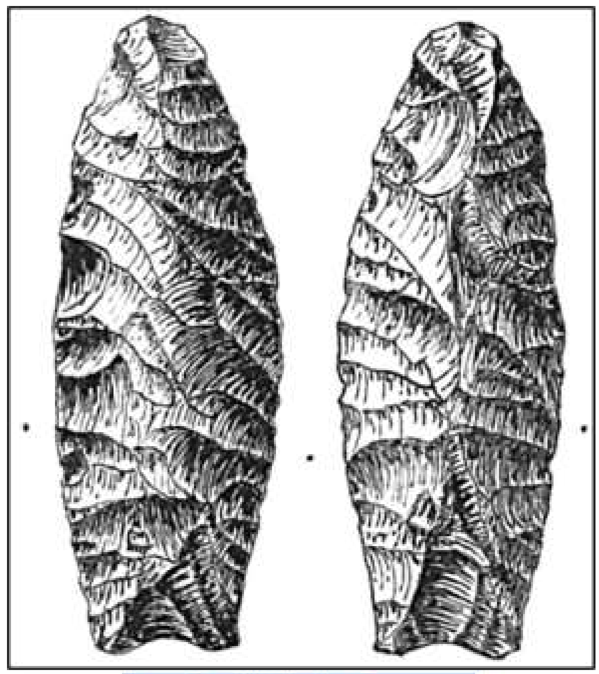


Figure 49 "Texas Angostura" Ages

From Oregon to Texas?

As reported by Hester et al. in 2019, one fascinating example of a potential Angostura reported from central Texas (Figure 50), just north of the town of Brownwood. What makes this artifact unique is the material – obsidian. X-ray fluorescence spectroscopy was used to identify the Glass Buttes obsidian flow in central Oregon as the source roughly 1,400 miles away. Physical attributes of this point are consistent with previously discussed definitions of the Angostura type, which is unusual for Texas versions. Specifically, a pattern of parallel oblique flakes that orient from upper-left to lower-right (UL-LR) and lower-right to upper-left (LR-UL) with numerous step terminations on both faces. Margins are ground and the shallow basal concavity were finished with 1-3 basal thinning flakes. Obviously, it is not known where the point in question was actually made, or how it got to Texas. Possible explanations include:

1. The point was made in Oregon; unlikely since Angostura points so far are unheard of there.
2. The point was made in Texas by an Angostura-making individual; unlikely since the flaking is very atypical of Texas Angostura points.
3. The raw material was traded from Indians in Oregon to the Rockies or High Plains where it was used by an Angostura point-making individual, and then made its way to Texas.



Texas Obsidian Angostura	
Length	60 mm
Max Width	21.5 mm
Max Thickness	9 mm
Basal Width	13 mm
Width-to-Thickness Ratio	2.39

Figure 50 Obsidian Point from Texas

Figure 51 Humboldt Concave Base Points

Based on the technological attributes discussed here, assuming the artifact is authentic, the third explanation appears most consistent with the available evidence. A regional trade of obsidian between Oregon and High Plains, to be used by people unaccustomed to obsidian, followed by a movement or migration of the people (or their point) all the way to Texas, is a complex story however. A fourth possible explanation is this point is actually a Humboldt Concave Base point, where haft-damage on the stem was mis-interpreted as grinding. Two Humboldt Concave Base points are shown in Figure 51 for comparison. The longer of the two points is nearly identical in size to the Oregon-sourced point with a length of 60 mm.

Similarities in Other Regions

Projectiles have been identified as Angostura in other regions around North America despite not conforming to the original Rocky Mountain/Norther Plains definition. Figure 52 below is from Burke County, Georgia (from https://peachstatearchaeologicalsociety.org/artifact-identification/projectile-points/lanceolates/angostura/). This point compares well to many Texas points. The flaking, described as "broad and random," and general shape is

Figure 52 Georgia Point Identified as Angostura

inconsistent with the Rocky Mountain Angostura definition. The article goes on to reference other Angostura and "perhaps other extremely similar points" from Central America to as far east as North Carolina (Haw River). If one were to include these in the Angostura category, along with all the Texas varieties, it would be natural to compare with other points that could also be considered similar, based solely on outline (general lanceolate concave-base). Examples might include the New Mexico Rio Grande point, on the left in Figure 53, from Perino (1968) taken from Gunnerson (1987 plate 39), or the Alaskan Mesa point in the middle, from http://www.lithiccastinglab.com/cast-page/2009octobermesasitepoint.html, or the much later Missouri Nebo Hill / Sedalia on the right, from Fisher, 2018

