CHAPTER 10

FLAKED STONE

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INTRODUCTION

The Rio Nuevo flaked stone analysis focused on materials recovered from several loci of the Clearwater site, AZ BB:13:6 (ASM): (1) the earliest occupations at the Congress Street locus; (2) two Agua Caliente phase features from the Mission Gardens locus; and (3) one Spanish period O'odham feature at the Mission locus. The earliest assemblage is the most recent addition to the large body of data about the unnamed phase of the Early Agricultural period (2100-1200 B.C.). The Clearwater site artifacts provide the first opportunity to investigate technological behaviors from different locations within the floodplain of the Santa Cruz during this previously inadequately understood interval. Similarly, literature about the flaked stone technology utilized by Pima populations in the Tucson area is virtually nonexistent; the Piman lithic assemblage is limited, but it is significant for beginning explorations of this time period.

SAMPLING

The analyzed sample included all artifacts from strata 503 and 504 (comprising the unnamed phase preceding the San Pedro phase of the Early Agricultural period, 2100-1200 B.C.) at the Congress Street locus (Stratum 503, n = 127; Stratum 504, n = 1,493), as well as all artifacts from Early Ceramic and Pima features at the Mission and Mission Gardens loci (n = 306). All projectile points recovered during the project were analyzed regardless of context. Therefore, the projectile point discussion includes the significant point assemblage recovered from the Cienega phase (800 B.C.-A.D. 50) occupations of the Clearwater site.

METHODS OF ANALYSIS AND DEFINITIONS OF TERMS

Artifact Classification and General Terminology

The typology used here utilizes a technological division of gross artifact classes, including cores, debitage, retouched flake implements, core tools, core hammers, and cobble hammers. These artifacts are differentiated on the basis of blank type and the presence or absence of retouch. Types and subtypes within the classes represent increasing levels of detail in the suites of attributes used to make the identifications. A number of key attributes were recorded for each artifact, including raw material, artifact class, artifact type, platform type (if applicable), presence or absence of cortex, weight, and maximum linear dimension. Definitions of some of the more frequently used terms in this chapter are presented in Table 10.1.

Cores

Cores are pieces of parent material from which flakes or blades are struck. They are recognizable by the presence of more than two aspects, striking surfaces (platforms) and negative flake scars. Specific core types are defined on the basis of the number of platforms present and the direction(s) in which they are oriented. They include single-platform, opposed-platform, bidirectional, multiple-platform, and bifacial cores. If fewer than three negative flake scars are present on an otherwise unaltered piece of raw material, the artifact is classified as a tested piece.

Attribute Recording. The attributes recorded include raw material, type (defined according to the number of platforms present), the presence/absence of cortex, mass (gm), and the maximum linear dimension (mm).

Debitage

Debitage includes all unretouched lithic artifacts that were struck from some parent material. Types are defined based on the set of technological attributes the artifacts possess; these include complete flakes, fragmentary flakes, and shatter. Special debitage types forming subsets of the main types above include bifacial thinning flakes, implement resharpening flakes, core rejuvenation flakes, and bipolar flakes.

Bifacial thinning flakes have distinctive platforms that are oriented at an acute angle to the dorsal aspect of the flake. These are usually lipped and often show faceting or grinding. The flakes have lateral margins that expand outward from proximal end to

Table 10.1. General terminology for Desert Archaeology, Inc., flaked stone analysis.

Term	Definition
Retouch	Intentional, macroscopically visible modification to the edge of a piece of lithic material, generally in the form of flaking; the conventional requirement for classifying edge modification as retouch is the presence of three or more contiguous intentional flake removals along a common edge.
Utilization damage/ Edge damage/Use-wear/ Wear traces	Macro- or microscopically visible modification of the edge of a piece of lithic material as a result of utilization or postdepositional processes; it is an unintentional by-product of behavior rather than an intended effect. Given this and the definition used for retouch, the term "use retouch" is misleading and is avoided here.
Implement	A piece of stone that was either utilized or designed to be utilized to perform a task.
Retouched implement/ Flake tool	Flake with one or more retouched edges, regardless of the presence or absence of wear traces.
Utilized flake	An unretouched flake that has been used to perform a task; identified by the presence of wear traces.
Formal tool/Formally retouched implement	Implement with patterned retouch corresponding with one of the traditionally established, intuitive tool types (e.g., projectile point, drill, biface, notch, graver, perforator, endscraper, sidescraper).
Expedient tool/Expediently retouched implement	Retouched implement characterized by unpatterned, usually nonextensive retouch; these may also be referred to as informal tools.
Core tool	Core with one or more retouched edges; flake implements are made from the by-products of core reduction, while core tools are made by shaping original cobbles or tablets of raw material into implements through flaking.

termination, giving them a semitriangular shape, and have incurved bulbar aspects that result in a distinctive appearance in cross section. Desert Archaeology analyses include both specifically identified bifacial thinning flakes (BTF) and potential retouch flakes (PRF), which include all complete flakes whose metric attributes fall within the range of variation observed for the BTF from a given region and time period.

Implement resharpening flakes are recognizable by a use bevel or other wear traces along the length of their platform edges; they are struck from a dulled edge to provide a fresh, sharp edge for continued work.

Core rejuvenation flakes are struck from cores to remove exhausted platforms and extend the use-life of the core. These are generally recognizable from the flaking platforms and partial flake scars around their perimeters, or by a ridge formed by remnant platforms across the dorsal aspect of the flake.

Another special debitage type that warrants a separate discussion is the utilized flake, which is a non-retouched flake with edge damage (abrasion, flaking, crushing, striations) and/or polish indicating it has been used to perform some task. While utilized flakes are subsumed by the debitage artifact class (due to the absence of retouch), they are usually included with retouched flake tools in discussions of task-related behaviors at a site.

Attribute Recording. Debitage was coded individually; recorded attributes included raw material, completeness, portion (if incomplete), presence/absence of cortex, platform type, termination type, type of platform preparation (grinding and/or faceting), number of remnant flake scars on the dorsal aspect, mass (gm), and a measure of linear dimension (mm). Desert Archaeology analyses rely on a single measurement of a flake's maximum linear dimension (irrespective of the flaking axis); dividing flake mass by this number results in a mass index value used to express relative flake thickness (lower values result from a lower weight-to-linear size ratio, indicating thin flakes).

