Suggestions for Recognizing Sites and Artifacts

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Pre-Class Primer

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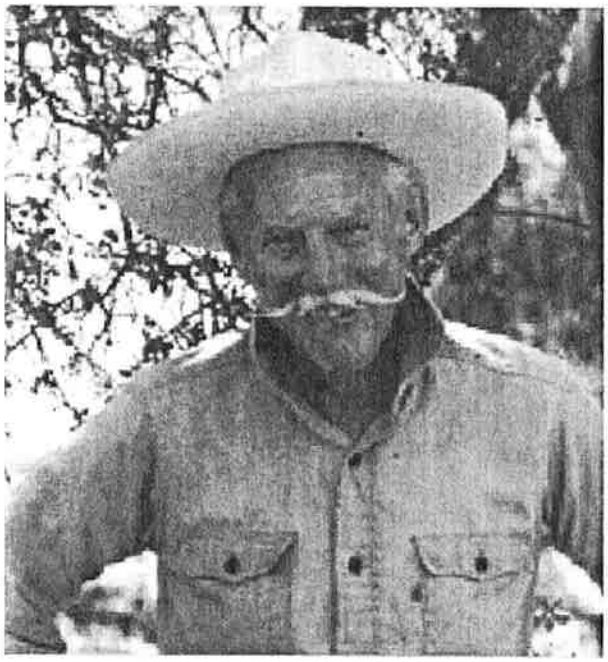
This training module is dedicated to the memory of Fritz Riddell, who served as an instructor in CAL FIRE's Archaeological Training Program for 16 years—from 1986 until his death in 2002.



Francis A. (Fritz) Riddell
1921-2002
Photo courtesy of Dan Foster

INTRODUCTION

CAL FIRE commissioned Far Western Anthropological Research Group to develop this piece specifically for posting on the CAL FIRE Archaeology website. This article is a required part of the pre-reading assignment for the students taking the full, five-day training course for Certified Archaeological Surveyor for CAL FIRE Projects, as well as those taking the one-day Refresher Course and Performance Evaluation Class. For many years, students have submitted comments to us regarding the content of our

training courses. One of the more frequent suggestions is that students be given the opportunity to spend more time on the Artifact Recognition Workshop. While we devote as much time to this as we can during the five-day course, this primer should provide the students with useful information ahead of time. Many, though not all, of the artifacts shown here will be used in the workshop.

Linda C. Pollack
Southern Region Archaeologist

Suggestions for Recognizing Sites and Artifacts: Raw Materials

RAW MATERIALS

Native Californians traditionally used a variety of natural materials for making tools, clothing, jewelry, and other items: stone, bone, shell, wood, plant fibers, sinew, feathers, and the like. Most of these items are highly perishable and do not survive well in the archaeological record. The exceptions are bone, shell, and especially stone. In fact, stone – flaked, ground, battered, and otherwise modified – makes up more than 90% of most archaeological assemblages in California.

The kind of stone an artifact is made of can tell us something about the movements and interactions of prehistoric people. For instance, an arrow point made of Napa Valley obsidian that is found at a site in the Sierra tells us that people, or trade goods, were moving back and forth between those areas. The same can be said of a handstone made of quartzite that is found in the Sacramento Valley, where no quartzite occurs naturally.

SOME ROCK BASICS

Rocks are made up of various minerals. The kinds of minerals, and their proportions, determine the colors of the rocks. For instance, granite is made up largely of quartz (white), feldspar (pink), and the dark minerals hornblende and mica. Basalt, on the other hand, has mostly dark minerals (pyroxene, olivine, calcium-rich plagioclase), so it is dark or very dark grey. These are the two most prevalent types of rock in California – in fact, basalt is the most common rock on the planet. High-quality basalt suitable for stone tools, however, is more rare.

The structure and texture of rocks is due in large part to how big the minerals are; the faster the rock cooled when it was being "born," the less time the minerals had to grow. Thus, basalt, which oozes from the ground and cools fairly quickly (when it hits air or water), has very tiny minerals that aren't easily seen with the naked eye. We refer to this as a fine-grained or aphanitic material. Granite forms beneath the surface and cools much more slowly, so the minerals have time to grow large – large enough for us to see them without magnification. Granite is a coarse-grained or phaneritic rock.

A geologist will tell you that the only sure way to identify a rock is to cut a thin-section and look at it under a microscope. Since that's not practical for the field (and most non-geologists – including most archaeologists – wouldn't know what they were looking at, anyway), it's best to be somewhat general when describing raw materials. We can note easily if they are fine-grained or coarse-grained, what color(s) they are, and if they contain identifiable minerals or inclusions. It's not necessary to know the difference between, say, granite and diorite – it's enough to say "coarse-grained igneous or granitic rock."

Fine-grained materials are best for flaked-stone tools (projectile points, bifaces, etc.), because they fracture in more predictable and controllable ways. Coarse-grained rocks

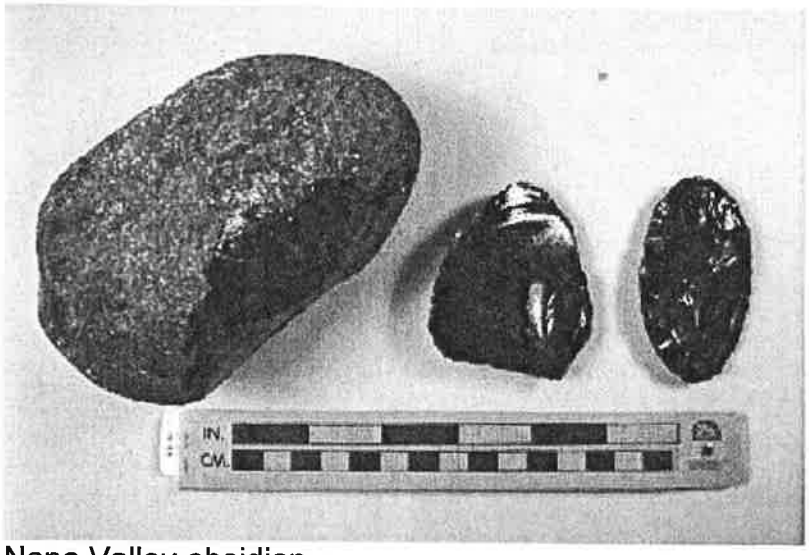
often are used for grinding stones, since the coarseness helps in the grinding process, but they are seldom if ever used for projectile points or other flaked-stone implements.

Here are the basic rock "families" recognized by most geologists:

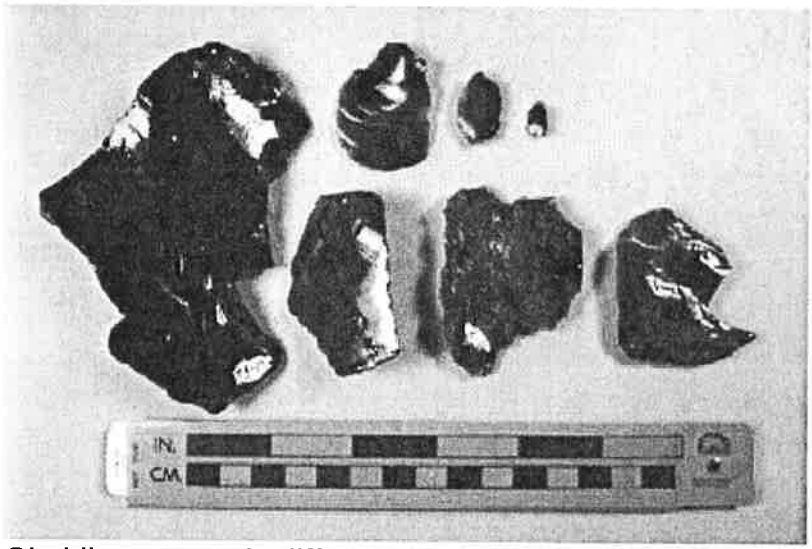
Rock Types	**Origins**	**Common Examples**
Igneous	Formed from molten magma. *Intrusive* igneous rocks are formed beneath the surface, cool slowly, and have large minerals. *Extrusive* igneous (volcanic) rocks are formed above the surface or underwater; they cool rapidly and have small minerals.	Granite Diorite Gabbro Basalt Rhyolite Andesite Obsidian (volcanic glass)
Sedimentary	Formed when sediments consolidate and harden. Often shows layering.	Chert/Jasper/Chalcedony (CCS) Sandstone Limestone Shale
Metamorphic	Formed when heat, pressure, and/or chemical reactions alter the structure of existing rock. Grains often are shiny and/or compressed into linear patterns.	Schist (from shale, basalt, or gabbro) Gneiss (from granite) Quartzite (from quartz sandstone)

COMMON TYPES OF TOOL STONE FOUND IN CALIFORNIA SITES

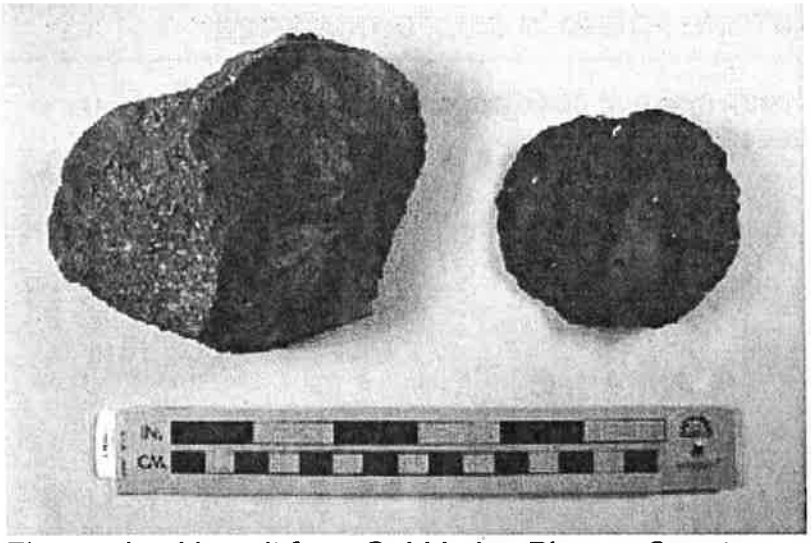
Flaked-stone implements are often made of obsidian, cryptocrystalline silicate stone (CCS), slate, or fine-grained basalt.



