RECOGNIZING ARTIFACTS

BY: Dr. Makoto Kowta
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I. INTRODUCTION.

Archaeology may be described as the study of past human lifeways through the detection and analysis of the physical effects of human activities. (Though archaeology is sometimes thought to be comparable to detective work ala Sherlock Holmes, it should be noted that whereas present-day criminal investigators are typically concerned with particular individuals and particular events, archaeologists are typically concerned with the repetitive and shared patterns of behavior that constitute the cultures of past societies).

Archaeological materials, which bear the imprint of human modification, occur primarily, though by no means exclusively, in the form of artifacts. Artifacts are, thus, discrete objects which bear some modification from the natural state attributable to man. One of the first and basic tasks of archaeology is that of differentiating such man-modified materials from materials that are unaltered from their natural state.

Alteration may take several forms, resulting in archaeological materials of differing character.

A. Natural objects may be purposefully modified or moved by man to serve some end. Tools, utensils, and weapons are familiar artifacts of this kind.

B. Natural objects may become modified in physical form as the incidental result of use. The worn surface of a cobble pestle or the dulling of the sharp edge of a stone flake used as a knife represent examples of modification of this kind.

C. The processes of manufacture, preparation or use may result in waste materials which may not be used further but which nevertheless reveal human activity. Flakes removed in shaping a stone tool, the discarded shells of seeds ground for food, the ash remaining from a log burned for heat all represent this form of modification.

(There is no unanimity in referring to all such materials as artifacts. The term "ecofact" is sometimes used to refer to faunal, floral, or geological specimens modified by man in an ecological context but which lack modification of the first two forms).

D. Objects may be modified with respect to provenience with or without modification of physical form. This kind of modification is represented by, for example, an otherwise unmodified quartz crystal found in a dead shaman's ceremonial pouch or a river cobble located on a ridge top.

You will note that specimens of this last kind are identified as artifacts from association or contextual data. This discussion does not consider artifacts of this kind further except to say that their recognition as artifacts requires knowledge of their natural provenience and sensitivity to their spatial relationship to other more readily recognized evidence of human behavior.

II. LITHIC ARTIFACTS: INTRODUCTION

For several reasons the identification of lithic or stone artifacts will pose special problems for a beginning archaeologist. These reasons include the circumstance that many stone artifacts are minimally shaped, the fact that primitive ways of working stone involve processes closely replicated in nature, and the general lack of knowledge concerning the properties of stone and the methods whereby it is worked by man.

As a first prerequisite, then, it is necessary to become familiar with the nature of stone and the technology of working it.

Let us first consider the salient properties of different kinds of stones in their role as artifact materials. Once you have developed an awareness of these properties and can recognize them in different types of stone, you will be in a position to concentrate on a narrowed range of possibilities as to artifact types making use of them.

Aside form its widespread availability, properties which attracted man to stone include:

A. Density, which lends itself to use as hammer stones or weights (e.g., basalt, quartzite).

B. Brittleness, resulting in sharp fractured edges usable for cutting or piercing (e.g., obsidian, flint, chert).

C. Abrasiveness, which serves well in grinding functions (e.g., sandstone, granite, pumice).

D. Softness, providing for ease in shaping without metal tools (e.g., soapstone, steatite, marble).

E. Aesthetic beauty in coloration or texture, and/or rarity, inviting use as articles of adornment or status (e.g., jade, turquoise).

III. METHODS OF WORKING STONE: FLAKING

Primitive or non-industrial methods of working stone fall into two broad categories-that of flaking or chipping on the one hand, and that of abrading or grinding on the other. Knowledge of the basic processes and the effects they produce will greatly enhance your ability to recognize lithic artifacts. In this section the techniques of flaking stone are considered.

Flaking is most often used to produce cutting or piercing implements with sharp edges or points. Stone best suited for the purposes are hard, very fine-grained, and possessed of a conchoidal fracture pattern.

Flint, chert (chalcedony), and obsidian are prized as knapping material, but other somewhat coarser, igneous rocks such as basalt, rhyolite, and andesite are also used for flaking purposes.

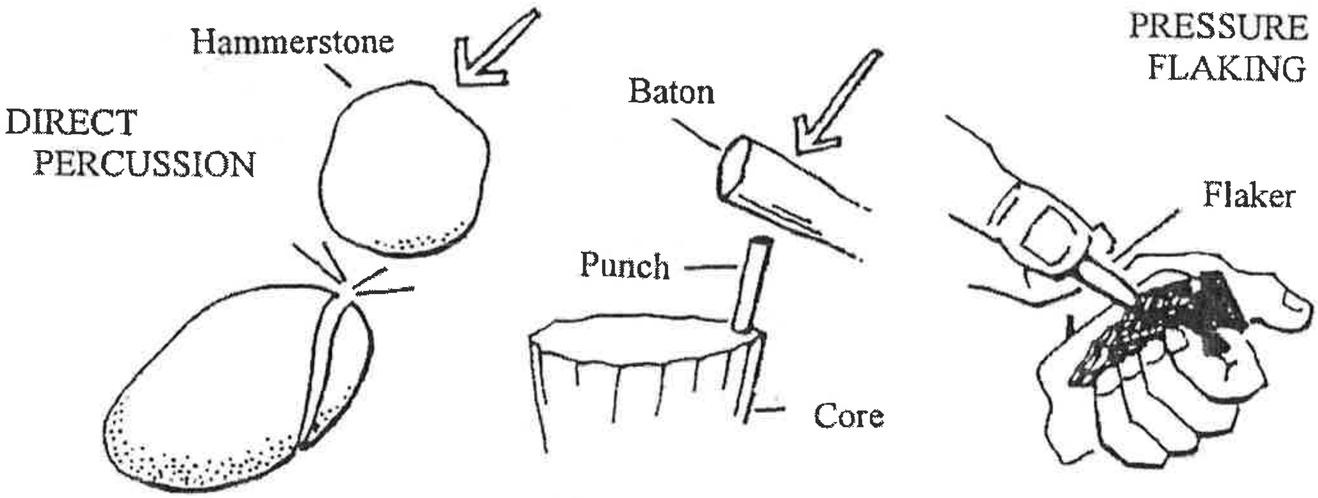
A. The process of flaking or knapping stone normally begins with the selection of a pebble or nodule of suitable size and fracturing characteristics. Ordinarily, the pebble or nodule will have a weathered outer surface called the cortex. The texture of this cortex will differ from material to material. For example, obsidian usually has a cortex that is light colored and somewhat rough in texture; a pebble of basalt may have a cortex that has been smoothed to a high polish by the action of water. In any event, weathering produces some chemical and/or physical change on rock surfaces and such altered portions (the cortex) will show observable differences from freshly exposed surfaces.