Potential Retouch Flakes. The metric attributes recorded for debitage are used to discriminate subsets of artifacts representing various technological behaviors. In this analysis, the distribution of size and weight data for identified bifacial thinning flakes was used to set the size thresholds for potential retouch flakes in the assemblage. The maximum mass index for likely retouch flakes was obtained from the mean value across all identified BTF in the Desert Archaeology database, plus 1 sigma (0.076). This mass index threshold covers 91 percent of the BTF, which is a tolerable level of accuracy in filtering the overall debitage assemblage. Therefore, discussions of potential retouch flakes in this report refer to the proportion of complete flakes in the assemblage that do not exceed this mass index threshold.

Unifaces

Unifaces are flakes with retouch extending from an edge onto only one aspect of the implement. Note that an implement with retouch on both aspects is still classified as a uniface as long as the sets of retouch flakes do not originate from a common edge.

Attribute Recording. The attributes recorded for unifaces include raw material, cortical coverage, mass (gm), and maximum linear dimension (mm). When time allows, the location, shape, and length of the retouched edge is recorded; otherwise, the retouch attributes exhibited by a particular artifact are summarized with reference to an established type name.

Retouch is described with reference to dichotomous qualitative attributes and the angle of the resulting modified edge (Table 10.2; after Rozen 1984: 457-459). Attributes are assigned through a series of yes-no questions (e.g., is the retouch extensive? is the retouch invasive?) to create a set of attributes corresponding to a technological type.

Bifaces

Although it is sometimes impossible to determine if a biface was made on a flake/blade blank or a core blank, in the current system, bifaces are considered to be flake tools with retouch extending onto both aspects of the blank from a common margin.

Common bifacial types include general bifaces, drills, and projectile points. General bifaces lack designed special-function components such as elongated bits or hafting elements and are classified according to stage of manufacture (Table 10.3). Drills have pronounced bits that are usually thick and diamond-shaped or square in cross section. Most drills are designed with some provision for hafting, such as a narrow, pointed base that fits into a socket in a wooden shaft, or flanges or notched bases allowing the drill to be secured to a shaft with sinews or other wrapping material. Projectile points have a sharp

Table 10.2. Definitions of retouch attributes.

Retouch Type	Definition
Unifacial	Retouch scars that extend onto only one aspect, or face, of the implement.
Bifacial	Retouch scars that extend from a common margin onto both aspects of the implement.
Irregular	Two or more noncontiguous retouch scars, but not more than two contiguous scars.
Continuous	At least three contiguous retouch scars.
Marginal	Retouch scars whose lengths do not exceed 10 percent of the maximum dimension of the implement.
Invasive	Retouch scars whose lengths exceed 10 percent of the maximum dimension of the implement.
Nonextensive	Continuous retouch scars whose extent is less than 20 percent of the perimeter of the implement.
Extensive	Continuous retouch scars whose extent is greater than 20 percent of the perimeter of the implement.

Table 10.3. Stages of biface manufacture (from Anderson and McDonald 1986:7.48-7.52).

Stage	Characteristics
1	Thick cross sections; markedly sinuous edges; hinge and step fractures; and deep, broad flake scars; cortical surfaces and stacked step fractures common.
2	Significantly lower length, width, and thickness than Stage 1 bifaces; irregular but straighter edges, irregular but more shallow flake scars, and far fewer hinge and step fractures, likely due to a shift by the knapper from a hammerstone to an antler billet; cortex expected to occur at a rate of roughly 30 percent.
3	Slightly sinuous edges, infrequent hinge and step fractures, and more regular, diffuse, and less expanding flake scars; approximately 30 percent thinner than Stage 2 bifaces; manufacture-induced breakage common; essentially finished implements lacking pressure flaking, final thinning, and hafting elements.
4	Regular outlines, straight edges, and regular flake scars; pressure finishing common; cortex completely absent; tend to be significantly shorter than Stage 2 bifaces and 30 percent thinner.

point at one end and a hafting element at the other. Point classification systems are regionally specific, with types defined according to sets of morphological attributes, such as notch location, stem shape, blade shape, length-to-width ratio, and flaking technique. Some types incorporate subregional or phase-based variants.

From a technological view, it is informative to address general bifaces in terms of the stages of manufacture, and thus, the level of labor investment they represent. The classification system used here for bifaces replicates that developed by Anderson and McDonald (1986) for the Wupatki Archeological Inventory Survey project. The latter was based on Womack's (1977) technological analysis and experimentation, which determined that thickness-to-width ratios and flake scar patterns are the variables most relevant for discerning biface reduction strategies. The resultant general biface types, produced in four stages of manufacture, are defined as follows (from Anderson and McDonald 1986:7.48-7.52).

Stage 1 bifaces have thick cross sections, markedly sinuous edges, hinge and step fractures, and deep, broad flake scars. Cortical surfaces and stacked step fractures are common. Stage 2 bifaces have significantly lower length, width, and thickness than Stage 1 bifaces. They are characterized by irregular but straighter edges, irregular but more shallow flake scars, and far fewer hinge and step fractures, likely due to a shift by the knapper from a hammerstone to an antler billet. Cortex is expected to occur on these bifaces at a rate of roughly 30 percent. Stage 3 bifaces have slightly sinuous edges, infrequent hinge and step fractures, and more regular, diffuse, and less expanding flake scars. These are approximately 30 percent thinner than Stage 2 bifaces, and manufacture-induced breakage is common. These are basically finished implements, but without pressure flaking, final thinning, and hafting elements. Stage 4 bifaces have regular outlines, straight edges, and regular flake scars; pressure finishing is common and cortex is completely absent. These tend to be significantly shorter than Stage 2 bifaces and 30 percent thinner.

Attribute Recording. The minimum set of recorded attributes includes raw material, cortical coverage, mass (gm), and maximum linear dimension (mm) measured relative to the long axis of the artifact. When time allows, more complete metric measurements are taken, although these vary according to biface type. All other measurements are taken parallel or perpendicular to this line.