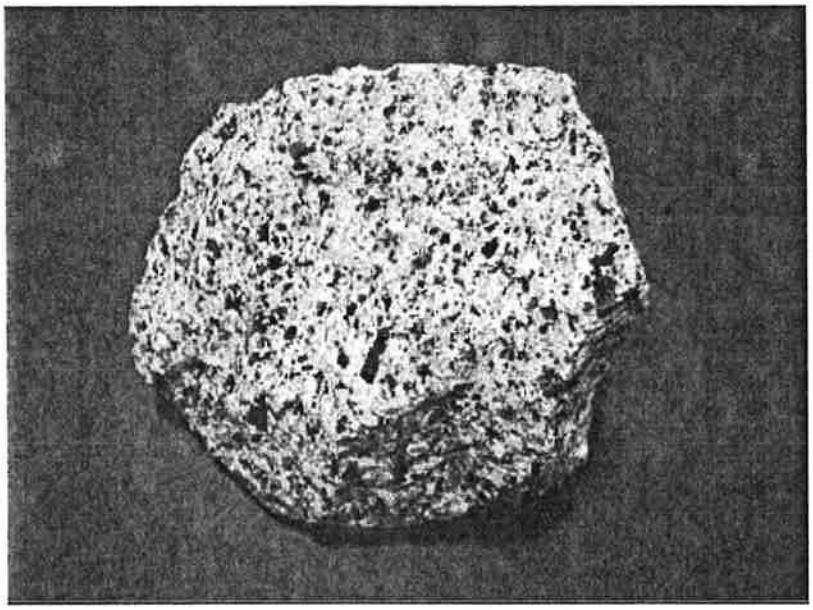
Napa Valley obsidian
Obsidian nodule with exterior cortex (left)
Flake of obsidian removed from nodule (center)
Obsidian biface (right); note flaking pattern



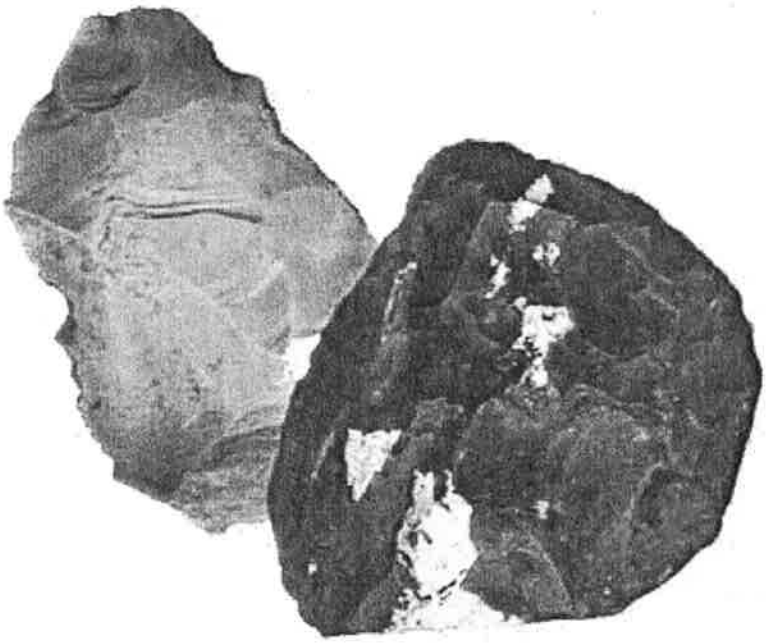
Obsidian comes in different colors (black, grey, red, green, etc.) and textures (frothy, "sugary," rough, glassy-smooth). Some is completely opaque, some cloudy or banded, and some nearly translucent. These visual characteristics can help identify the quarry where the obsidian was collected.



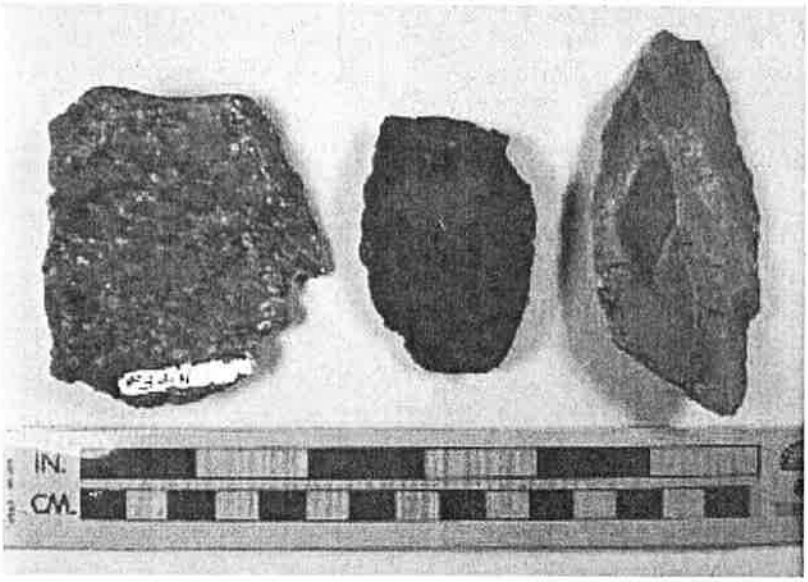
Fine-grained basalt from Gold Lake, Plumas County
Nodule with exterior cortex (left)
Flake tool (right); note flaked edges



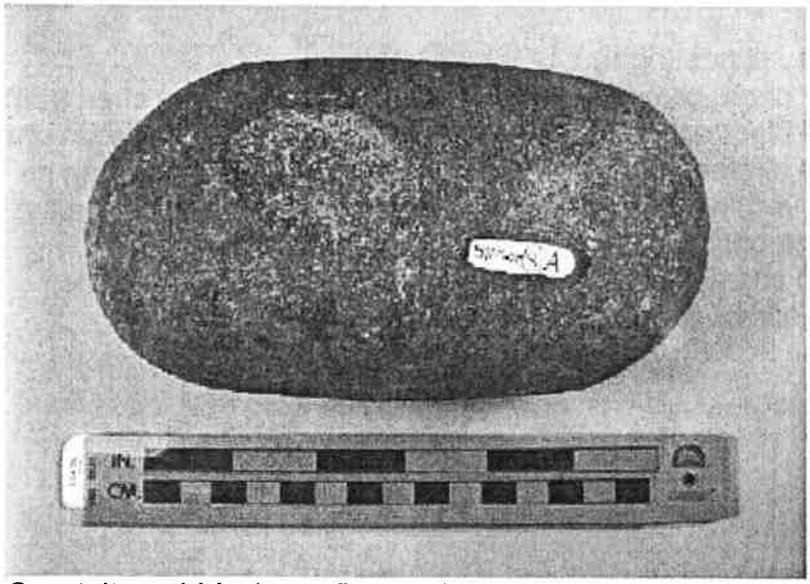
Granite



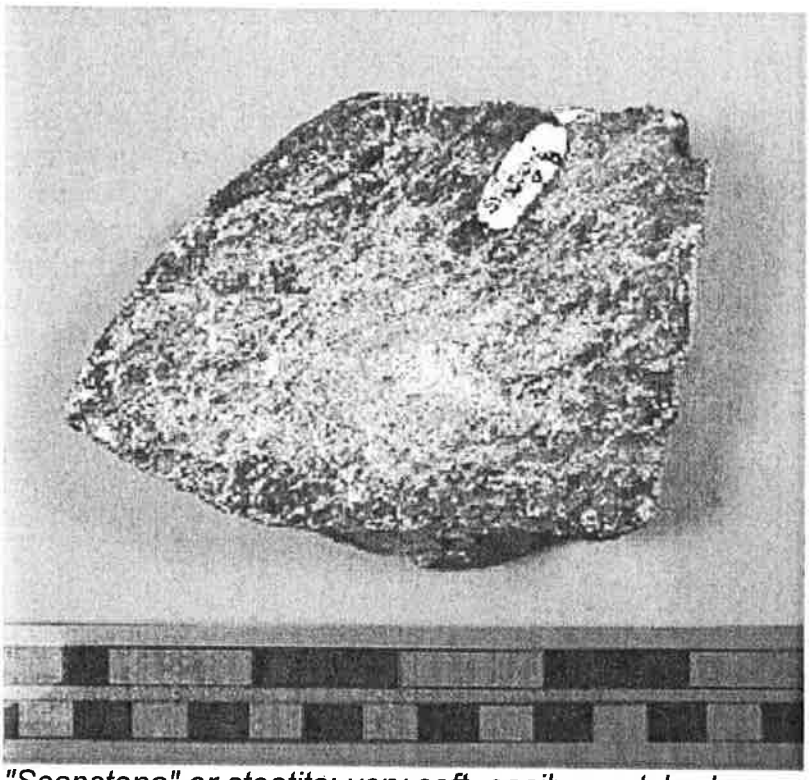
Franciscan (left) and Monterey cherts (right)
A very common type of CCS, chert, comes in a variety of colors. Monterey chert from the central California coast is black and sometimes has lighter bands. Franciscan chert from the North Coast Ranges is green or red. Chert from the Sierran foothills can be many colors – yellow, brown, red, white, green – often with two or more colors on the same artifact. Chert tool stone often was heated first, to improve its flaking qualities. Heat-treatment can change both the color and the texture of CCS stone, sometimes giving it a "waxy" appearance.



