

STORIES IN STONE

LITHIC ARTIFACTS MANUAL

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Hill Country Archeological Association

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INTRODUCTION

Stone artifacts, known as lithics, are some of the most interesting and archeologically important artifacts you can find in the field while searching for prehistoric archeology sites.

"Love is fleeting, but stones are forever!"

The reason archeologists make such a big deal out of stone artifacts is because they last the longest and they tell a lot about the prehistoric people that made them. Stone tools have been discovered in Africa that are more than 2 million years old—the oldest known tools. Actually the anthropologists think they were made by one of our direct ancestors, *Homo erectus*, not by us *Homo sapiens* (Homo = man in Latin, sapiens = wise or knowing in Latin; so it means "wise man").

In this training section you will learn where Texas Indians obtained stone to make stone tools, how they were made, what they were use for, how old they are, and what they tell us about how and when Indians lived in the Hill Country.

WHY STUDY STONE ARTIFACTS?

Finding man-made stone flakes and chipped stone tools when surveying for archeology sites is a great way to identify a site. It is the most common way professional archeologists identify prehistoric sites throughout the world. Bone, ceramic/pottery, and metal last a long time too but nothing like the thousands or millions of years that stone tool can remain little changed.

Stone artifacts possess secrets about the people who made them and it is up to the archeologist to unravel these mysteries. Secrets like: What kind of stone is this? What region of United States did it come from? When was it made into a tool? How was it used? Did it travel far to reach the current site?

WHERE DID INDIANS OBTAIN STONE FOR TOOLS?

Texas is special in that it has a number of sources of stone that can be chipped into tools (a process called Knapping). These stone types all share the characteristic of having a microcrystalline structure containing a high percentage of silicon dioxide, called "quartz" or "silica". They are generally classed as "chert" but due to differences in chemical composition, color, and crystal structure at various locations across the state, they have a variety of names: Edwards chert, chalcedony, agate, jasper, hornstone, novaculite, and Alibates flint. "Flint" is another commonly used name for chert, but geologists say flint applies to chert in Europe where it formed in chalk and marly limestone. European flint can have a higher concentration of silicon dioxide and be finer grained than American chert.

One of the best sources of chert for making tools in the United States is the chert here in the Edwards Plateau. Known as Edwards, Georgetown, Pedernales, and other names depending on color and location of the deposits. These deposits vary greatly in quality and ease for knapping into tools. Indians improved the quality (=knap ability) of some cherts by heat treating them beneath the coals of the camp fire for 24 to 48 hours. Resulting in a reddish or pinkish color and a greasy or slick feeling to the stone.

Petrified wood contains silica and was also used by Indians to make tools. However the finest stone to knap into tools and projectile points is obsidian, which is volcanic glass and has extremely sharp edges. Sadly no deposits occur in Texas, although it did enter Texas thru trade and has been found rarely in prehistoric sites in the Hill Country.

Chert is common in the Kerrville area in the rivers and on the hills as eroded cobbles. It is a light to dark brown to root beer color. Deposits in limestone are commonly found between about 1,900 and 2,000 feet in elevation as eroded or eroding cobbles, nodules, or layers of tabular stone. The chert was deposited about 125 million years ago in the limestone ocean floor that covered much of Texas. The silica that formed the chert came from the

decaying bodies of animals like sponges and radiolarians which have silica in their skeletons.