Projectile point measurements include total length (mm) and the lengths, widths, and thicknesses (mm) of the blade and stem. Other measurements that can be useful for distinguishing differing point types include neck width, basal concavity depth, notch depth and width, and tang angle. Ratios among sets of these attributes are used to quantify the morphology of a given point and place it within a range of observed variation corresponding to a particular type.

Core Tools

Core tools are distinguished from retouched flake implements by blank type; flake implements are made on the by-products of core reduction, while core tools are produced by shaping original cobbles or tablets of raw material into implements through flaking. Core tools are generally larger and heavier than flake tools, but their edge morphologies are analogous. In the interest of comparative studies, it is preferable to deal with cores, core tools, core hammers, and cobble hammers separately, providing other researchers the opportunity to group or separate them as they wish.

Core tools include scrapers, choppers, discoids, denticulates, and composite tools. Other, more rarely encountered examples include perforators and notches. The classification process is essentially the same as for retouched flake implements, although a smaller set of tool types is defined than for flake tools.

Attribute Recording. Recorded attributes include raw material, cortical coverage, mass (gm), and maximum linear dimension (mm). As with flake tools, retouch location, type, and angle are summarized with reference to an established type name.

Core Hammers

A core hammer is a core with evidence of secondary use as a hammer (battering). Core hammers are treated separately from core tools, because even though they were utilized as something other than a source for flakes, they were generally not specially shaped for the second function. These and cobble hammers are the only flaked stone artifacts defined explicitly in terms of their inferred function.

Due to the specific nature of the type definition, the only types defined for this artifact class are complete core hammers and fragmentary core hammers.

Attribute Recording. Raw material, the presence/absence of cortex, mass (gm), and maximum linear dimension (mm) are recorded.

Cobble Hammers

A cobble hammer, or hammerstone, is an otherwise unmodified cobble that exhibits battering in one or more locations. Due to the specific nature of the type definition, complete hammerstones and fragmentary hammerstones are the only types defined for this artifact class.

Attribute Recording. Raw material, the presence/absence of cortex, mass (gm), and maximum linear dimension (mm) are recorded.

A Note on Tool Classification

Each retouched implement was categorized according to the location, type, and extent of retouch it exhibited, in conjunction with edge angle attributes. As type definitions are technologically, rather than functionally, derived, there should be no overlap of unifacial and bifacial retouch within tool types. All retouched implements which could not be accurately described by a shorthand term such as "endscraper" or "drill" were typed according to their retouch attributes and are discussed in the analysis as expediently retouched implements or informal tools. As explained earlier, manufacture-derived attributes (retouch), rather than inferred function, serve as the basis for an implement type designation. However, while the attribute sets are quite effective in differentiating implement types based on their technological attributes, many of the resulting type names are equally nonintuitive and unwieldy.

To make the results of the analysis easier to read and understand, traditional type names were used when possible to describe the assemblage; e.g., "continuous invasive unifacial retouch, medium/steep, denticulate, proximal/distal end" becomes the much easier to comprehend "denticulated endscraper." Because these terms carry functional implications from long-term traditional use in the literature, it must be emphasized that *no specific functional inferences are implied* for simplified implement types such as "scraper" or "chopper;" they are used here only to facilitate communication.

Southwestern formal tools are quite different in overall appearance than those from the Paleolithic, Mesolithic, and Neolithic of Europe and the Middle East. Tools from these Old World regions were manufactured from standardized blanks (blades), which had the effect of homogenizing the appearance of the tool assemblages.

In contrast, Southwestern retouched flake implements were made from unstandardized blanks (flakes). Although this contributes to an "informal" appearance for the Southwestern tools, the retouched edges themselves are, in fact, quite standardized. Therefore, the Southwest can be considered to have produced formal tools other than projectile points—the retouched edge morphologies rather than the blank morphologies being the relevant attributes. The edge morphologies of the formal, "intuitive" tool types can be defined in terms of the retouch attributes discussed above.

ASSEMBLAGE DESCRIPTIONS

Pre-San Pedro Phase Assemblage

A total of 1,600 flaked stone artifacts was recovered from pre-San Pedro phase (strata 503 and 504) contexts at the Congress Street locus of Clearwater. Most of the assemblage was debitage, with relatively small numbers of cores, hammers, and retouched implements also recovered (Table 10.4). Slightly more cores and retouched implements were recovered from extramural pits than from pithouse fill or nonfeature, extramural space, but overall artifact distributions were fairly consistent across the contexts.

Raw materials are dominated by igneous rock available in the immediate vicinity of the site (Table 10.5). The most frequently occurring materials include fine-grained basalt from the foothills of the Tucson Mountains; a fine-grained, ashy-gray rhyolite with small phenocrysts; and fine-grained quartzites available in cobble form in the bedload and lag gravels of the Santa Cruz River. Exceptionally high-quality rock occurred in smaller but regular quantities across the early contexts. Primary among these is a salmon-colored jasper and a very fine-grained, lavender-to-blue dacite. Sources for these materials have not been identified, but their consistent occurrence in San Pedro and Cienega phase assemblages from sites along the Santa Cruz as far north as Ruthrauff Road (Wetlands site, AZ AA:12:90 [ASM]; Sliva 1998b) suggests a western Tucson Basin source readily accessible from the floodplain settlements.

Bifacial implements, particularly projectile points, dominate the tool assemblage (Table 10.6). The few unifacial tools include scrapers, a perforator, and a notch/spokeshave. Five of the 10 points were complete enough to be stylistically diagnostic; four of these are Cortaro points (the three most complete are pictured in Figure 10.1a-c) and another is possibly a San Pedro (Figure 10.1f). All of these points were recovered from Stratum 504 contexts dated to circa 2100 B.C. (Chapter 19, this report). Cortaro points first appear in the Chiricahua phase of the Middle Archaic period (3000 B.C.-2100 B.C.), but are common, if in low numbers, through the end of the Cienega phase of the Early Agricultural period (800 B.C.-A.D. 50). San Pedro points first appear in the San Pedro phase (1200-800 B.C.) and persist through the earlier portion of the Early Ceramic period (A.D. 50-350). Additional point types recovered from contexts that may not be associated with the strata 503 and 504 occupations include an Armijo-like point (Chiricahua phase; Figure 10.1d) and a San Pedro (Figure 10.1e).