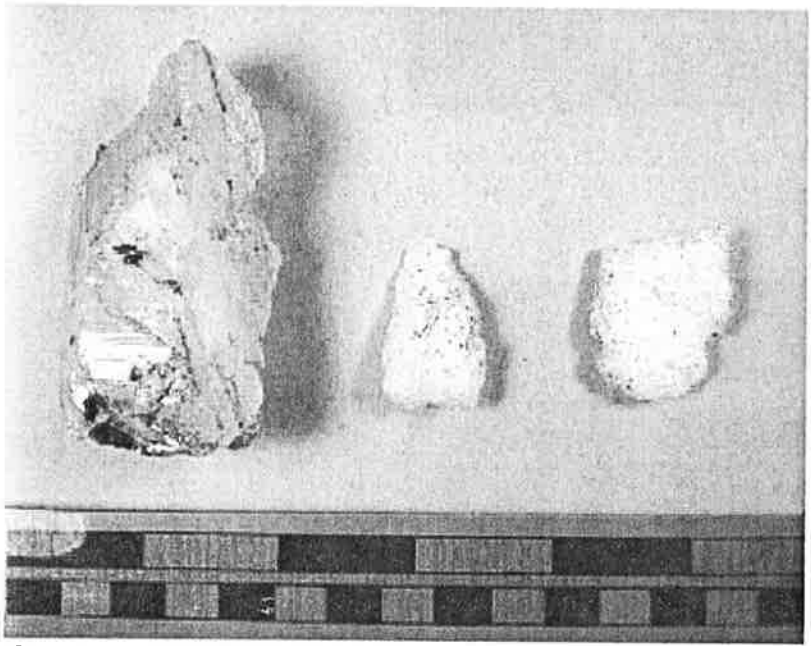
Vesicular volcanic material (vesicles formed by gas bubbles)



Quartzite cobble (note fine-grained texture); extremely hard material suitable for hammerstones and other tools used for heavy battering



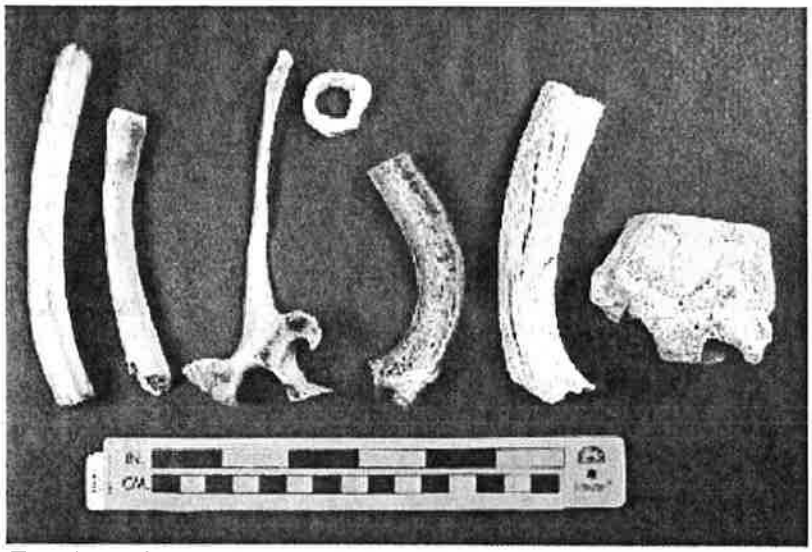
"Soapstone" or steatite; very soft, easily scratched or carved (often made into bowls or vessels)



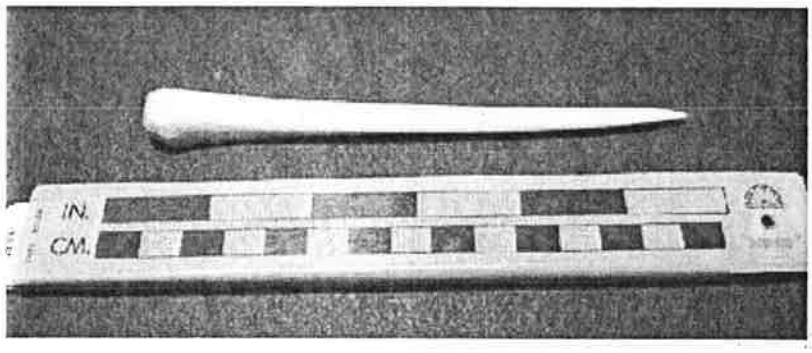
Quartz crystal (left) and milky quartz artifacts (right); extremely hard material, very difficult to make into artifacts

OTHER RAW MATERIALS

Although they are more perishable (and thus are not found as often), some artifacts were made of wood, bone, shell, and other organic materials. Any bone fragments found at an archaeological site should be examined closely to see if they are modified (ground, polished, cut, incised, etc.). Bone at a site also might reflect diet (deer, rabbit, bird, fish), and sometimes it signals the presence of human burials. It is important to differentiate between fresh or "green" bone – say, from a deer that died the previous winter – and older, drier, highly weathered bone. Fresh bone will be much heavier and much smoother to the touch than archaeological bone. Also look for tell-tale signs of modern butchering ("t"-bones, ham bones, and the like).



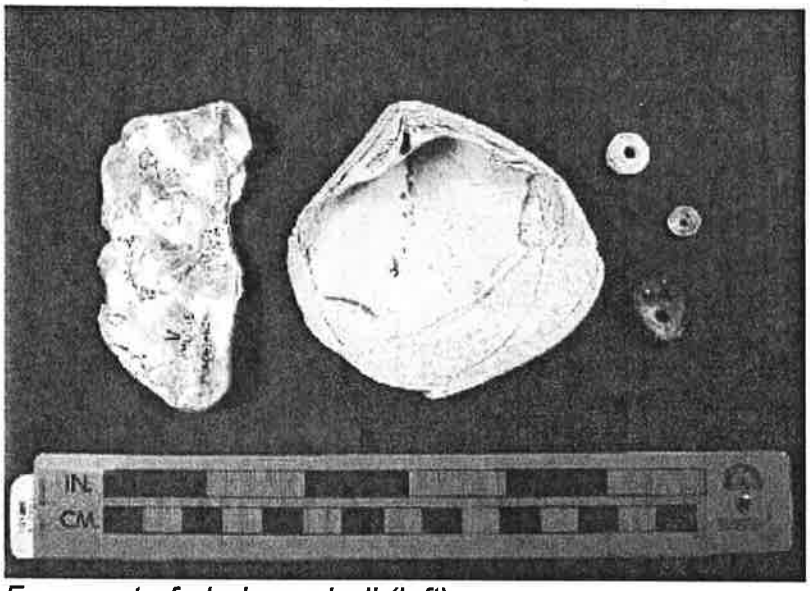
Fresh or "green" bone (left)
Modern butchering (center)
Older, weathered bone (right)



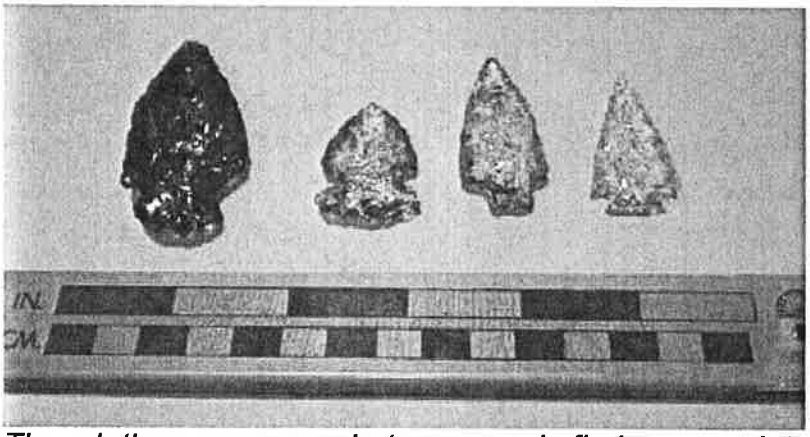
Bone awl

Shell, both marine and freshwater, also were made into artifacts. Beads, pendants, fishhooks, and other items are found at many sites, particularly on the coast, in the

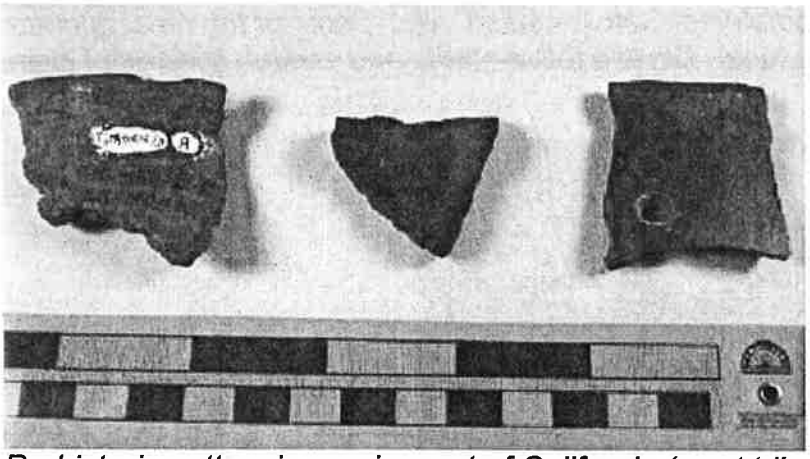
Central Valley, and in the Sacramento–San Joaquin Delta. Some of the most common raw materials are Haliotis (abalone), Olivella (olive-shell), and various species of clams.