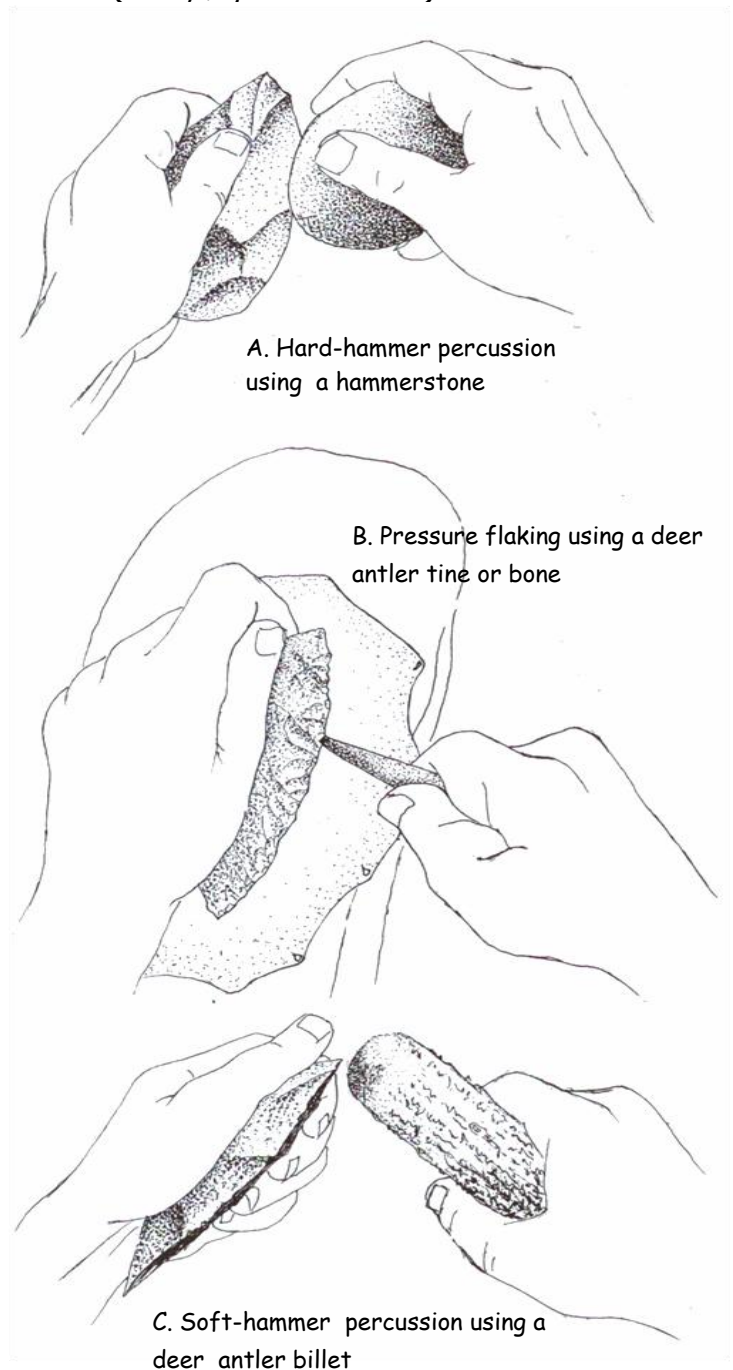
Chert cobbles can be found in gravel bars and river beds across much of Texas as a result of water erosion and rivers moving the cobbles downstream. Indians quarried and utilized these and hillside sources for making stone tools, especially areas like Kerrville, Junction, and Georgetown that had high quality chert.

HOW WERE STONE TOOLS MADE?

Stone tools and other stone objects were made by 4 methods: chipping (i.e. knapping), grinding, pecking, and polishing, depending on the type of stone. The following discussion applies only to the method of chipping stone, containing silica, into tools. Other stone types like basalt, sandstone, soapstone and serpentine required grinding, pecking and polishing methods to form them into tools.

Three techniques are commonly used to knap stone tools from chert, obsidian, and similar silica containing stones (see Fig. 1). They are used together to knap chert from a cobble to a finished tool. The order is first Hard-hammer percussion, then Soft-hammer

Figure 1. Types of stone knapping. From Turner et al. (2011, figs. 2-1 to 2-3)