B. The methods of flaking stone most often utilized are:

1. Direct percussion, by far the most common and basic, in which the material is struck directly with a hammer of some kind – usually of stone but sometimes of bone or other material.

2. Indirect percussion, in which a third object I placed between the hammer and the rock to be worked in order to transmit the force of the hammer to a limited, predetermined spot. This technique is less commonly used and is normally confined to the detachment of specialized flake forms from specially prepared cores (which are generally produced by direct percussion).

3. Pressure flaking, in which flakes are removed, not by striking at the core, but by firmly pressing against the thin edge of a flake with an instrument, the flaker. This is a finishing or retouching technique rather than a technique usable for the initial shaping of an object.



INDIRECT PERCUSSION

C. Cores. The original mass of stone from which flakes are removed is the core. (Note that flakes may serve as cores for the production of smaller flakes. Normally, however, the term implies some bulk, as represented by the original mass).

1. Tools may be made of the core (core tools) or of the detached flakes (flake tools).

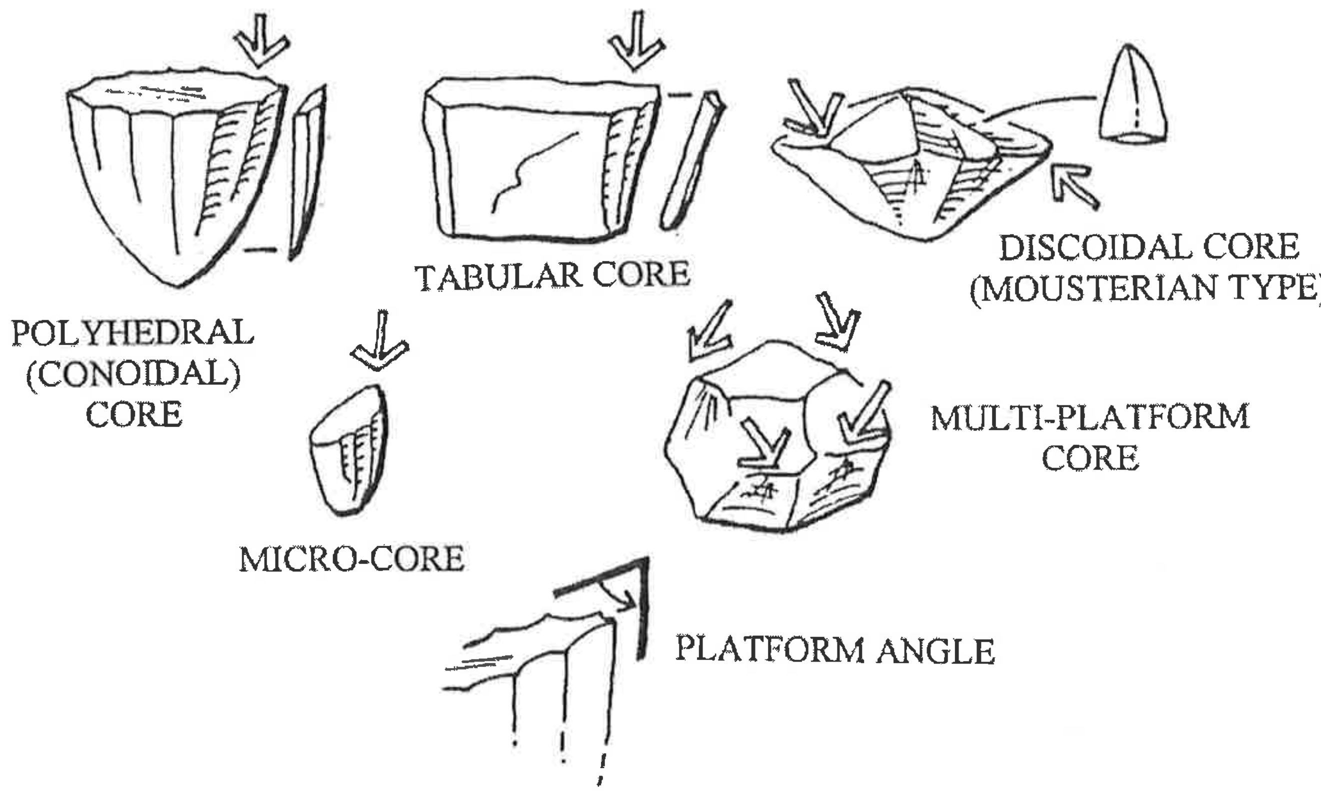
2. The striking platform is the surface to the edge of which blows are directed in the removal of flakes. This surface may be a natural cortex surface but more commonly is a freshly exposed surface.

3. Striking platforms that have multiple flake scars or other evidence of intentional modification mad preparation are prepared platforms.

4. The angle formed by the striking platform and the side of the core is the platform angle.

5. Cores are commonly classified on the basis of size, overall form, number and placement of striking platforms, and types of flakes produced.

6. A core that is spent – i.e., so much used that it can no longer yield useable flakes - is a nucleus or spent core.



D. Flakes. Fragments of stone detached from a core are generally referred to as flakes.

1. Very small flakes are sometimes called spalls, though the term is sometimes also used to refer to fragments detached by other than intentional flaking – e.g. through alternated heating and freezing in nature.