Fragment of abalone shell (left)
Clam shell (center)
Beads made of Olivella shell

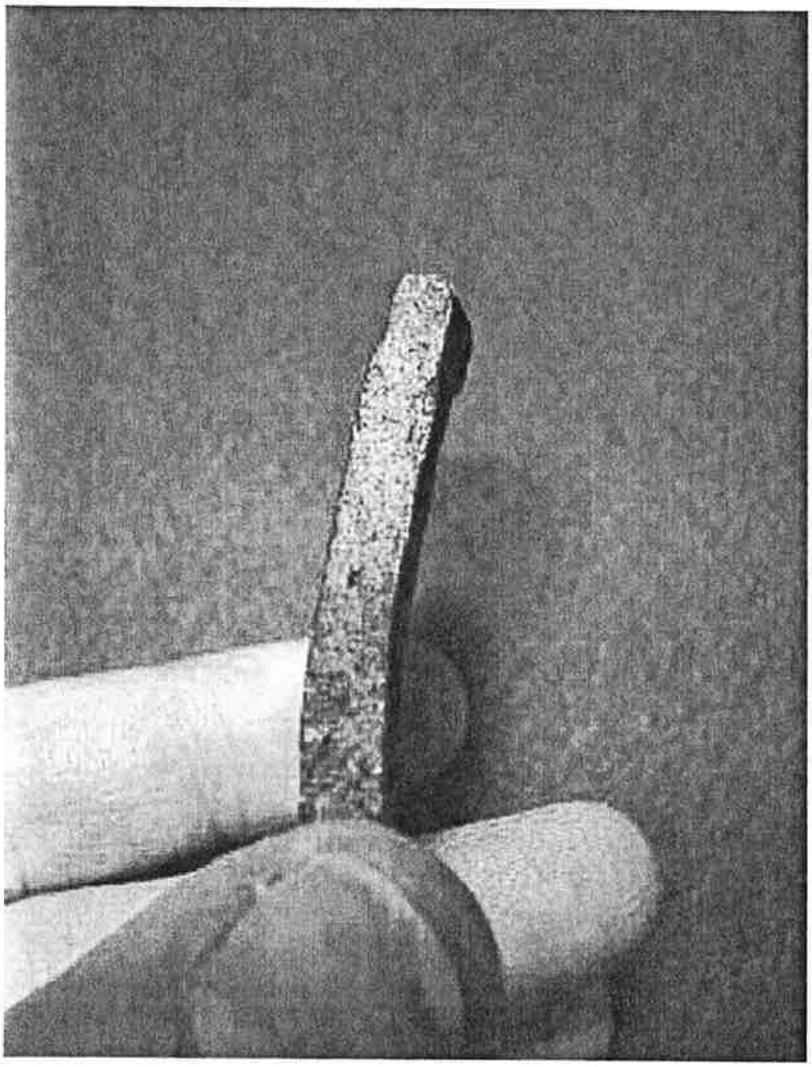


Though they are somewhat rare, we do find arrow points and flake tools of man-made glass, like the specimens you see here. Obviously we can date these to the Historic period, since pre-Contact native people in California did not make glass.



Prehistoric pottery is rare in most of California (most tribes used baskets, instead), but it does occur in the far southern areas of the state, especially in the southeastern deserts and along the coast. Some baked-clay items have also been collected from sites in the Sacramento area. Note the obvious shaping of these pieces, especially the rim fragments (on the far left and far right).

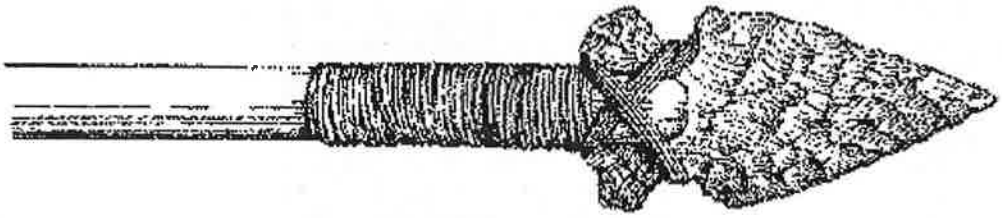
Side view of rim piece.



Side view of rim piece.

Suggestions for Recognizing Sites and Artifacts: Projectile (Dart, Spear, Arrow) Points

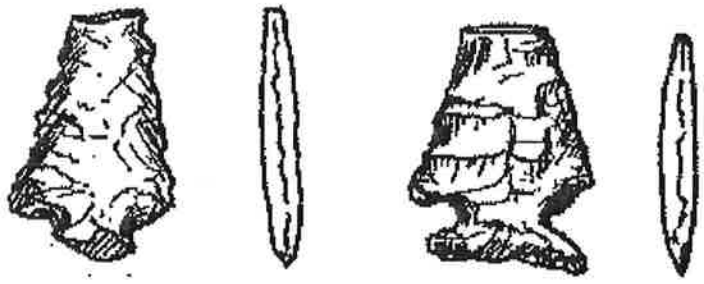
PROJECTILE (DART, SPEAR, ARROW) POINTS



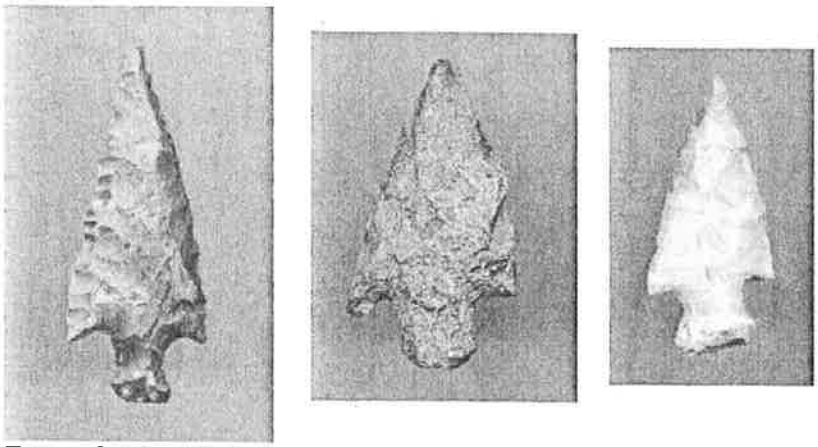
Projectile points are the stone (sometimes bone) tips hafted onto dart, spear, and arrow shafts. The size and style of a projectile point can provide important archaeological information.

Point Sizes fall into two general categories: large (dart/spear points), and small (arrow points). California Indians began using bows and arrows only about 1,500 years ago (slightly earlier in some areas, slightly later in others), and so arrow points are later in time than dart/spear points. Sometimes it's difficult, though, to tell a large arrow point from a small dart point. Also be aware that dart points can be broken and re-sharpened into smaller forms.

Point Styles are based on morphology: side-notched, corner-notched, stemmed, concave-based, leaf-shaped, and so on. Different regions of California can have different names for very similar-looking point types. For example, a small, corner-notched arrow point found near Lake Tahoe would be called a "Rose Spring" point, while a very similar artifact found in Mendocino County would be called a "Rattlesnake" point .



Rattlesnake Points



Rose Spring Points

In many cases it's best to use general morphological descriptions, rather than type-names, to avoid misinterpretation.

Important characteristics for describing projectile points are these:

- Size (sketch or photograph with a scale)
- Shape of base (straight, notched, concave, convex, stemmed)
- Shape of stem, if applicable (contracting, expanding, square, wide)
- Presence and location of any notches (side-notched, corner-notched)
- Raw material (obsidian, chert, basalt, etc.)
- Other (serrated, re-sharpened, leaf-shaped, bi-pointed, etc.)

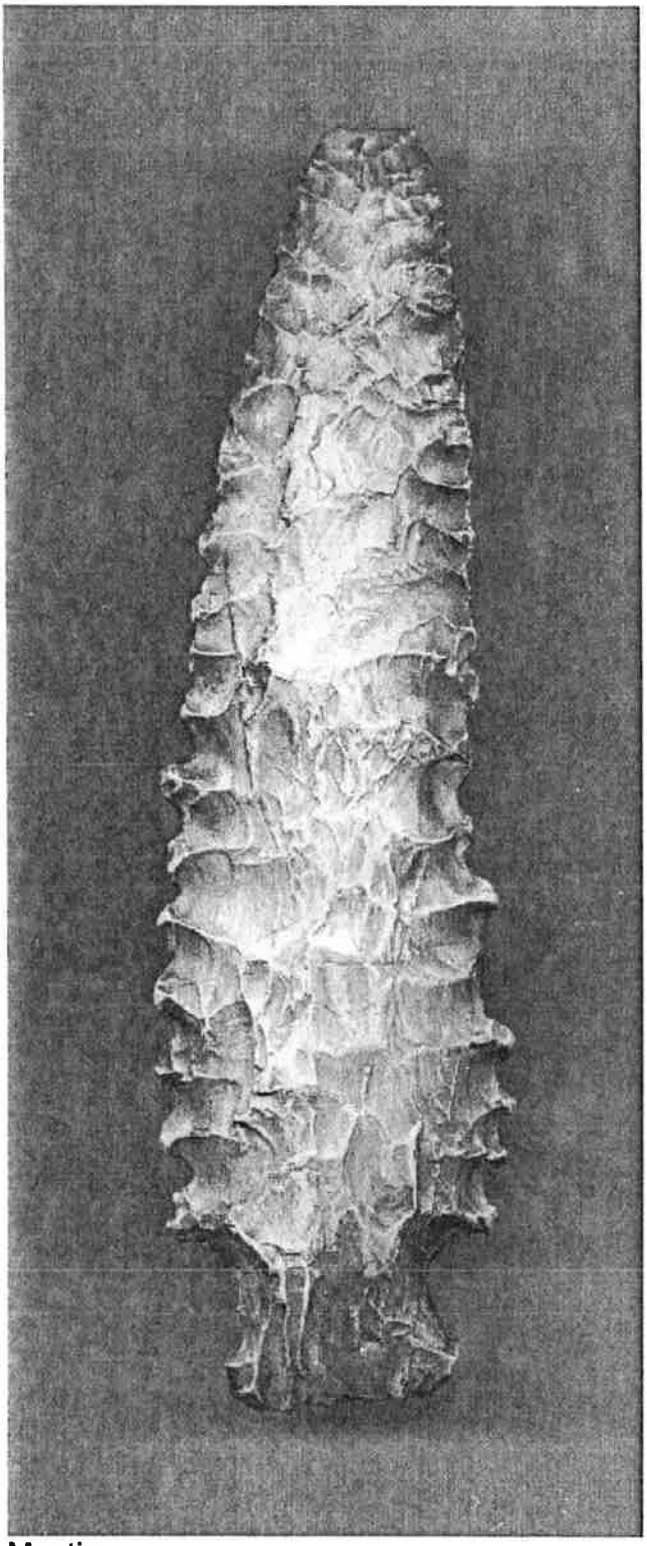
There also is much disagreement about the age ranges of many point styles, in part because they can be different ages in different regions. There is a general consensus that large, heavy dart points are older than arrow points, and that (for instance) Desert Side-notched arrow points generally are younger than Rose Spring arrow points. However, trying to fit a particular type of projectile point into a specific time range can be misleading, at best. That said, here are a few examples of well-known point types in California:

Dart Points: larger, heavier points for hafting to dart/spear shafts

Fluted
Many parts of California and the west, but rare
Earliest-known dart point in the west (10,000 years+)
Tell-tale characteristics: large, "leaf-shaped" blade; deep flutes originating from the base

Large Stemmed (sometimes called Great Basin Stemmed)
Most areas of California and the western Great Basin (especially near ancient lake shores like Tulare Lake and Honey Lake)
Early Holocene (> 7,000 years)
Tell-tale characteristics: Very large and thick; stems usually contract toward bottom; blade edges may be ground

Borax Lake Wide-stemmed
Lake County and surrounding regions
Early/Middle Holocene (> 4,500 years)
Tell-tale characteristics: large and thick; stems generally squared and nearly as wide as the blade



Mostin
Lake County (and beyond?)
Ca. 8500-6500 BP
Tell-tale characteristics: large, with long, broad, triangular blades, sometimes serrated; bases are stemmed or pentagonal (though some variants are leaf-shaped)

Martis Series (Contracting-stemmed, Side-notched, Corner-notched)
North-central Sierran region, especially the Tahoe/Truckee area
Primarily Middle Archaic (ca. 4500-1500 BP), sometimes slightly older
Tell-tale characteristics: usually notched; usually made of basalt; identified by geographic location

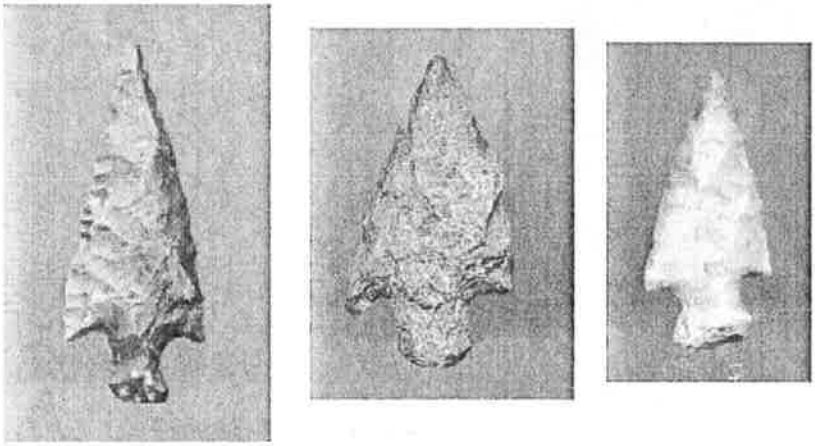
Elko Corner-notched

Elko Eared

Elko Series (Corner-notched, Side-notched, Eared)
Very common throughout eastern California and the western Great Basin
Primarily Middle Archaic (ca. 4500-1500 BP)
Tell-tale characteristics: notched; sometimes deep basal notching forming "ears"
Note that the "Elko" points shown here could also be interpreted as "Gatecliff" points!

Large Corner-notched
Throughout much of California (specimen shown here found in Delta region)
Middle Archaic and earlier
Tell-tale characteristics: large size; notches at corners; base narrower than blade

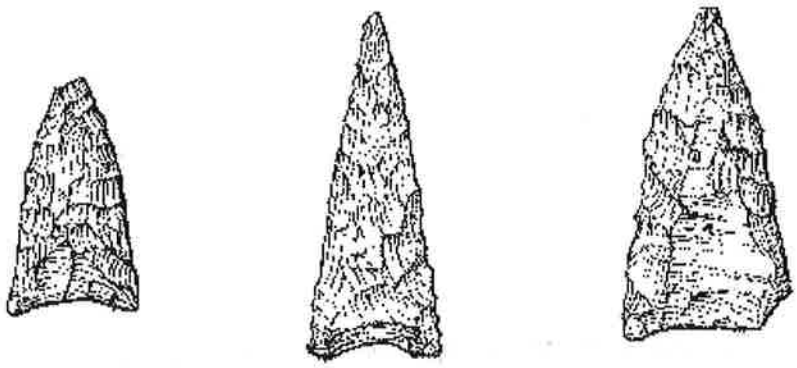
Arrow Points: smaller, thinner, more gracile than dart points



Rose Spring
Most of eastern California and the western Great Basin
Late Archaic (ca. 1500-600 BP)
Tell-tale characteristics: triangular body, expanding stem; corner-notching

Gunther Barbed
Most of northern California (type-site on Gunther Island in Humboldt County)
Late Archaic/Terminal Prehistoric (ca. 1500 BP to Historic Period)
Tell-tale characteristics: long tangs or "barbs" that usually extend past the stem/base; stem very small and usually contracting

Desert Side-notched
Most of eastern California and the western Great Basin
Terminal Prehistoric (ca. 600 BP to Historic Period)
Tell-tale characteristics: long and thin in relation to width; notches placed high on the sides; triangular in overall shape



Cottonwood
Northern and eastern California and the western Great Basin
Terminal Prehistoric (ca. 600 BP to Historic Period)
Tell-tale characteristics: very small and thin; triangular in shape, with no notches or stems

Stockton Serrated
Central California Valley/Delta
Late Period (after AD 900)
Tell-tale characteristics: small point with varying shapes (leaf, triangular, stemmed, notched) with multiple notches on each blade edge to form a serrated edge. Mostly commonly 2-3 serrations on each edge, sometimes many more.

A final note: Dart and arrow point types can be confusing, and not all archaeologists agree on how to define, recognize, or even date a particular type. When in doubt, make a sketch, take a photo, and write a description of the point's size, shape, and raw material.

"Small, side-notched point (ca. 2.5 cm long) made of yellow CCS stone"

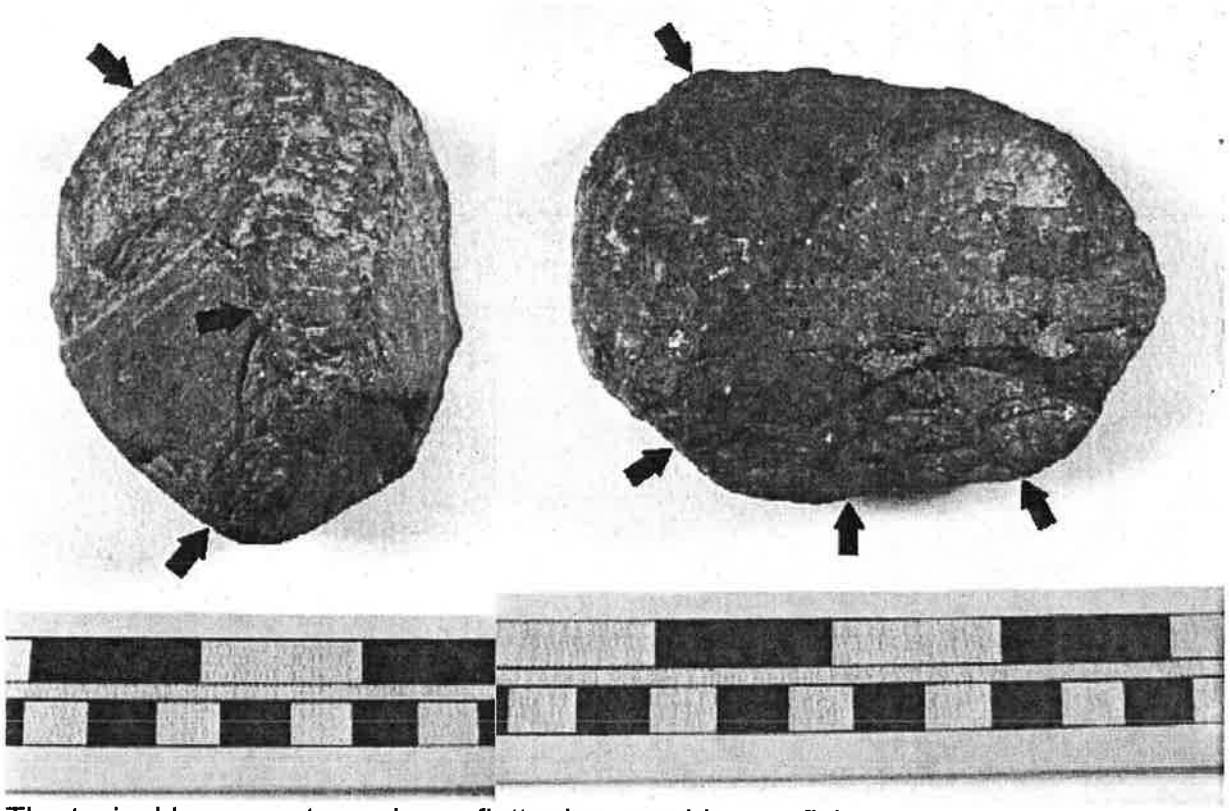
"Large basalt point with square stem, tip missing; ca. 5 cm long"