The technological attributes of the assemblage are consistent with patterns established for San Pedro

Table 10.4. Pre-San Pedro phase (strata 503 and 504) flaked stone artifact class distributions at the Congress Street locus, the Clearwater site, AZ BB:13:6 (ASM).

Context	Artifact Class	Total	Percent
Pithouse/Possible pithouse	Debitage	328	97
	Core	5	1
	Biface	5	1
Total		338	100
Extramural pit	Debitage	68	92
	Core	3	4
	Biface	2	3
	Hammerstone	1	1
Total		74	100
All feature contexts	Debitage	396	96
	Core	8	2
	Biface	7	2
	Hammerstone	1	<1
Total		412	100
Extramural space (nonfeature)	Debitage	1,163	98
	Core	8	1
	Uniface	4	<1
	Biface	11	1
	Core tool	1	<1
	Core hammer	1	<1
Total		1,188	100
All contexts	Debitage	1,558	97
	Core	16	1
	Uniface	4	<1
	Biface	18	1
	Core tool	1	<1
	Core hammer	1	<1
	Hammerstone	1	<1
Total		1,599	100

phase assemblages within the Tucson Basin (Table 10.7). The relatively high occurrence of PRF indicates tool-manufacturing activities. However, this should be viewed at the level of this individual site or, more accurately, a location within the site that happened to be excavated, rather than as a definitive marker discriminating this unnamed phase from the San Pedro phase proper.

Agua Caliente Phase

Two pithouses at the Mission Gardens locus, Features 3014 and 3038, dating to the Agua Caliente phase (A.D. 50-500) of the Early Ceramic period were excavated, yielding a flaked stone assemblage of 273 artifacts. In addition to debitage, the assemblage includes seven cores or core fragments, two hammers, a scraper, and a notch (Table 10.8). No diagnostic artifacts were recovered.

Spanish Period O'odham

One O'odham feature, Feature 64, dating to the Spanish period, a trash concentration at the Mission locus, contained 44 flaked stone artifacts. One core and three projectile points were recovered; the remainder of the assemblage is debitage (Table 10.9). Nine Pima arrow points were recovered from five

Table 10.5. Pre-San Pedro phase raw material distributions, by context, at the Congress Street locus, the Clearwater site, AZ BB:13:6 (ASM).

	Pithouse/Possible Pithouse		Extramural Pit		Nonfeature, Extramural Space		All Contexts	
Material	Total	Percent within Context	Total	Percent within Context	Total	Percent within Context	Total	Percent
Unspecified fine-grained igneous	27	8	7	9	230	19	264	17
Unspecified medium-grained igneous	33	10	4	5	87	7	124	8
Unspecified coarse-grained igneous	0	0	0	0	16	1	16	1
Basalt or basaltic andesite	70	21	13	18	147	12	230	14
Fine-grained dacite, lavender to white	41	12	3	4	40	3	84	5
Rhyolite	62	18	31	42	224	19	317	20
Fine-grained ashy gray rhyolite or andesite/black and white phenocrysts	13		17		61		91	
Fine-grained gray rhyolite/black and white phenocrysts	6		0		12		18	
Fine-grained black rhyolite/black and white phenocrysts	2		1		10		13	
Fine-grained Rillito Peak rhyolite ("Rillito Peak jasper")	6		0		26		32	
Fine-grained dark brown rhyolite/white phenocrysts	7		4		36		47	
Fine-grained brown rhyolite/black and white phenocrysts	1		2		10		13	
Fine-grained red rhyolite/white phenocrysts	3		0		1		4	
Fine-grained red rhyolite/black and white phenocrysts	1		0		1		2	
Fine-grained purple rhyolite/white phenocrysts	0		0		1		1	
Medium-grained gray rhyolite/ white phenocrysts	4		1		20		25	
Medium-grained gray rhyolite/ black and white phenocrysts	3		1		10		14	
Medium-grained light brown rhyolite/white phenocrysts	10		1		25		36	
Medium-grained brown rhyolite/ black and white phenocrysts	3		4		5		12	
Medium-grained pink-gray rhyolite/white phenocrysts	1		0		2		3	
Medium-grained purple rhyolite/ white phenocrysts	1		0		2		3	
Coarse-grained Rillito Peak rhyolite ("Rillito Peak jasper")	0		0		2		2	
Coarse-grained brown rhyolite/ white phenochrysts	1		0		0		1	
Obsidian	1	<1	0	0	14	1	15	1
Fine-grained metasediment	20	6	5	7	93	8	118	7
Fine-grained quartzite	21	6	3	4	97	8	121	8
Extremely fine-grained quartzite	18	5	3	4	60	5	81	5
Silicified limestone	6	2	1	1	10	1	17	1

Table 10.5. Continued.

Material	Pithouse/Possible Pithouse		Extramural Pit		Nonfeature, Extramural Space		All Contexts	
	Total	Percent within Context	Total	Percent within Context	Total	Percent within Context	Total	Percent
Medium-grained quartzite	1	<1	0	0	1	<1	2	<1
Unspecified fine-grained metamorphic	2	1	0	0	3	<1	5	<1
Unspecified medium-grained metamorphic	1	<1	0	0	0	0	1	<1
Chert	18	5	1	1	99	8	118	7
Unspecified chert	13		1		76		90	
Buff's chert	5		0		23		28	
Jasper	6	2	0	0	50	4	56	4
Chalcedony	6	2	0	0	2	<1	8	1
Quartz	4	1	0	0	13	1	4	<1
Unidentified/Other	1	<1	0	0	1	<1	2	<1
Total	338	100	71	100	1,187	100	1,583	100

additional Spanish period features, including a wall and four extramural pits (Table 10.10).

Raw material distributions are similar to those seen in the pre-San Pedro phase assemblage, with virtually all artifacts made from fine- to medium-grained, locally available materials (Table 10.11). The exception to this is the range of materials represented by the projectile points, most of which were manufactured from stone types that do not occur in the Tucson Basin (cherts and jaspers from unknown sources; Figure 10.2a-j). The single Cienega point recovered from a Spanish period O'odham context is produced from Buff's chert (Figure 10.2k) and is one of only six points of this material known from all Desert Archaeology excavations in the Santa Cruz floodplain. The remaining points closely resemble some Sobaipuri (Protohistoric) forms, but are more properly called "Piman" due to their association with historic-era features. The points are quite small (with one exception, all are less than 20 mm long), triangular blades with moderately deep concave bases. Two have finely serrated edges; none have side notches.