2. Flakes that are struck from the outer surface of a core retain portions of the cortex. Such flakes are called decortication flakes.

3. The removal of a flake produces a fresh facet or surface referred to as the flake scar on the parental mass.

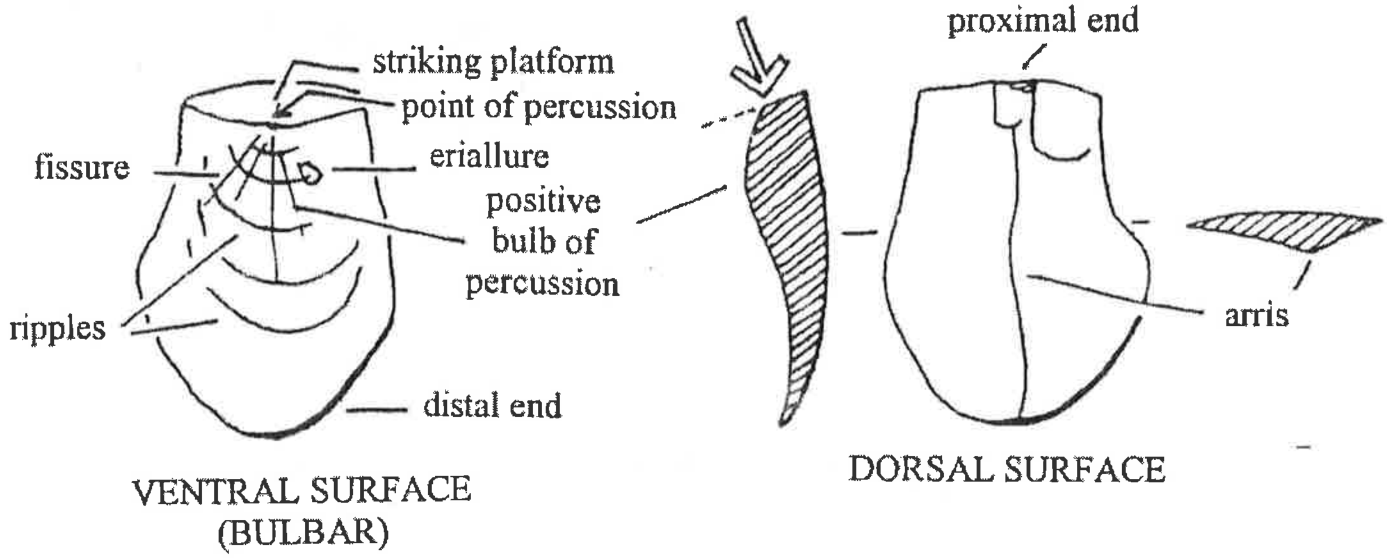
4. The intersection of flake scars produces a ridge, which is called an arris.

5. The undersurface of a flake, especially one removed by heavy percussion from fine-grained material, characteristically exhibits the following features:

   a. A swelling emanating from the point of impact of the percussive instrument. This is the positive bulb (or cone) of percussion. (The concave portion of the corresponding flake scar on the core is the negative bulb (or cone) of percussion).

b. A shallow trianguloid depression on the bulb of percussion is called the bulbar scar or eriallure.

c. A series of concentric ridges or ripples following the contours of the bulb and one or more fissures or shallow groves radiating out from the point of percussion.



6. The surface of the flake exhibiting the bulb of percussion is the bulbar or ventral surface; the opposite surface is the dorsal surface. The portion of the flake that retains a part of the striking platform is the proximal or bulbar end of the flake. The opposite end is the distal end.

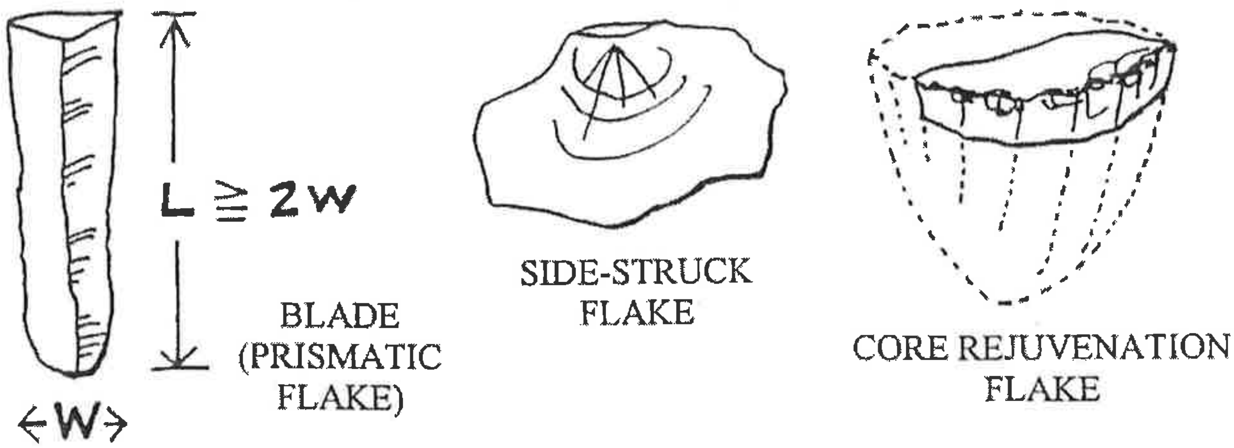
7. Flakes are differentiated according to various criteria.

   a. Flakes whose length exceeds twice the width measurement are referred to as blades, especially when associated with cores specially prepared to produce them.

   b. Small flakes of prismatic form are often called micro-blades.

   c. Flakes with the striking platform along a long border rather than at one end are called "side-struck" slakes.

d. Flakes removed from partially used cores to freshen up the striking platform edge are core rejuvenation flakes.