Suggestions for Recognizing Sites and Artifacts: Hammerstones

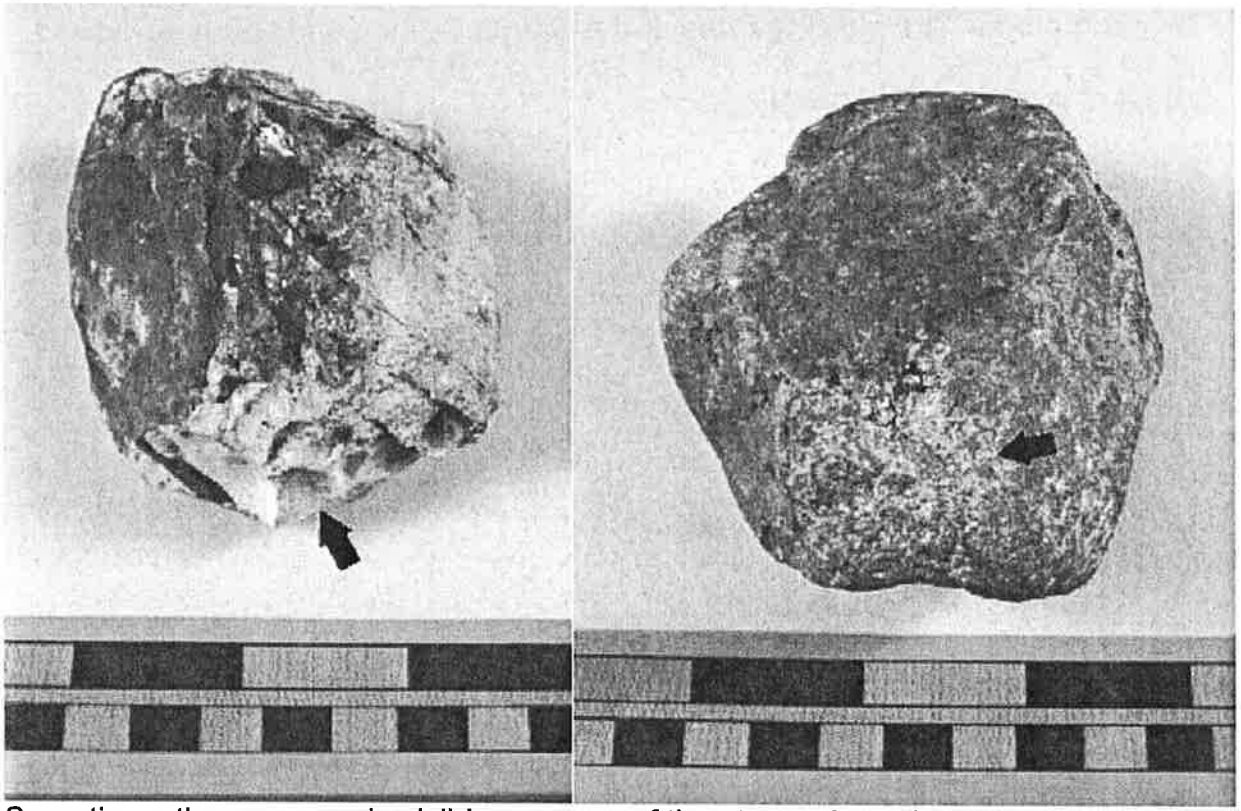
HAMMERSTONES

"Hammerstone" is the archaeologist's term for a hand-held stone that shows battering on one or more surfaces, from coming into contact with another hard object: presumably, the harder the object, the heavier the battering. Smaller, fist-sized hammerstones often were used for flaking obsidian, chert, and other raw materials into tools.

It was important for the hammerstone to be made of relatively hard material, so that it would not break when striking other objects. Quartz, quartzite, and basalt make particularly sturdy hammerstones, but these materials are not available in all areas of California, and so stones like chert and sandstone also were used.



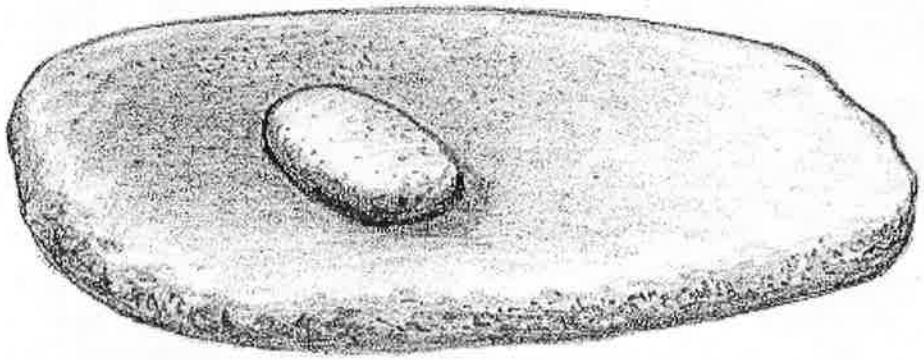
The typical hammerstone shows flattening, crushing, or flake removal along one or more edges. Note how the texture of the battered edge is different from the rest of the piece.



Sometimes the use-wear is visible as areas of the stone where the exterior rind or cortex has been battered away (left). Also note the whitish crushed areas (right).

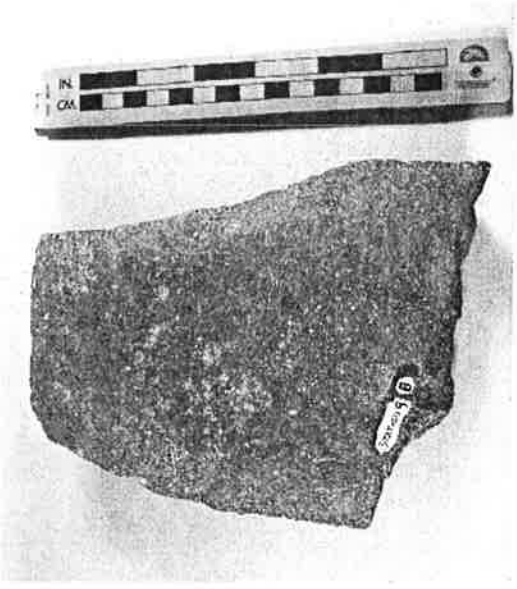
Suggestions for Recognizing Sites and Artifacts: Milling and Grinding Tools

MILLING AND GRINDING TOOLS

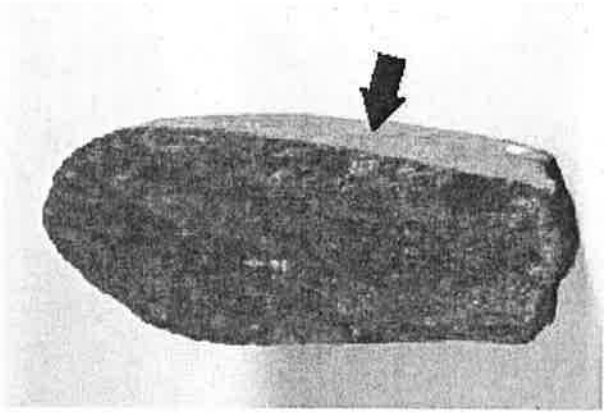


Native people in California traditionally used stone (and sometimes wood) for milling seeds, pulverizing small animals, grinding pigments, and other uses. Wooden tools very rarely survive in the archaeological record, but stone tools remain for thousands of years. The most common milling and grinding tools in California are the mortar and pestle, and the millingstone and handstone (also called by their Spanish names, metate and mano ["hand"]). Sometimes these items are carefully and beautifully shaped, and sometimes they are unshaped, "expedient" tools that are recognizable only by the polish or wear on them. Often they are found in pieces, rather than as whole implements, and so it is important to be able to recognize the fragments.