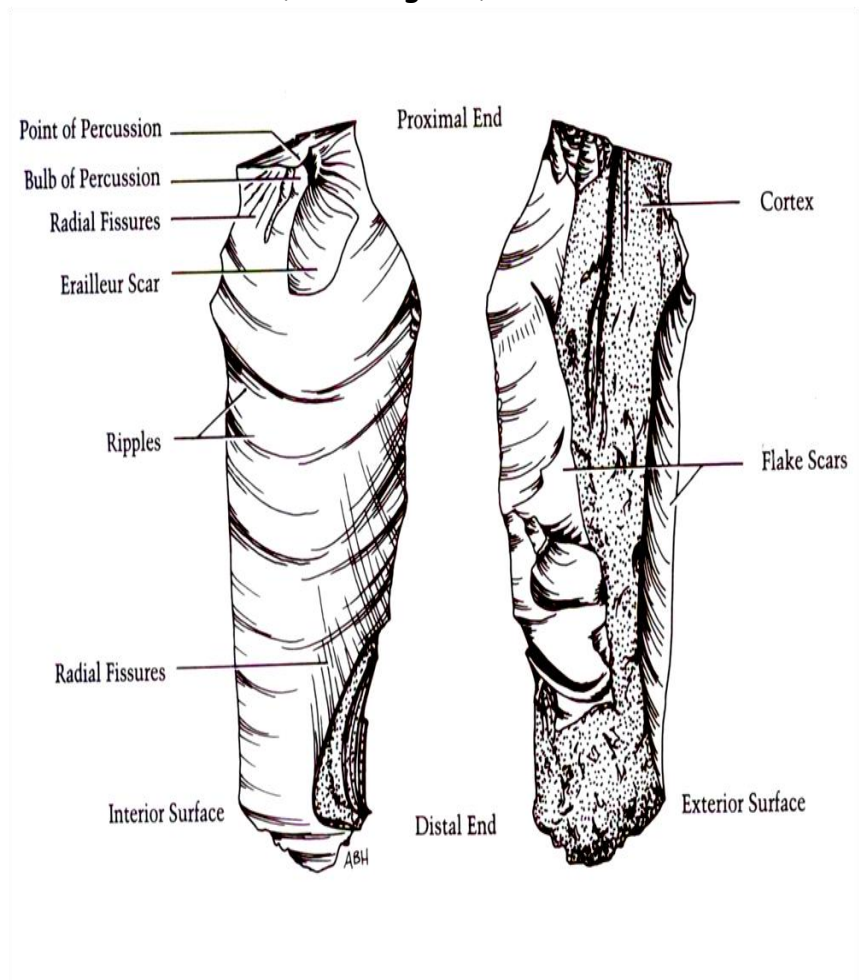


percussion (including Punch flaking), and finally Pressure flaking.

When knapping chert or obsidian the surface is struck a sharp blow—sending shock waves through the stone (called a core) in a cone-shaped pattern, producing a conchoidal fracture that detaches a fragment called a flake (Fig. 2). The process of removing flakes from a core or another flake is a process that reduces the core and forms it into the desired tool, or it produces a flake that is formed into a tool by removing more flakes from it—this is a reduction process.

Flakes removed in this manner with percussion flaking can be identified as made by man, or what archeologist call, "culturally produced". See Figure 2 for the typical characteristics of a hard hammer percussion flake. Also the same flake characteristics are produced on the core but are the negative form of the flake. Soft-hammer, punch, and pressure flaking produce a slightly different flake with lip on the end that was struck. These flakes are also smaller and thinner than Hard-hammer flakes.

Figure 2. Typical hard hammer flake characteristics.
From Whittaker (1994, fig 2.3)