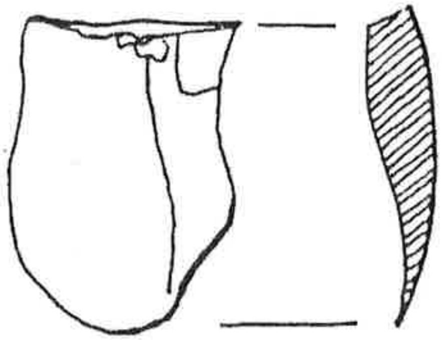


e. If the distal end of a flake terminates in a think, sharp edge, as in most cases, it is said to have a feather edge. Feather edged flakes are produced by free flaking, in which the percussive blow is applied with pronounced follow-through.

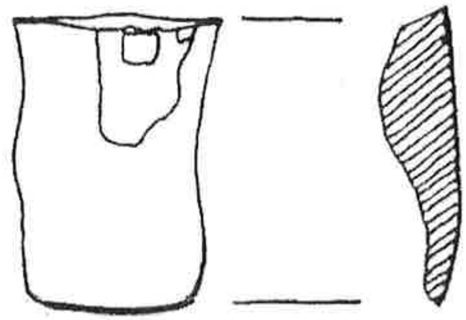
f. If the distal end of a flake terminates in an abrupt curve toward the dorsal surface, the flake is said to have, or end in, a hinge fracture. These seem to be the result of inadequate follow-through in free flaking.

g. If the distal end of a flake terminates with a definite angle toward the dorsal surface, the flake is said to terminate in a step fracture. The scale-like scars left by such flakes are called step scars and the process whereby they are produced, step or resolve flaking. Step flaking is typically employed in sharpening thickly beveled working edges, and is produced when the percussion blow is directed in toward the center of the piece being worked.

h. A special form of flaking directs the blow to the edge of a flake. This is the burin blow which results in a specialized tool called a burin, and a burin spall, which may itself be used as a special engraving tool.



FEATHER EDGE



HINGE FRACTURE

STEP FLAKING

BURIN

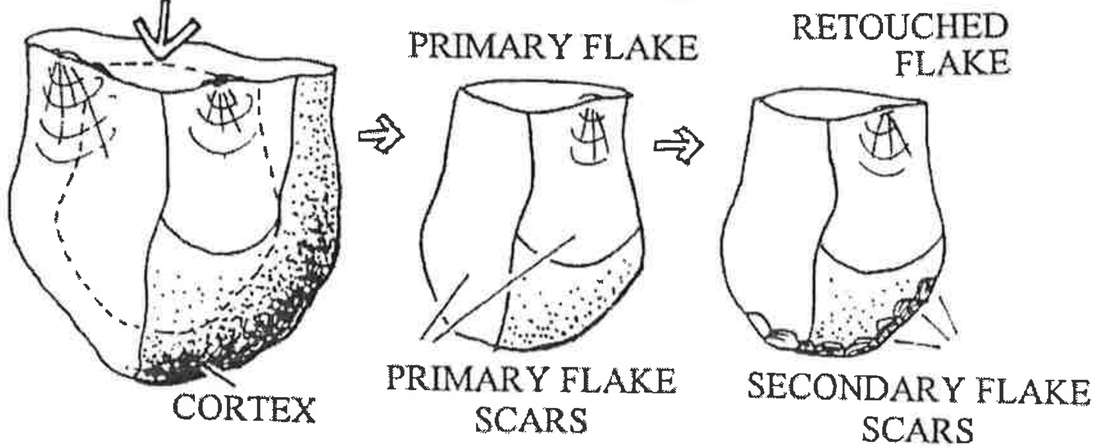
8. Primary and Secondary flaking. So far we have been discussing primary flaking.

   a. Primary flaking refers to the flaking of the core up to and including the point of the detachment of the flake in question. The flake scars present on the detached flake are the primary flake scars.

   b. Flaking which takes place on the flake after its detachment from the core is secondary flaking, or retouch flaking or retouching. Secondary flaking is utilized in finishing the form of the flake tool and/or sharpening a dulled edge. It is done by either percussion or pressure flaking.

   c. Typically, a flake will exhibit only one primary positive bulb of percussion; it may exhibit one or more negative bulbs of percussion depending on the degree to which the core was shaped before the flake was detached. Primary flake scars are often incomplete, having been truncated at the time of the removal of the flake.

d. Negative bulbs of percussion present on a flake may represent either primary or secondary flaking but negative bulbs of percussion emanating from an edge of the flake almost always represent secondary flaking. (Remember that the striking platform angle must be 90° or less for the effective removal of flakes).



9. Flaking may produce either a unifacial edge or a bifacial edge.

   a. A unifacial edge is one in which only one of the two surfaces is retouched, the other consisting of a smooth cortex face or a single primary flake scar.

   b. A bifacial edge is one with secondary flaking on both surfaces of the edge.

   c. These terms may be applied to tools according to the nature of the edges they possess – unifacial choppers or bifacial choppers, for example.

10. Pressure flaking is primarily a secondary flaking technique used to refine the form of a flake object.

   a. Pressure flaking generally permits the removal of flakes that are thinner and finer than may be attained by percussion flaking, though it may also yield crude flake scars indistinguishable from percussion flake scars.

   b. Pressure flaking is sometimes preceded by a heat treatment of the material or the preparation of a small platform on the edge of the flake by grinding.

IV. METHODS OF WORKING STONE: ABRADING

A. In comparison to flaking, the process of modifying stone by abrasion or grinding is a much simpler one, but one that demands a great deal more time and patience. The basic processes involved are these:

1. Selection of suitable material. Stones most often selected for working by the abrading method are those that have relatively large grains, those that are relatively soft, or those that have some aesthetic quality.

2. The first step in the actual manufacture may be that of flaking the material to the approximate form of the desired article. This results in a "preform" or quarry blank. This step may be by-passed, however, and the manufacture may begin with what would be the next step after flaking, that of pecking.