Figure 53 Rio Grande, Mesa and Nebo Hill / Sedalia

p. 30. These are considered separate types by most, i.e. not Angostura, in part based on flaking. Fisher studied "cultural relatedness through the examination of flake scar patterns from different lithic projectile point types". He asserted "If these manufacturing techniques are socially learned, and the production of certain archaeological types of projectile points represent related groups, then similarities in these flake scar patterns should contain the information to relate groups of people who share this same knowledge and technique" (pp. v, vi). *Subtle* changes in flaking techniques and patterns across a geographic or temporal span, or due to differences in available raw materials, can support the concept of cultural drift among an otherwise relatively consistent cultural manifestation. Do the differences between the Rocky Mountain Angostura flake patterns and patterns on points from other regions, combined with the spatial separation itself, support a differentiation of cultures? The differences observed here are more than subtle. They are the result of a fundamentally different, socially learned, manufacturing process. Therefore, all these point forms from around the continent, even from roughly the same time period, should not be considered Angostura and all should have valid and separate type names. Re-invention, not cultural drift however, explains re-occurrences of stylistic techniques separated by thousands of years as in the case of Nebo Hill / Sedalia in Missouri or the even later obsidian pieces from California used in this study.

Summary

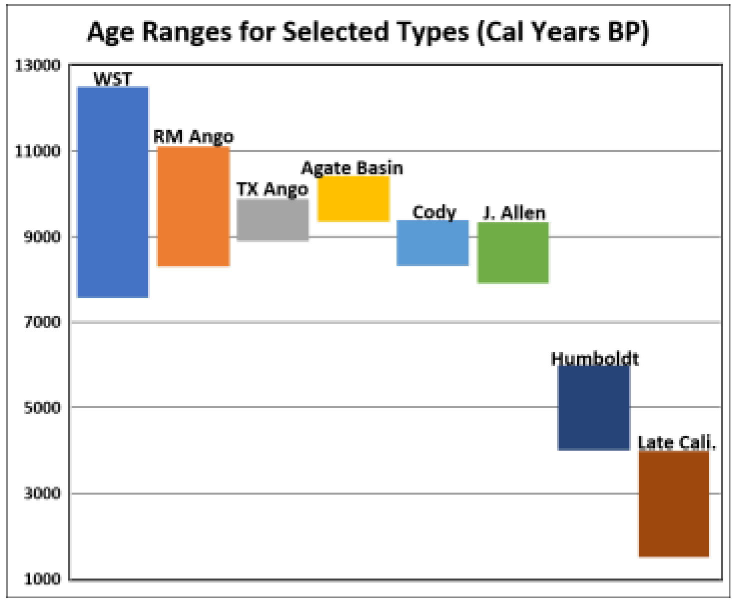


Figure 54 Major Types of the West and Far-West

This study examines certain early Holocene projectile points made and used in central Nevada. The goal is to determine if they conform to the Angostura type definition based on descriptions provided for the northern Great Plains and Rocky Mountains. Despite considerable controversy over the type definition based on variations across time and space, the Rocky Mountain definition is valid and separable from most other regional variants. Seven subject projectiles, all found in central Nevada, have been determined to meet the Angostura type definition. None are made from obsidian. Comparisons were made to the Humboldt series, and other far-western points that are commonly mis-identified as Angostura. The general and ubiquitous lanceolate shape, concave-base form lent itself well as stone projectiles throughout prehistory. The Humboldt series, and other western obsidian types that possibly descended from them, represent similar but independent technologies from much later time periods. Comparisons are also presented with Texas and other versions that have been documented in large numbers and studied extensively, some of which are from the same time period. A primary discriminating attribute for the original Angostura type is the peculiar and specific flaking pattern defined as parallel, oblique and sequential, upper-left to lower-right and lower-right to upper-left, or "UL-LR / LR-UL". These Angostura points are also un-shouldered, non-serrated and non-beveled. In the never-ending exercise of lumping and splitting, these attributes may or may not resonate the same way with everyone. But as Fisher points out, "as projectile point types are often used to define archaeological complexes or 'cultures,' … flake scar patterns that result from manufacture can be used to assess relationships between projectile point types, and by extension 'cultures,' based on similarities and differences in their flake scar patterning" (2018, p. 3). The conclusion here is the Rocky Mountain definition of Angostura represents a valid regional type, and is so far confined to the Northern Great Plains, Rocky Mountains and now the Great Basin.

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