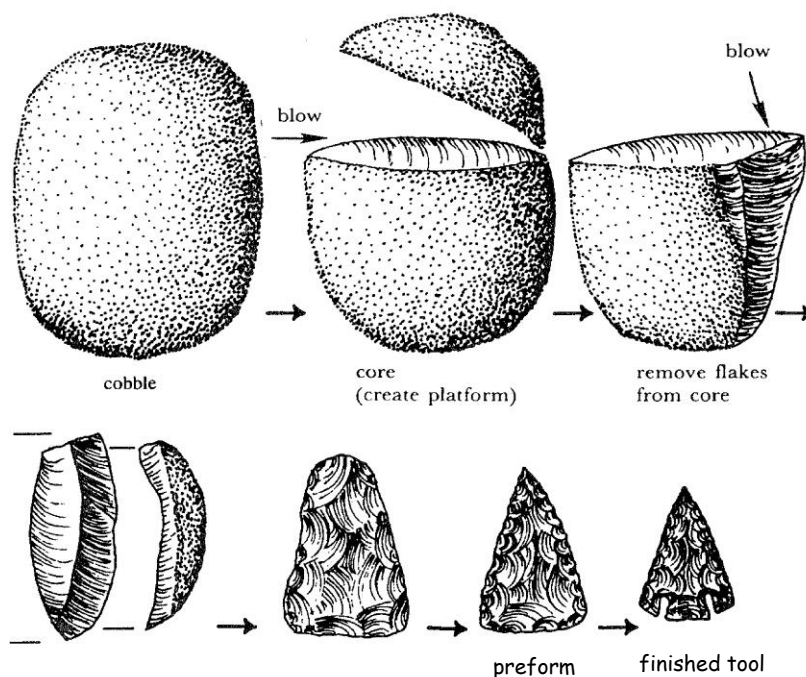


During the knapping process waste flakes are produced called debitage. These waste flakes were sometimes used by Indians for knives or scrapers with little or no additional chipping. There are three types of debitage flakes, primary

with lots of cortex (i.e. a limestone like rind that commonly coats chert cobbles), secondary flakes with little cortex, and interior flakes with no cortex (also called tertiary flakes).

A flake found when searching for a site can be either from natural weathering, like ice fractures that form breaks, or heat fractures that form "pot lids", or water erosion such as being rolled down a stream, or man made from road grader or bulldozer blade chips, or a rock crusher. These are sometimes difficult to tell from chips knapped by prehistoric Indians. The best way to tell if it is made by Indian knapping is to look for; a. the characteristic point of percussion also called the striking platform (i.e. the site of impact), b. the "D" shaped erailleux scar, c. the bulb of percussion, and d. ripples (Fig. 2). But they are not always easy to see or even present, especially in thinning flakes made by soft hammer (including punch produced flakes), or pressure flaking. Do not feel foolish or frustrated if you cannot easily identify some flakes as to whether they were made by prehistoric Indians or some other way. Even the professionals argue about this.

Figure 3. Steps in making a stone tool from a chert cobble. From Turner et al. (2011, fig. 2-7).