Millingstones or "Metates"



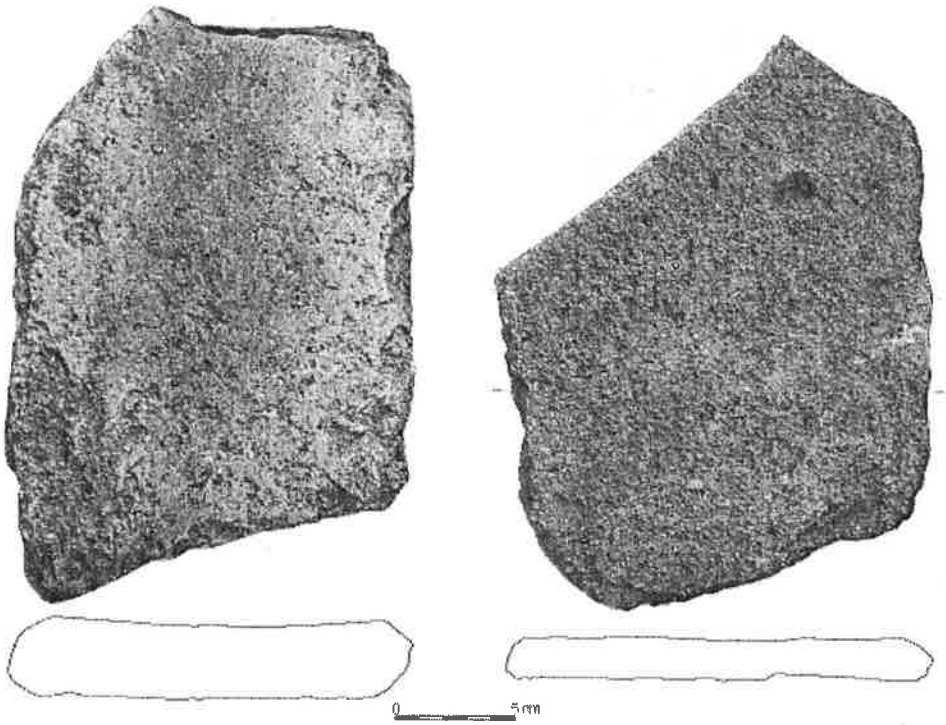
MILLINGSTONE FRAGMENTS



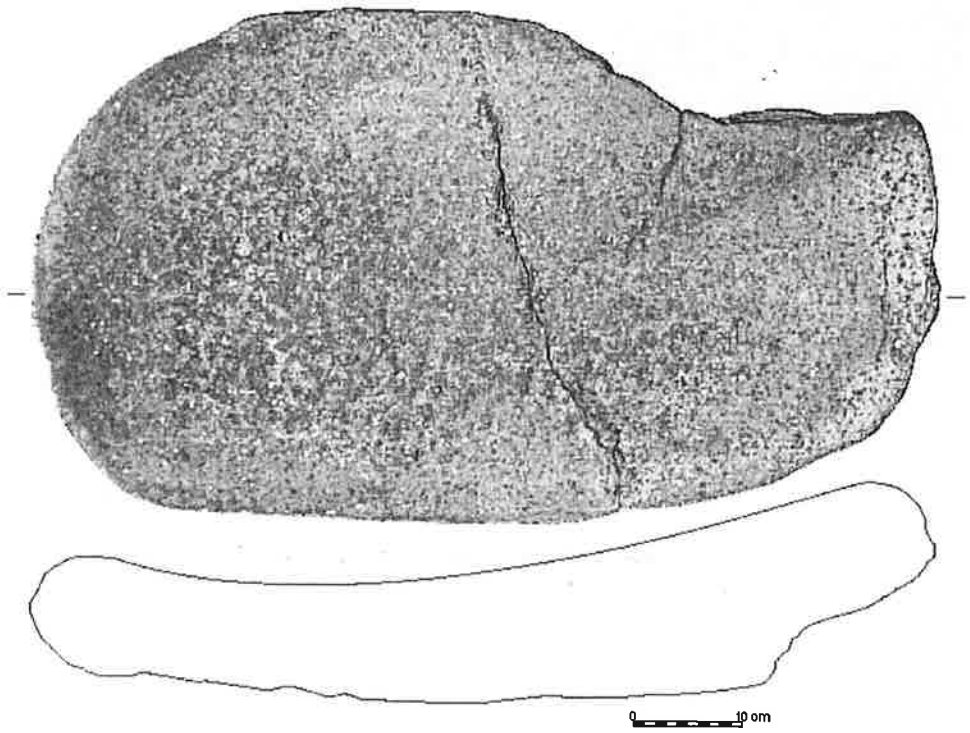
Look carefully at these fragments of broken millingstones. They can be difficult to recognize, but they should show some type of wear, in the form of smooth, polished areas; high spots that have been ground flat; a "dished" or slightly concave surface; or sometimes pecking to make the smoothed surface rough again to allow continuing use. Sometimes a millingstone is also used as an anvil to crack open nuts and other hard items; in these cases, there will be small, circular pitted areas on the flat stone.

The two photos at left are of the same fragment and as you can see it is sometimes easier to see the smoothly ground surface in the end view.

Below are three photos of nearly complete millingstones.

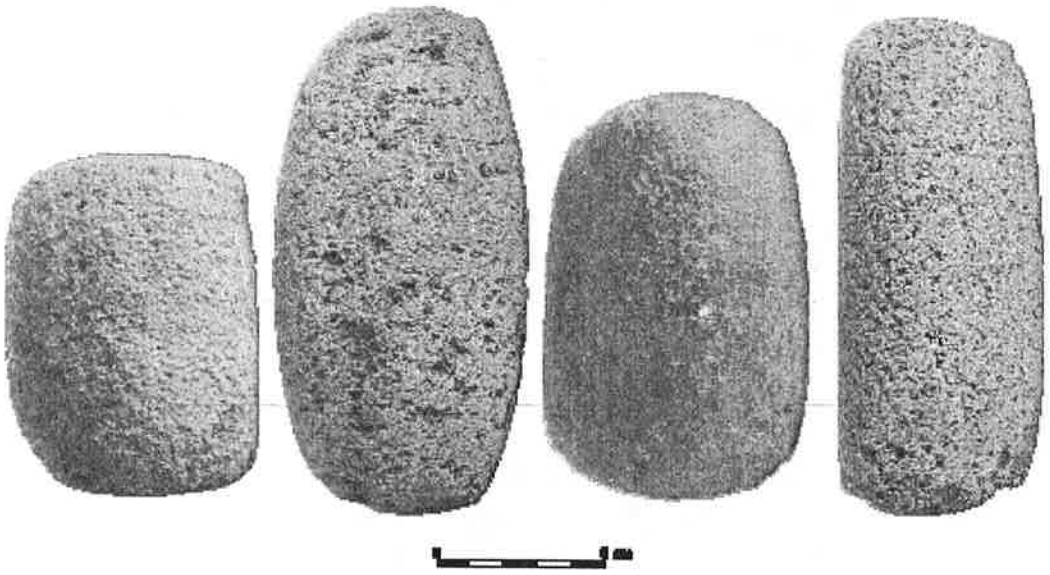


Nearly complete millingstones



Handstones or "Manos"

Handstones are the smaller, hand-held stones used to grind the seeds or other materials against the millingstone. They show similar kinds of wear, and sometimes have been used as pestles or hammerstones as well as handstones – in these cases, there are battered areas as well as smoothed areas on the tool.



Mortars

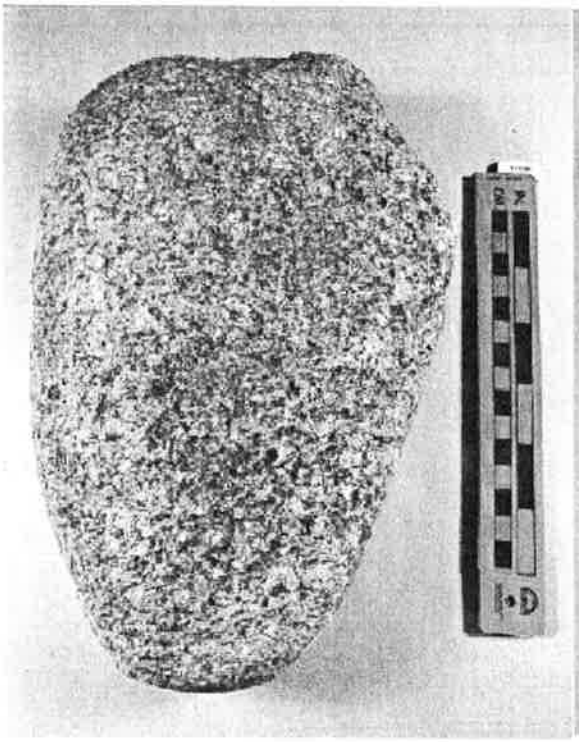
Mortars are deep, cup-shaped holes used for pounding and pulverizing various materials. Often they are associated with acorn processing, but they were used for other things, as well. Mortars occur as bowls shaped from stone or wood; or as cups formed in rocks, boulders, or bedrock outcroppings. Sometimes natural holes in stone can be mistaken for mortars, but the natural ones are rarely as smooth and rounded as those made by humans.

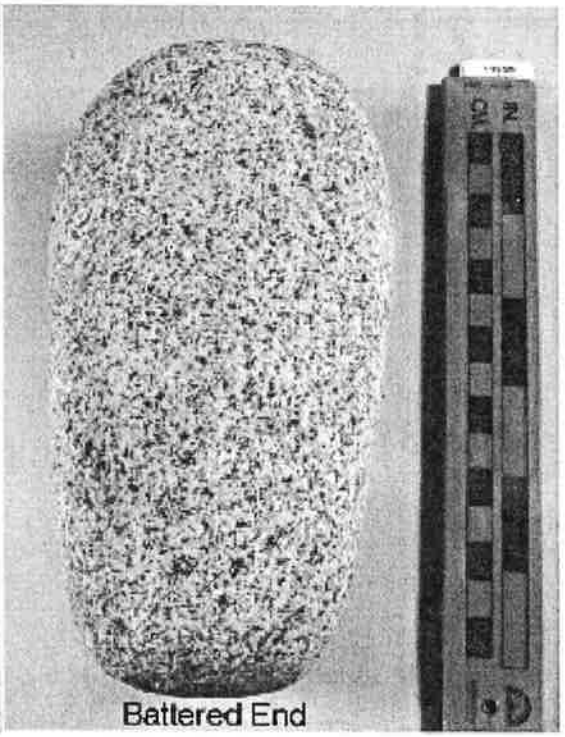
Mortar
(Photo courtesy of Dan Foster)