The available sample is too small to construct a valid technological profile for Spanish period O'odham flaked stone at the Clearwater site. General impressions, however, suggest at least some bifacial manufacture occurred. Seven bifacial thinning flakes were recovered, and most of the debitage falls within the size parameters observed in Early Agricultural period assemblages (which tend to be dominated by tool-manufacturing activities; Sliva 2005).

PROJECTILE POINTS FROM RIO NUEVO

The projectile point styles recovered during the Rio Nuevo excavations span the Middle Archaic and Early Agricultural periods and fit well with the stylistic and chronological sequence demonstrated for the Tucson Basin by earlier investigations (Sliva 1997, 1998a, 1998b, 1999b, 2005). The earliest contexts at the Congress Street locus (Stratum 504) yielded complete and fragmentary points that are typically associated with the Middle Archaic period to the San Pedro phase of the Early Agricultural period (see Table 10.6). These include three Cortaro points (see Figure 10.1a-c), a fragmentary possible San Pedro blade (see Figure 10.1f), and three non-diagnostic point tips (see Figure 10.1g-i). While these tips are non-diagnostic, their acute angles fit within the ranges of variability for Armijo and Empire points. Two additional points from surface and trench collections are included in Figure 10.1 due to their chronological affinity with the earlier time period—one is an Armijo point (associated with the Middle Archaic period, see Figure 10.1d), and the other is a San Pedro (associated with the San Pedro phase through the Early Ceramic period, see Figure 10.1e). Although the latter two points are not directly associated with the pre-San Pedro occupation of the site, they may have been scavenged from the area by later inhabitants. However, the Armijo-like point, which was collected from a trench wall, may be associated with the pre-San Pedro occupation of Stratum 504.

Table 10.6. Projectile points and other retouched artifacts from pre-San Pedro (Stratum 504) contexts at the Congress Street locus, the Clearwater site, AZ BB:13:6 (ASM).

Context	Field Number	Artifact Type	Figure
Nonfeature, extramural space	7173	Cortaro point base	10.1b
Nonfeature, extramural space	7194	Non-diagnostic Archaic point fragment; distal half of blade with long impact fracture	10.1g
Nonfeature, extramural space	7195	Non-diagnostic point tip fragment	10.1h
Nonfeature, extramural space	7289	Non-diagnostic point tip fragment	N/A
Nonfeature, extramural space	7306	Basal quarter fragment, possibly of Cortaro point	N/A
Nonfeature, extramural space	7469	Non-diagnostic point tip fragment with impact fracture	N/A
Extramural pit Feature 624, fill	7650	Possible San Pedro point blade midsection	10.1f
Pithouse Feature 3371, floor fill	9279	Non-diagnostic point tip fragment	10.1i
Pithouse Feature 3371, floor	9299	Cortaro point basal fragment with impact fracture	10.1a
Pithouse Feature 3359, floor fill	9204	Cortaro point with an impact fracture and possible secondary use as drill	10.1c
Pithouse Feature 3359, floor fill	9234	Complete Stage 1 biface	N/A
Nonfeature, extramural space	7142	Large flake perforator	N/A
Nonfeature, extramural space	7174	Sidescraper	N/A
Nonfeature, extramural space	7241	Fragmentary point preform	N/A
Nonfeature, extramural space	7258	Fragmentary Stage 1 biface	N/A
Nonfeature, extramural space	7310	Fragmentary Stage 4 biface	N/A
Nonfeature, extramural space	7329	Notch	N/A
Nonfeature, extramural space	7336	Large humpback biface	N/A
Nonfeature, extramural space	7385	Denticulated composite scraper	N/A
Nonfeature, extramural space	7597	Fragmentary Stage 1 biface	N/A
Pithouse Feature 516, floor fill	6926	Fragmentary Stage 1 biface	N/A
Extramural pit Feature 622, fill	7641	Fragmentary Stage 2 biface	N/A

Although the assemblage from the Cienega phase occupations at the Congress Street, Mission, and Brickyard loci was not sampled for this study, all points from Cienega phase contexts were analyzed (Table 10.12). Two are the smaller Cienega Short varieties that are generally associated with the Early Cienega phase (Figure 10.3a-b; Sliva 1999a). Most are Cienega Long points, which were produced throughout the Cienega phase (Figure 10.3c-k). Two San Pedro points also came from Cienega phase contexts (Figure 10.3l-m). An additional point included in the figure is a Cienega Flared (Figure 10.3n) recovered from an American Territorial period well. In all, the Cienega phase contexts contained a full suite of point styles known to be associated with the Early Cienega phase occupation of the Santa Cruz floodplain. The absence of Cienega Stemmed points, a subtype exclusively associated with the Late Cienega phase (Sliva 1999a), suggests the excavated Cienega deposits belong to the earlier portion of the phase.

The highest degree of stylistic uniformity is exhibited by the Piman points recovered from Spanish period O'odham contexts (see Figure 10.2a-j; see Table 10.9). All are small, triangular points with moderate-to-deep basal concavities. The lone non-Piman point recovered from these contexts is a broken, partially reworked Cienega Long point produced from Buff's chert (see Figure 10.2k); this point was likely scavenged from the site and modified by later occupants before being discarded.