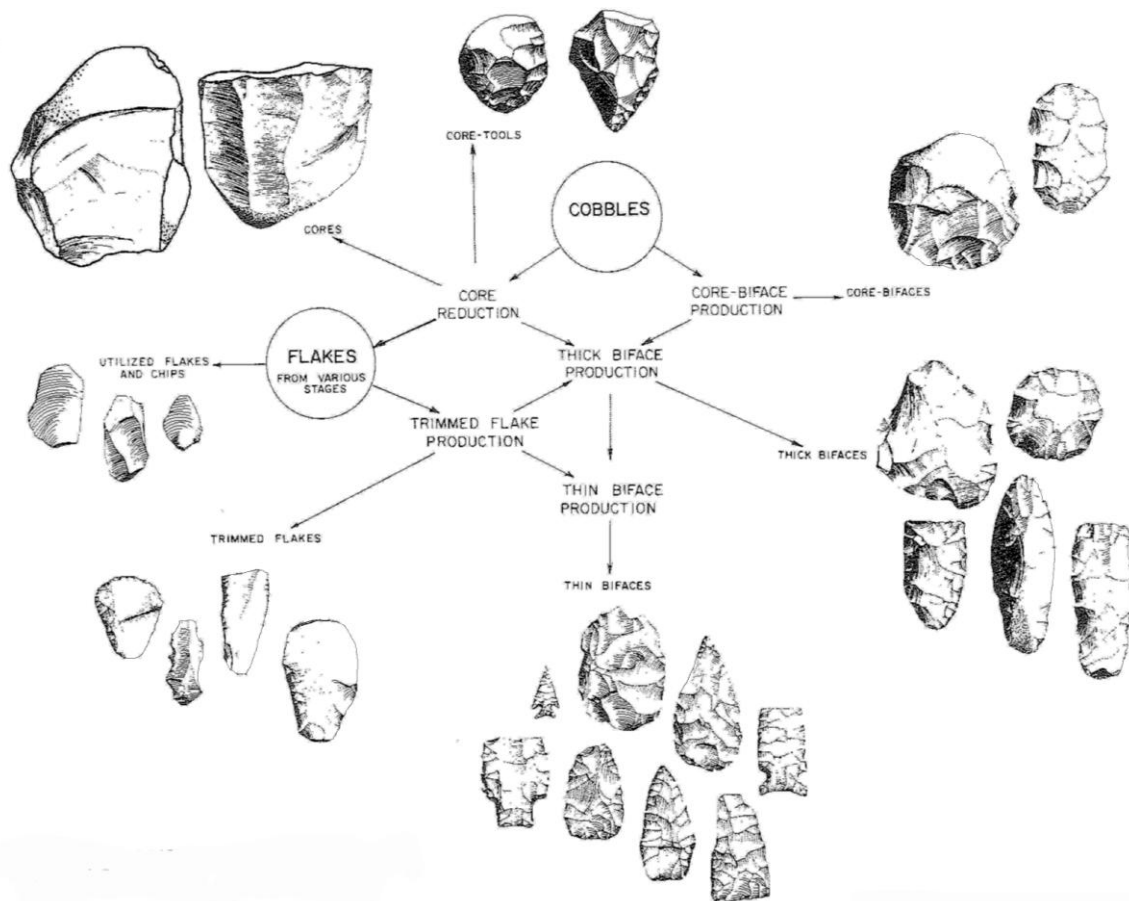
The process of making tools from a chert cobble is shown in Figure 3. It is not an easy process, in fact many artifacts found at prehistoric sites are knapping failures due to poor quality flint or mistakes in knapping.

WHAT DO WE CALL THE STONE TOOLS WE FIND?

Chipped stone artifacts have several names, general ones and more specific ones. For example the same artifact can be a thin biface, a projectile point, and a Frio dart point! Naming chipped stone artifacts is easy if we use the most basic descriptions; such as core, core tool, projectile point, thick or thin biface, thick or thin uniface, and edge modified flake (also called "utilized flakes" or "trimmed flakes"). Figure 4 shows most of these general categories.

Figure 4. Products and by-products of lithic tool production.

From Hester (1980, fig. 5.2).



Whether the edge of the artifact is bifacial or unifacial, is important. Most scrapers are unifacial, whereas knives and projectile points are bifacial (Fig. 5). Uniface means the artifact is chipped on only one side of the cutting edge, and biface means it is chipped on both sides. Thick bifaces and unifaces are thicker than a pencil, and thin ones are as thin or thinner than a pencil.

Figure 5. Example of a knapped chert uniface tool on the left, and a biface on the right. Arrows indicate the side that was knapped. The artifact on the left is a thick uniface scraper. On the right is a thin biface blade.



WHAT CAN STONE TOOLS TELL US ABOUT THE ANCIENT INDIANS THAT USED THEM?

One of the most useful things that an artifact can tell us is when the artifact was made, and about how old the site is. Archeologists call these "diagnostic artifacts", because they can tell us this secret (Table 1). They are not as accurate as your birthday but within maybe 500 or 1000 years of when the

artifact was made; and when the people that made it lived and traveled through the location where the artifact was found. They were hunter-gatherers and ever on the move. Likely staying only a few weeks to a few months at any one site. Although they frequently returned over and over to the good campsites with food and water. So if an expert carefully interrogates the artifact, it can sometimes tell us:

- When the tool was made.
- When the site was used or people traveled through the area.
- What materials the stone tool was used to work on, such as; wood, bone, plant, or animal.
- How the tool was used, such as; to cut, saw, chisel, plane, drill, or engrave.
- Where the stone originated.
- If the stone was heat treated.
- If it had a handle (i.e. haft).
- Whether it was broken during use or in manufacture.
- If the stone or tool was acquired by trading.
- Styles of tools can tell us about Indian regional preferences and tribal relationship through time.
- An assemblage of tools from a site can tell us; what kinds of activities went on at the site, when they took place, and how the site was used through time.