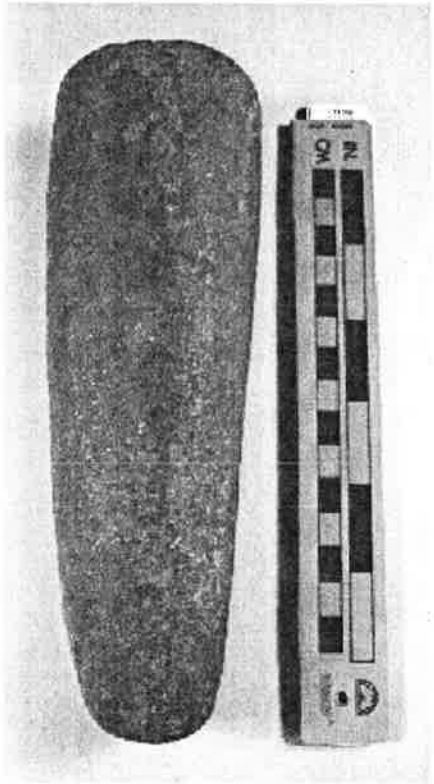
Bowl mortar

Pestles

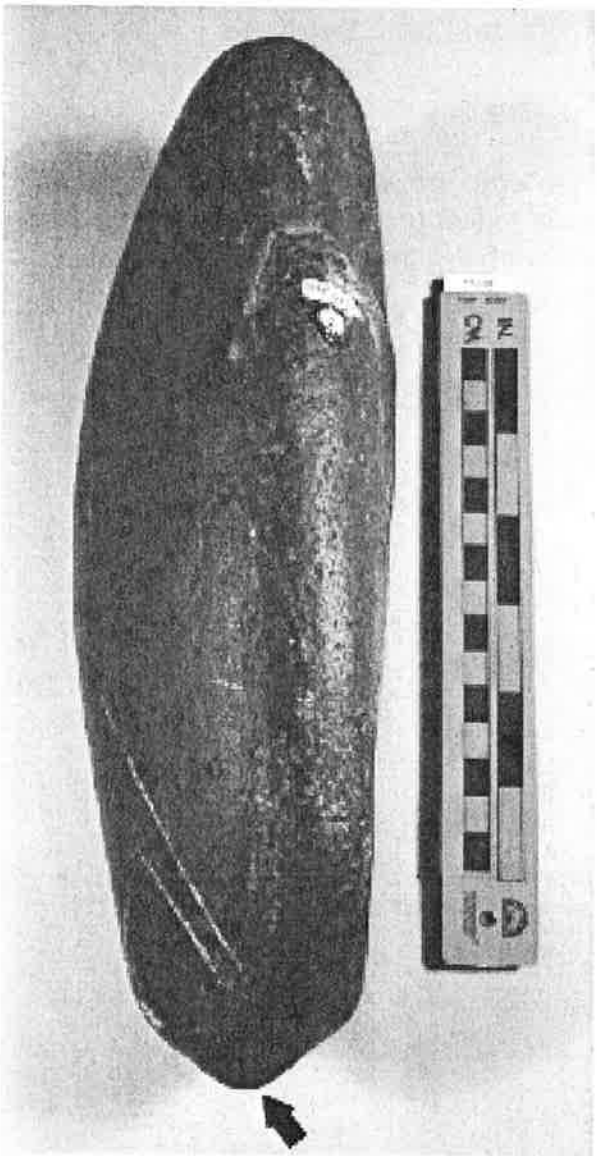
Pestles are generally elongated to fit into the mortar holes and one or sometimes both ends are battered. The "business" end of a well-used pestle can be battered almost flat by contact with the stone mortar.







Other pestles are carefully shaped, like the basalt specimens you see here.

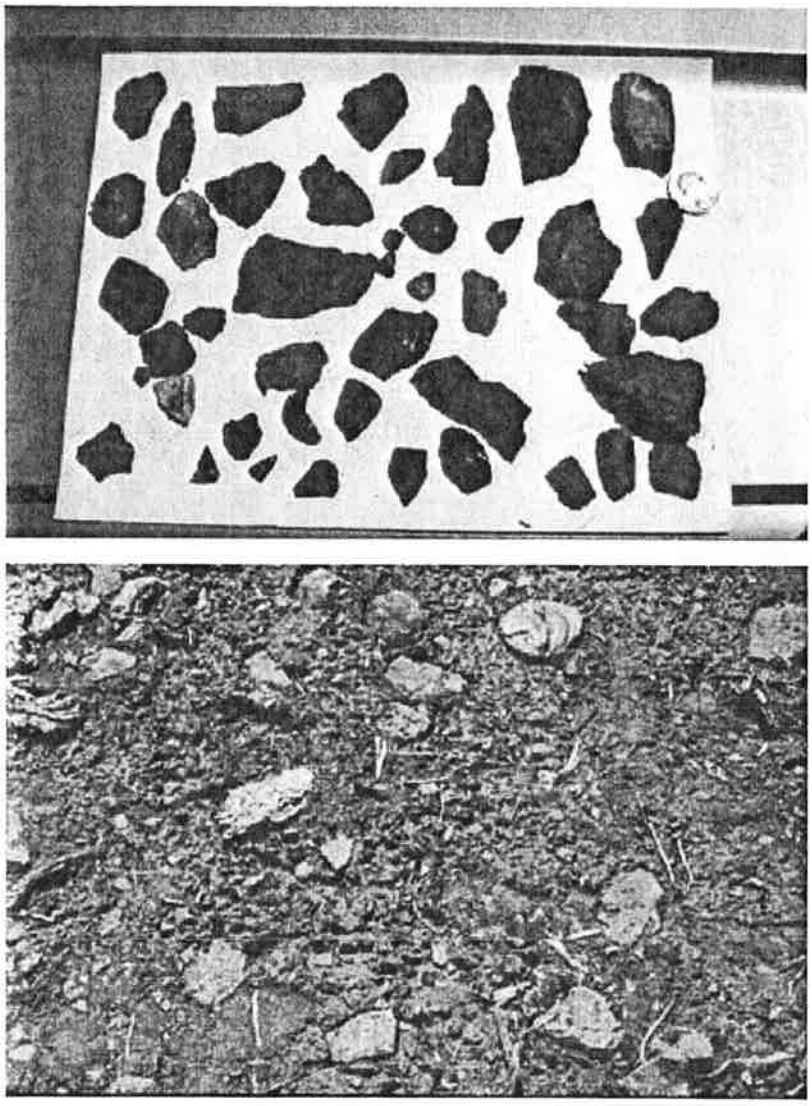


This unusual pestle, made from very fine-grained basalt, has a nipple-shaped end rather than a flat end. This means that the material of the mortar was softer than the basalt of the pestle, and so did not cause the heavy battering seen in other pestles. This item was most likely used in a wooden mortar, rather than a stone one.

Suggestions for Recognizing Sites and Artifacts: Lithic Debitage

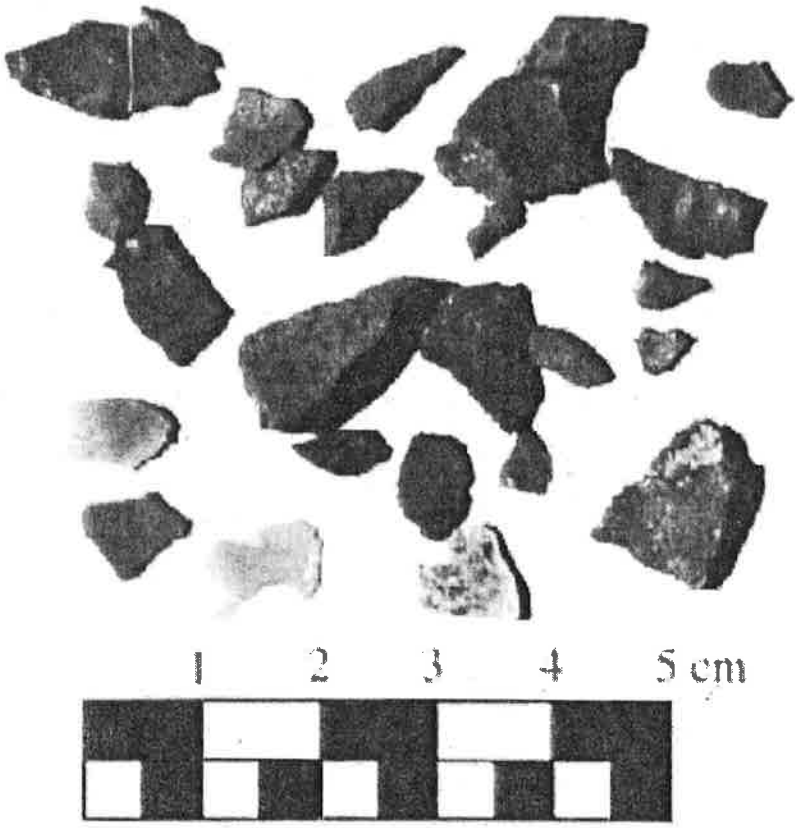
LITHIC DEBITAGE

Debitage is a term used by archaeologists to refer to the waste materials produced during the manufacture of stone tools. Whereas at first one might assume such waste products are inconsequential, these are in fact some of the most useful artifacts archaeologists use to understand past human behavior.



Waste flakes are described, classified, and studied like other categories of archaeological data. They are especially useful for understanding the character of lithic technology, since these reflect the nature of the specific technology involved in their production. For example, lithic debitage derived from the manufacture of arrow points is distinctive from that associated with dart or spear point manufacture. Since waste materials are usually left right where tools were made, they can sometimes be more meaningful than finished projectile points for understanding a particular site's function.

Like other stone artifacts, these also may often be sourced, providing clues about trade systems and exchange patterns in prehistory. Lithic debitage in archaeological sites can be used to evaluate intensity of use, integrity of the archaeological deposits, and other important questions.



Lithic scatters are archaeological sites that consist solely of flaked stone artifacts, principally lithic debitage. Sites of this type are often analyzed statistically using measurements of raw material percentages, density of artifacts, and technological forms.