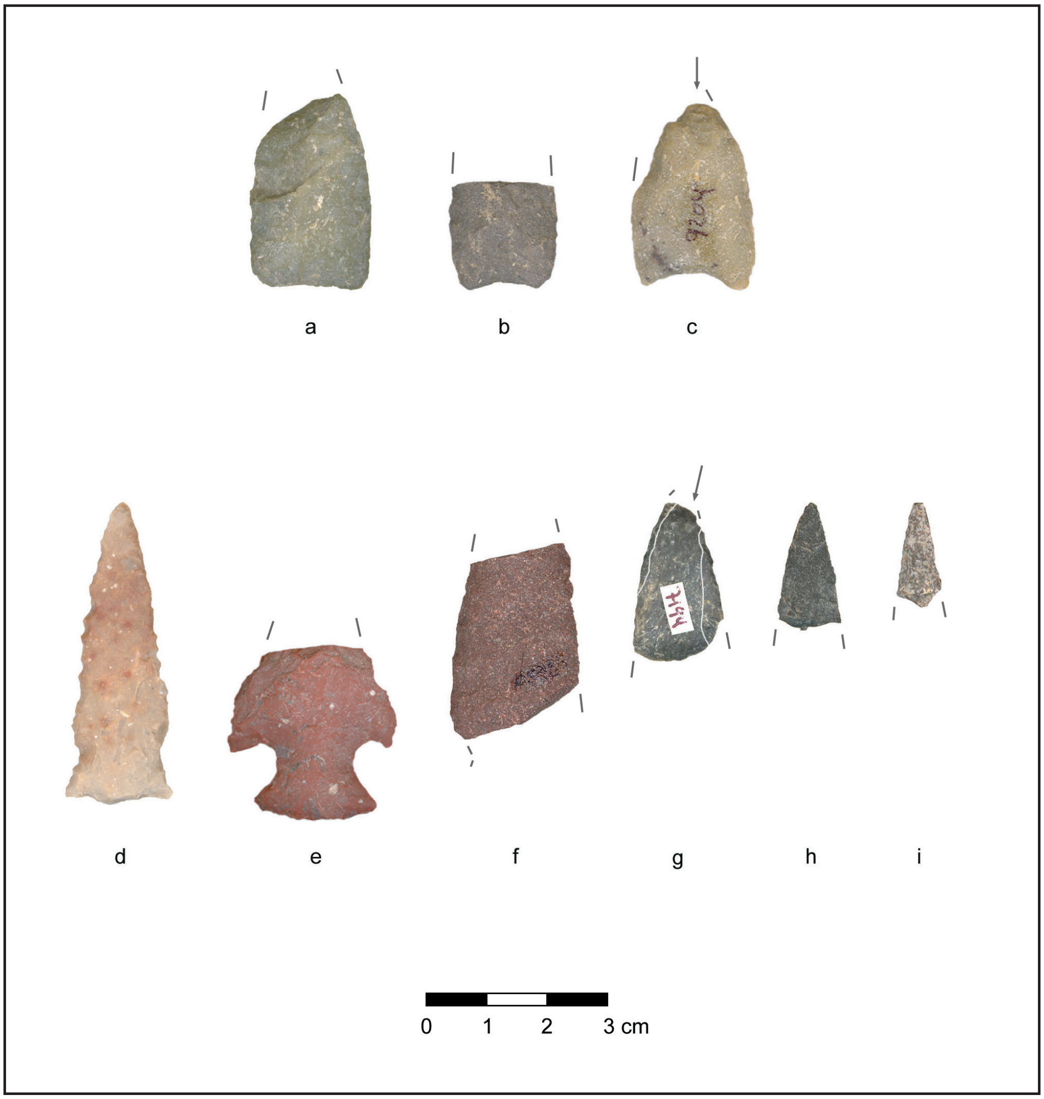

Figure 10.1. Projectile points from pre-San Pedro or unknown period contexts at the Congress Street locus, the Clearwater site, AZ BB:13:6 (ASM): (a-c) Cortaro; (d) Armijo-like; (e-f) San Pedro; (g-i) non-diagnostic tips.

Table 10.7. Technological profiles of assemblages from pre-San Pedro contexts at the Congress Street locus, the Clearwater site, AZ BB:13:6 (ASM), compared with aggregated data from other Early Agricultural period sites in southern Arizona.

			Debitage				Cores[d]			Percent of Tools[e]		
Context	*n*	Tool Percent	Average Size (mm)	Average MI[a]	Percent NC[b]	Percent PRF[c]	Percent	Flakes: Core[d]	Average Size (mm)	Expedient Uniface	Formal Uniface	Biface
Pre-San Pedro phase features	412	2	20.94	0.111	86	74	2	49	60.73	0	0	100
Pre-San Pedro phase extramural space (nonfeature)	1,188	1	21.64	0.122	87	73	1	145	62.61	0	27	73
All pre-San Pedro phase contexts	1,600	1	21.46	0.119	87	74	1	97	61.73	0	18	82
San Pedro phase	19,270	1	23.68	0.108	87	69	1	146	58.38	6	32	62
Early Cienega phase	12,096	3	25.14	0.165	77	58	1	81	60.81	8	36	56
Late Cienega phase	24,076	2	30.97	0.252	76	45	3	35	72.38	12	38	49

Note: Details and references for aggregated phase-level data are available in Sliva 2005:Table 3.11.
[a]Mass index; weight/maximum linear dimension; shatter and debris excluded.
[b]Noncortical debitage.
[c]Potential retouch flake population, including identified bifacial thinning flakes and all other debitage with a mass index no more than one standard deviation greater than the average for identified bifacial thinning flakes from all assemblages in the Desert Archaeology database.
[d]Includes core hammers.
[e]Includes all retouched flake implements; untypable fragmentary artifacts excluded.

Table 10.8. Agua Caliente phase flaked stone artifact class distributions at the Mission Gardens locus, the Clearwater site, AZ BB:13:6 (ASM).

Context	Artifact Class	Total	Percent
Pithouse fill	Debitage	253	96
	Core	7	3
	Uniface	2	1
	Hammer	2	1
Total		264	100
Pithouse floor/ Floor pit	Debitage	8	89
	Core hammer	1	11
Total		9	100
Total		273	100

Table 10.9. Spanish period O'odham flaked stone artifact class distributions at the Mission locus, the Clearwater site, AZ BB:13:6 (ASM).

Context	Artifact Class	Total	Percent
Extramural pit	Debitage	43	84
	Biface	8	16
Total		51	100
Trash concentration	Debitage	95	90
	Core	2	2
	Uniface	1	1
	Biface	7	6
	Core hammer	1	1
Total		106	100
All contexts	Debitage	138	88
	Core	2	1
	Uniface	1	1
	Biface	15	10
	Core hammer	1	1
Total		157	100
Total		358	100

Table 10.10. Projectile points from Spanish period O'odham contexts at the Mission locus, the Clearwater site, AZ BB:13:6 (ASM).