Archeologists have named the different time periods of Indian prehistory based on what they think are culturally distinct Stages and Phases. These cultural Phases are different in different regions of the state. The cultural Stages and Phases for the Hill Country are listed in Table 1. For our work we will only use Stages: e.g., Paleo-Indian, Early Archaic, Middle Archaic, Late Archaic, Neo-Archaic, and Historic. The Historic starts about 1600 AD, when Columbus discovered America, up to 50 years ago. Any artifact or feature younger than 50 years is Modern trash.

Table 1. Key Diagnostic Artifacts and Features Indicating Age of a Site or Layer in a Site. From Prewitt (1981)

Stage	Phase	Time Diagnostic Artifacts & Features
Historic AD 1600	(None)	(Items of European Manufacture)
Neo-Archaic AD 600	Toyah AD 1300	Covington Biface, Perdiz, Cliffon, End Scrapers, 4-Bevel Biface, Leon Plain Ceramics, Cemeteries
	Austin	Scallorn, Granbury, Friday Biface, Cemeteries
Archaic (Late Subperiod II) 680 BC (Late Subperiod I) 2400 BC Middle 3600 BC Early 7000 BC	Driftwood	Mahomet, Hare Biface
	Twin Sisters	San Gabriel Biface, Ensor, Eroth Biface
	Uvalde	Marcos, Montell, Castroville, Frio, Fairland
	San Marcos	Marshall, Williams, Lange, Burnt Rock Middens
	Round Rock	Pedernales, Burnt Rock Middens
	Marshall Ford	Bulverde, Burnt Rock Middens
	Clear Fork	Nolan, Travis, Burnt Rock Middens
	Oakalla	Baird, Taylor, Burnt Rock Middens
	Jarrell	Bell, Andice, Martindale, Uvalde
	San Geronimo	Gower, Hoxie, Wells
	Circleville	Angostura, Galondrina, Meserve, Scottsbluff
		Clovis, Folsom, Plainview
Paleo-Indian 9500 BC		

HOW DO WE KNOW WHAT A TOOL WAS USED FOR?

In some cases Archeologists can tell what a stone tool was used for by examining the unique use wear patterns, and plant or animal residues on the tool. The use scars occur on the stone tool as it is used in cutting, sawing, chopping, planing, or scraping on materials like animal hide, antler, bone, meat, plants, stone, and wood. The scars are: polish (i.e. shiny areas), striations (i.e. fine scratches), and different chip patterns found on the cutting edge (i.e. tiny, 1-10 mm chip scars called, step, scalar, and half-moon scars). You can see polish scars with your eye, but you will need a 40 power or higher magnification to clearly see the striations and tiny chip scars from use.

In most cases it takes an expert with lots of experience and a good laboratory to identify exactly what a tool was used for. But we can at least look for the presence of these scars. If any of them are present it was possibly used as a tool. On large tools like choppers, hammer-stones, and core-tools it is easier to see the use scars. If used they will show an obvious crushed area in the stone where they were used to hammer on another hard surface, like cracking bone to obtain the fatty marrow.

However, a problem we have with tools we find during surface surveys is that they are commonly chipped by natural forces like animals stepping on them, which can look similar to chipping from use. So in most cases we will not try to determine if a surface find was used as a tool because we will likely be wrong.

WHAT TYPES OF TOOLS WERE MADE IN THE HILL COUNTRY AND HOW WERE THEY USED?