   In this process, a hard hammerstone is used to strike the surface of the material selected so that minute particles are dislodged. This process is continued until the desired final form is approximated.

3. The actual abrading or grinding then commences, with the object being pressed or grinding then commences, with the object being pressed against and rubbed back and forth along a slab of abrasive stone.

4. When the desired shape has been achieved by this means, it might then be polished by rubbing it with or against abrasives fine enough to obliterate the striations caused by the grinding process.

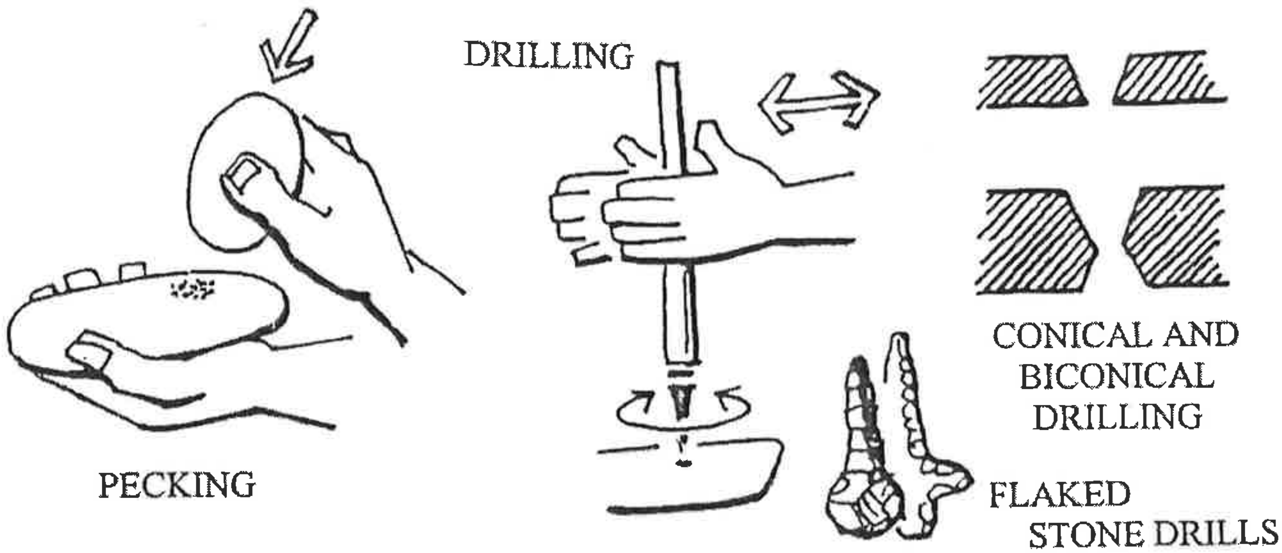
B. Soft stones such as steatite may be shaped initially more by a cutting or scraping process than by flaking and pecking.

C. Drilling stone is essentially an abrading process with the drill bit (with or without added abrasives) serving to remove stone particles – through a downward and rotating motion.

1. Drilling with a stone bit typically results in a conical or tapered hole unless drilling is done from both sides, in which case a biconical or "hour-glass" perforation results.

2. Drilling is sometimes used as a method of reducing a large piece of stone to smaller size – by drilling a series of holes in a line and breaking the piece along it.

D. Stone may also be "sawn" by means of a thin slab of abrasive stone used on edge. Typically the sawing is only partial, used to provide a groove along which the piece may be broken.



V. COMMON FLAKED STONE ARTIFACTS

In analyzing lithic materials, or in fact archaeological materials of any kind, it is well to keep in mind the probability that specimens you recover will be in a broken or fragmentary state. This being the case, it is necessary for you to be able to visualize in your mind alternatives with respect to possible complete forms. A familiarity with examples of complete specimens of artifacts commonly found in the region you are working in is therefore an important part of the preparation for artifact identification.

With reference to flaked stone artifacts, a good point to remember is that the large majority of flaked stone objects were fashioned to provide a sharp cutting edge; you should therefore concentrate on finding such a feature. In this connection you should not let your familiarity with modern metal blades mislead you into looking for sharp, thin edges only, for many stone tools functioned with cutting edges with bevels ranging up to 90°.

In looking for an edge on a stone object, concentrate on two types of modification:

A. Evidence of deliberate manufacture. Not all sharp edges were actually used for cutting purposes although they might have been so used. Therefore, look further for indications that the edge was actually the object of concern. This is best manifest in secondary or retouch flaking along a border. Remember here that secondary flake scars must originate from an exposed edge. Thus, if you should detect a series of small flake scars all originating from a single border, this is presumptive evidence of a concern to produce a workable edge. (Take care that you are not misled by the edge of the striking platform of a core or a core rejuvenation flake from the periphery of the platform).

B. Evidence of use. Evidence of use might take the form of a blunting or polishing of the working edge detectable only by feel or microscopic examination. (Also hold the edge up to a light; you may be able to see light reflected off the polished edge). More commonly, you may see minute use scars or larger resharpening flake scars (often of the step variety) originating along a border.

C. Common forms of flaked stone objects include the following:

1. Used flakes. Primary flakes exhibiting no deliberate secondary flaking but showing minimal edge modification by use in the form of edge polish or use scars.

2. Flake scrapers. The term scraper is used, perhaps too loosely, to refer to any edged implement too light to be a chopper and lacking the diagnostic features of projectile points and blades – namely bilateral symmetry and pointed distal end. (The function or method of use implied by the term is rarely demonstrated.)

   Flake scrapers are primary flakes with secondary modification confined to the working edge only.