Context	Field Number	Point Type	Figure
Feature 1 (Spanish compound wall)	5025	Piman	10.2a
Feature 64 (trash concentration)	5910	Piman (fragmentary)	10.2b
Feature 64 (trash concentration)	6247	Cienega Long (scavenged)	10.2k
Feature 166 (trash concentration)	6656	Piman	10.2c
Feature 177 (extramural pit)	6555	Piman	10.2d
Feature 178 (extramural pit)	6502	Piman	10.2e
Feature 178 (extramural pit)	6517	Piman	10.2f
Feature 178 (extramural pit)	6515	Piman (fragmentary)	10.2g
Feature 203 (extramural pit)	6604	Piman	10.2h
Feature 203 (extramural pit)	6605	Piman	10.2i
Feature 203 (extramural pit)	6606	Piman	10.2j

Table 10.11. Spanish period O'odham raw material distributions, by context, at the Mission locus, the Clearwater site, AZ BB:13:6 (ASM).

	Total	
Material	Total	Percent
Unspecified fine-grained igneous	35	11
Unspecified medium-grained igneous	23	7
Unspecified coarse-grained igneous	1	<1
Basalt or basaltic andesite	69	22
Fine-grained dacite, lavender to white	3	1
Rhyolite	65	19
Fine-grained ashy gray rhyolite or andesite/black and white phenocrysts	20	
Fine-grained gray rhyolite/black and white phenocrysts	4	
Fine-grained black rhyolite/black and white phenocrysts	4	
Fine-grained Rillito Peak rhyolite ("Rillito Peak jasper")	2	
Fine-grained dark brown rhyolite/white phenocrysts	4	
Fine-grained red rhyolite/black and white phenocrysts	1	
Medium-grained gray rhyolite/white phenocrysts	8	
Medium-grained light brown rhyolite/white phenocrysts	17	
Medium-grained brown rhyolite/black and white phenocrysts	3	
Medium-grained red rhyolite/white phenocrysts	1	
Coarse-grained Rillito Peak rhyolite ("Rillito Peak jasper")	1	
Fine-grained metasediment	14	4
Silicified limestone	3	1
Fine-grained quartzite	20	6
Extremely fine-grained quartzite	16	5
Chert	46	15
Unspecified chert	29	
Buff's chert	17	
Chalcedony	15	5
Jasper	2	1
Quartz	4	1
Other	1	<1
Total	317	100

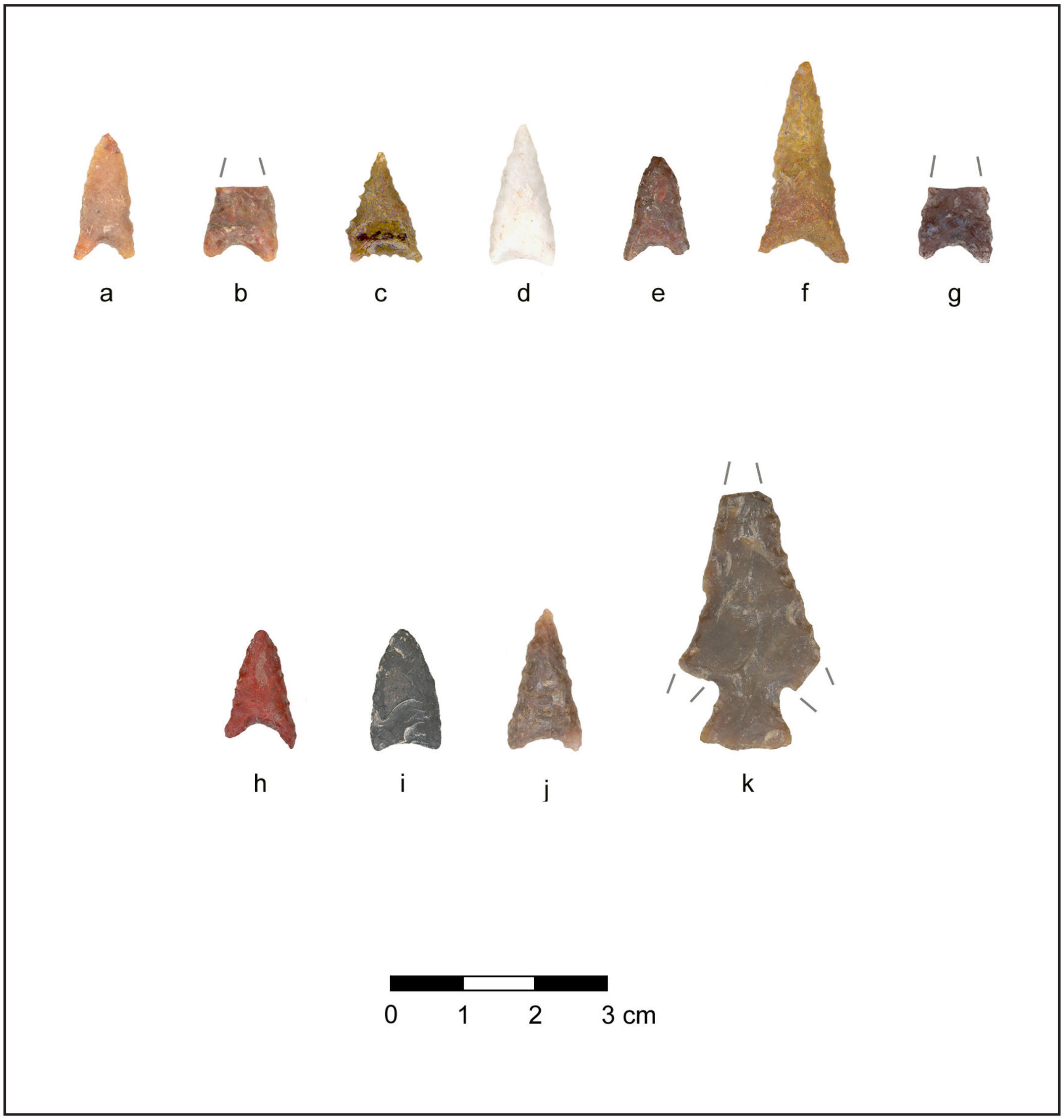

Figure 10.2. Projectile points from Spanish period O'odham contexts at the Mission locus, the Clearwater site, AZ BB:13:6 (ASM): (a-j) Piman; (k) reworked Cienega Long.