Stone was used to make or prepare almost all items used in everyday life, such as, tools, clothing, shelter, food, paint, medicine, and trapping and hunting equipment. The best source of information for all the tool types and their uses is the book "*Stone Artifacts of Texas Indians*" by Turner et al. (2011). Following is a summary of the common types of artifacts and their likely uses as tools. These artifacts have been found in Kerr County and the surrounding Hill Country. Keep in mind we know little about how many of these

tools were used. See Figures 4 to 7, and *Stone Artifacts of Texas Indians* for examples of the following tools and ornaments.

CHIPPED CHERT TOOLS.

1. Core Tools—cores with wear from use as a tool. Commonly used to break bone for marrow, crush or chop plant or animal matter, or used as a hammer stone, or to dig, or to chop wood.
2. Unifaces—thick or thin unifaces that were modified by further flake removal from only one face. Cortex maybe present or absent. When used they will show edge wear like scalar scars, step scars, or half-moon scars, polish, striations, and/or rounded corners. They were used to: scrape plant leaves to make twine or rope from plant fibers; scrape, plane or engrave wood and bone, and scrape hides to remove hair and tissue. Types: gravers, scrapers, gouges, burins, blades, Clear Fork Uniface, and others.
3. Bifaces—thin or thick bifaces. No cortex present except in some thick bifaces like Kerrville biface. May show edge wear (like scalar scars, step scars, or half moon scars, polish, striations, and/or rounded corners) and/reworking or modification. They were used in a variety of activities from hunting to butchering animals, to cutting hides, to working wood, to cutting plant material. Types: dart points, arrow points, knives, drills/perforators, scrapers, choppers/axe/adze, Bristol Biface, Clear Fork Biface, Corner-Tang Knife, Gahagan Biface, Guadalupe Biface, and others.
4. Utilized Flakes—flakes that were used and show edge wear. These utilized flakes may have been modified by further flaking of the edge. Used for any cutting and scraping activity where they were expedient and convenient.

GROUND, PECKED, AND POLISHED STONE AND SHELL TOOLS

These artifacts are make from a wide variety of materials including: basalt, chert, granite, jasper, limestone, quartzite, sandstone, sea shell, siderite (i. e. hematite), and soapstone. Many different items were made from these

materials. However we can only guess at the way many of these were used, or what cultural or spiritual significance they may have had to prehistoric peoples.

5. Manos and Metates, Mortars and Pestles—used for grinding food, pigments for paint, and medicine.
6. Hammerstones—their shape was modified by use as the Indians used them to knap chert, crack nuts or bone, and other household related activities.
7. Incised and Engraved Stones—use is unknown. Likely spiritual or ornamental.
8. Shaft Straighteners—these grooved stones may have been heated and used to straighten arrow shafts, the experts are uncertain.
9. Stone Pipes—used to smoke various plant materials. A pipe usually had a stem of hollow bone.
10. Gorgets—stone or shell ornaments commonly with two drilled holes. Thought to be worn on a cord around the neck. May have been worn for personal decoration, social status, or spiritual reasons, unknown.

Figure 6. Examples of pecked, ground, & polished manos, metates, pestles and mortars.

From Turner et al. (2011).
Much smaller than actual size.