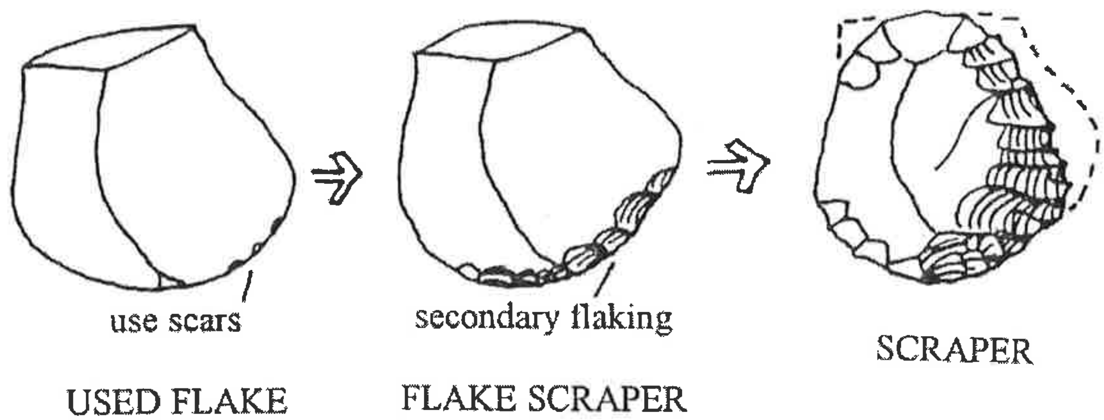
3. Scrapers. These are implements showing greater overall modification and standardization of form than flake scrapers. This category may be variously subdivided- e.g., end scrapers, side scrapers, domed scrapers, strangulated or notched scrapers (i.e., spoke shaves) – according to the nature of the working edges and overall form.

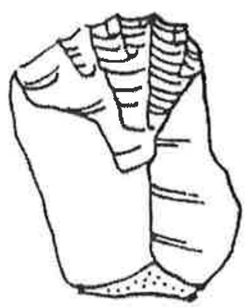
4. Drills/Perforators. These are characterized by a slender projecting part. In one form the projection is a minute retouched point on the edge of a small flake. In another form the drill has a pronounced elongated shank and broad base. In the latter type, the drill bit is usually relatively thick and diamond shaped.

5. Choppers. These are relatively large and heavy implements presumably used for rough shaping. The edge may be unifacial or bifacial, straight or sinuous (made by alternating the removal or retouch flakes from one side to the others in overlapping fashion). The edge bevel tends to range from

45° to 90° and the edge may encircle the whole implement or constitute less than a third of the periphery.

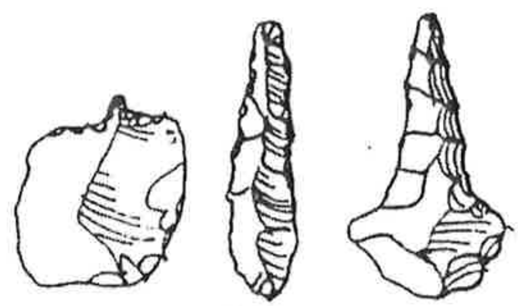
6. Scraper planes. These implements partake of the characteristics of scrapers and choppers but are characterized by a flat basal or bulbar surface, high back, and steep edge that extends fully or partially around the basal border.





END SCRAPER

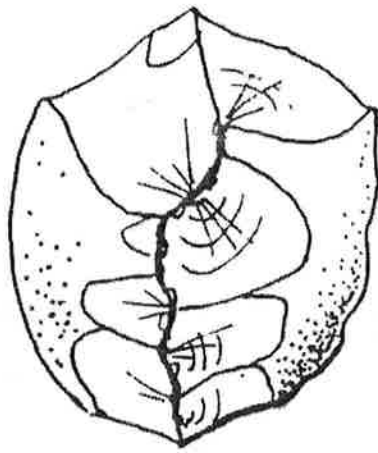
SPOKESHAVE

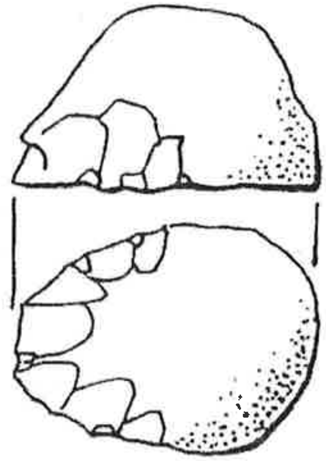


DRILLS

7. Core hammerstones. Flaked cores with projecting edges or points may be used as hammers as in "sharpening" or roughening the surfaces of grinding stones. These cores may be recognized by the blunting of the edges—manifested as a localized roughening of the texture and light coloration.

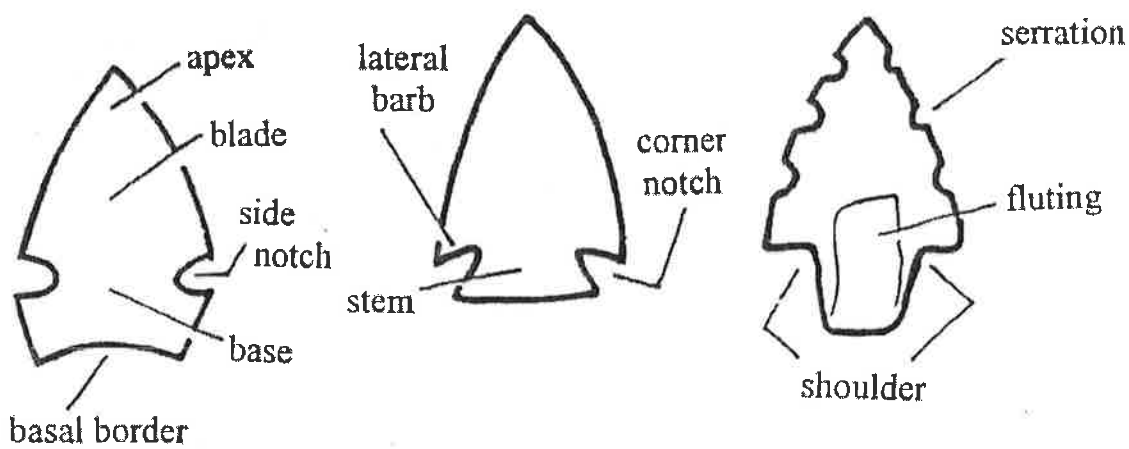
8. Cores. Multifaceted specimens revealing no evidence of use aside from that involved in the production and removal of flakes. As previously mentioned, cores occur in various forms.