Table 10.12. Projectile points and a drill from Cienega phase, American Territorial period, or unknown period contexts at the Mission, Congress Street, and Brickyard loci, the Clearwater site, AZ BB:13:6 (ASM).

Context	Field Number	Date	Point Type	Figure
Feature 3357 (burial)	9329	Cienega phase	Cienega Short	10.a
Feature 3294 (pithouse floor fill)	8912	Cienega phase	Cienega Short	10.b
Sheet trash	8711	Unknown	Cienega Long	10.c
Feature 15 (pithouse floor fill)	5850	Cienega phase	Cienega Long	10.d
Sheet trash	8953	Unknown	Cienega Long	10.e
Feature 3270 (pithouse floor fill)	8761	Cienega phase	Cienega Long	10.f
Feature 15 (pithouse floor fill)	6005	Cienega phase	Cienega Long	10.g
Feature 9372 (pithouse fill)	8421	Cienega phase	Cienega Long	10.h
Feature 3264 (pithouse floor)	8686	Cienega phase	Cienega Long	10.i
Sheet trash	5928	Unknown	Cienega Long	10.j
Feature 3245 (pithouse floor fill)	3245	Cienega phase	Cienega	10.k
Feature 15 (pithouse floor fill)	5988	Cienega phase	San Pedro	10.l
Feature 3262 (pithouse floor fill)	8632	Cienega phase	San Pedro	10.m
Feature 3006 (well)	7749	American Territorial period	Cienega Flared	10.n
Feature 3074 (pithouse floor fill)	7873	Unknown	Drill	10.o

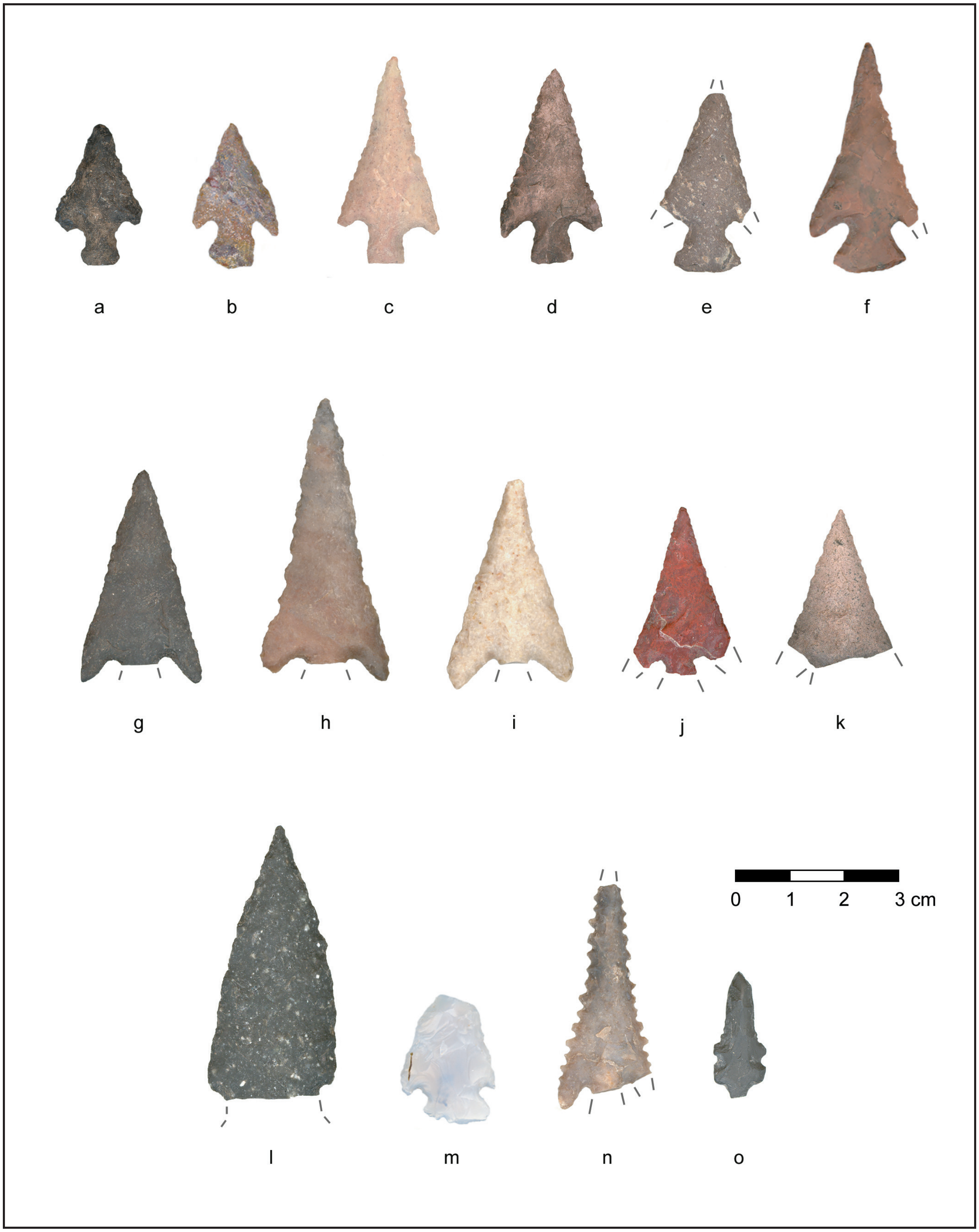

Figure 10.3. Projectile points and a drill from Cienega phase, American Territorial period, or unknown period contexts at the Mission, Congress Street, and Brickyard loci, the Clearwater site, AZ BB:13:6 (ASM): (a-b) Cienega Short; (c-j) Cienega Long; (k) non-diagnostic Cienega; (l-m) San Pedro; (n) Cienega Flared; (o) drill.

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