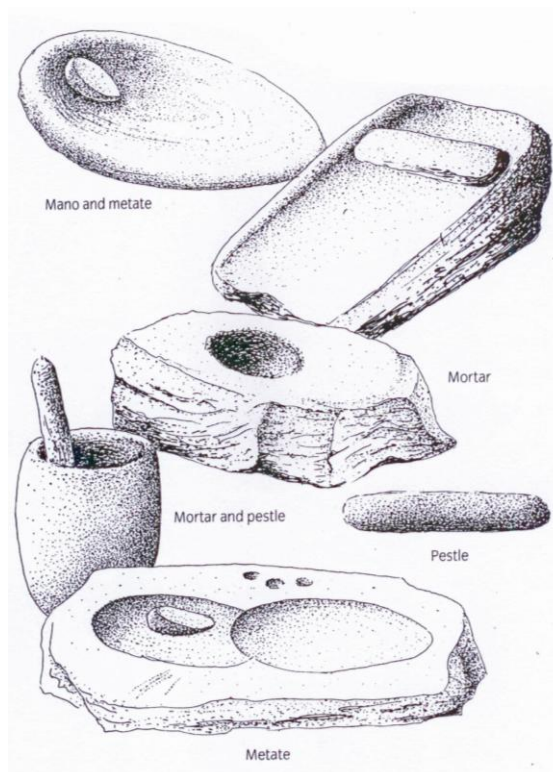
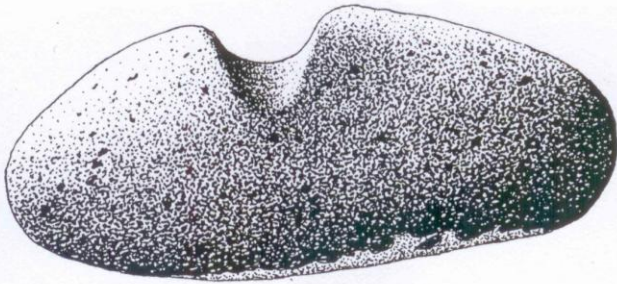
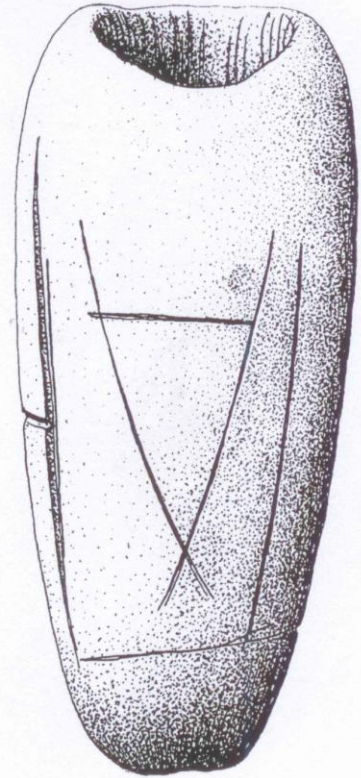
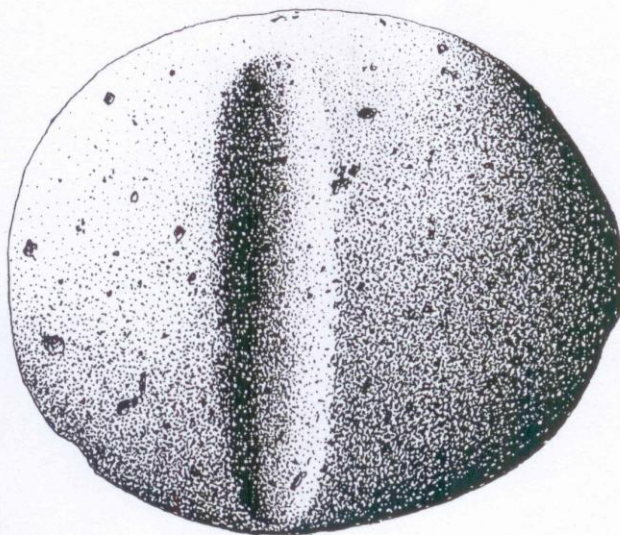


Figure 7. Examples of pecked, ground, and polished artifacts.

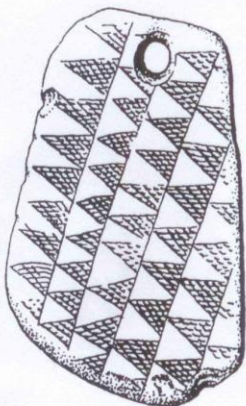
From Turner et al. (2011). Not actual size.



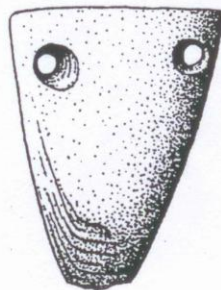
Shaft Straightener



Stone Pipe
without stem



Incised Stone



Shell Gorget



Hammerstones

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