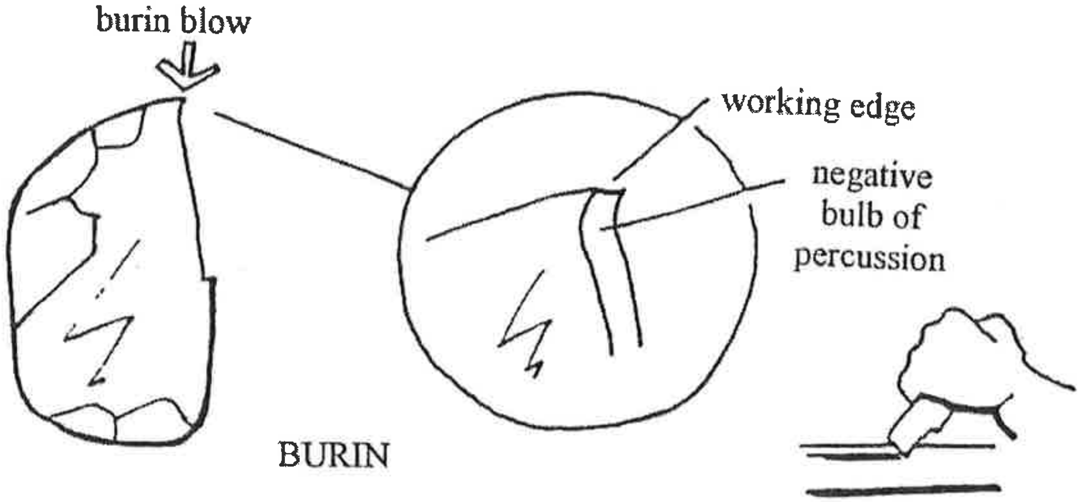


9. Projectile points. The term projectile point is preferred to more specific terms like arrowpoints, atlatl dart points, or spear points, when the exact manner of use is uncertain. They are usually (though not always) bifacially worked, bilaterally symmetrical, have pointed distal end, and have a maximum width toward the proximal end, which may be elaborated with notches, shoulders, or constricted stems. The basal border may be straight, convex, or concave.

10. Blades. The term blade has at least two meanings in common usage. In one sense it refers to flakes, usually of prismatic form, which have the length equal to or greater than twice the width. Modification of this basic form yields a variety of more specialized blade tools such as scrapers, points, burins, etc.



11. Burins. Burins are specialized chisel-like tools mainly adapted for the working of antler and bone. Its characteristic feature is a short transverse cutting edge formed by striking the narrow edge of a flake or burin form to detach a spall.



12. Cooking stones. Irregularly shaped fist-sized stones with evidence of heat exposure and marked with flake scars showing little by way of bulbs of percussion.

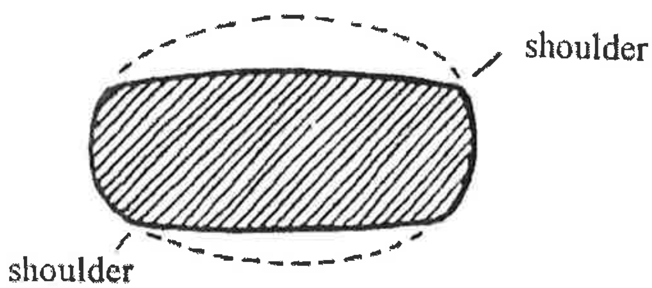
VI. COMMON ABRADED STONE ARTIFACTS

If a stone specimen shows no flake scars, examine it carefully for pecking or grinding marks. Pecking may show up on an otherwise smooth cobble as small, shallow, light-colored pits where the rock was hit with another rock or where it was used to hit another piece. These marks are most likely to occur along or toward edges, but may also occur toward the center.

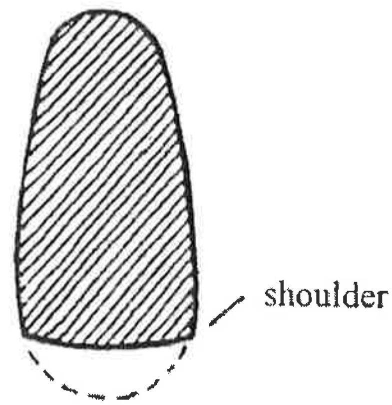
Grinding and polishing are not always easy to detect because smoothening of the rock surface can and does occur in nature through weathering.

A. Be on the lookout for the following kinds of clues:

1. Profile shows angle or shoulder where curvature of new surface intersects the original outline.

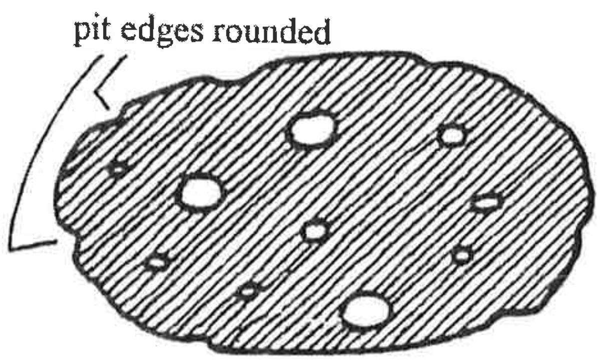


MANO CROSS-SECTION

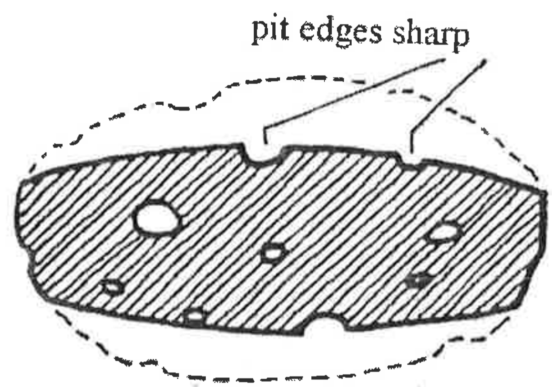


PESTLE CROSS-SECTION

2. On vesicular rock, the new surface makes sharp angle with exposed vesicles. In naturally weathered surfaces exposed vesicles will have rounded edges.

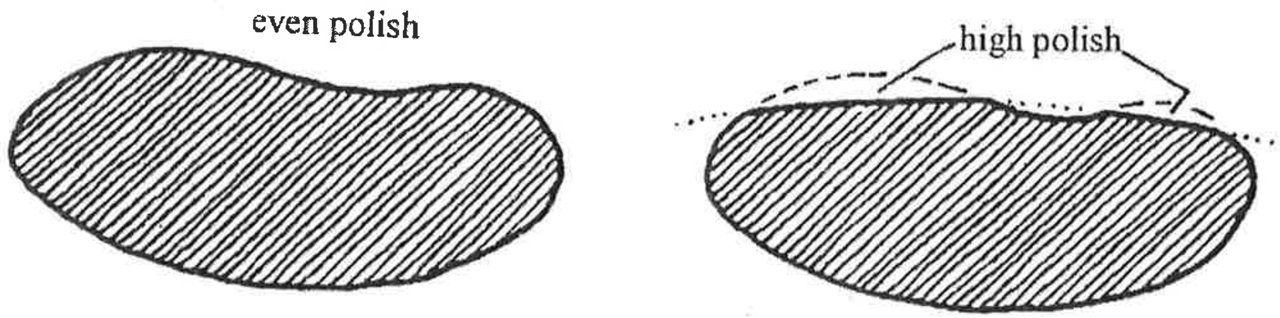


UNMODIFIED VESICULAR BASALT PEBBLE

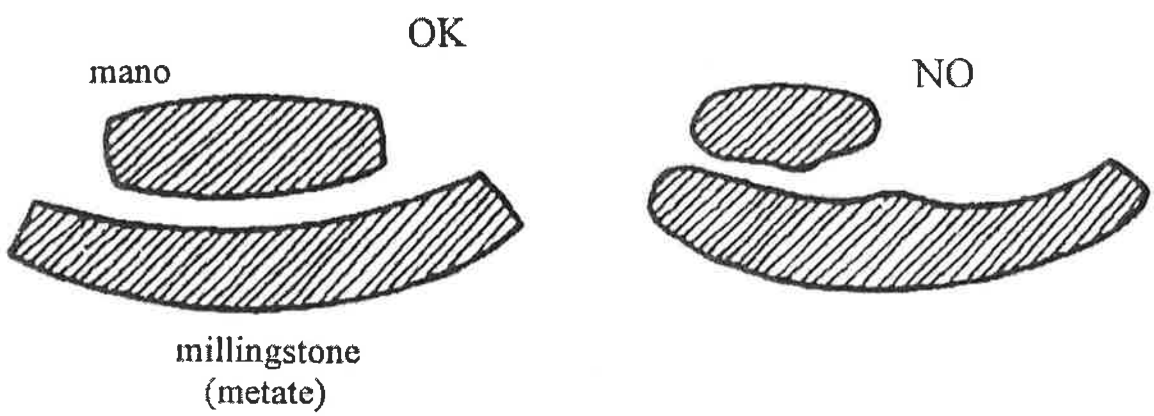


VESICULAR BASALT MANO

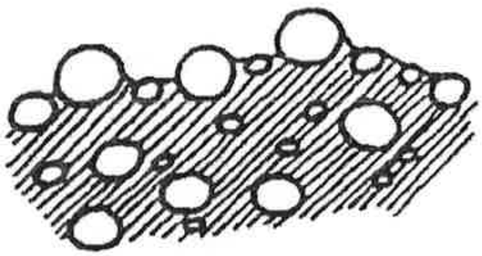
3. If grinding occurs on an uneven, undulating surface, polish will occur mainly on the high spots.



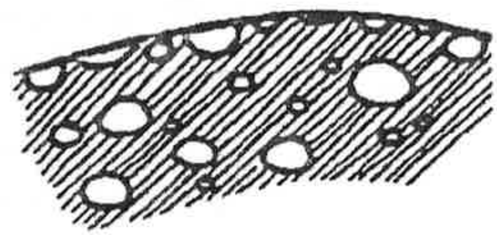
4. The presence of a protrusion on either a convex or concave surface usually indicates that the surface was not used for grinding.



5. In granular or large grained rock, grinding will cut through individual grains to form a smooth surface; in natural smoothening, this is less likely to occur. (This may not be observable without the use of a lens).



NATURAL



GROUND

B. Procedure for determining intentional grinding.

1. First, feel the clean specimen all over with the fingers for differences in surface texture and sharpness of exposed edges.

2. Second, hold the specimen up to a strong light and examine it from different angles to see if there are any differences in reflectance.

3. Examine the specimen by eye, or better yet, with magnifying glass or microscope for striations, looking especially for those that are not randomly distributed but form patterns oriented to the outer borders or along the longitudinal axis.

4. Hold a straight edge to the surface and observe its contours. Most intentionally ground surfaces are either flat or slightly and evenly cured in a convex or concave arc; undulating surfaces should warn caution.

C. Commonly occurring ground stone artifacts include the following, as sorted by material.

1. Dense fine grain rocks – (e.g. basalt, rhyolite, andesite, etc.).

a. Hammerstones. Characterized by concentrations of peck marks on an otherwise smooth pebble or core, usually along edges or protruding points.

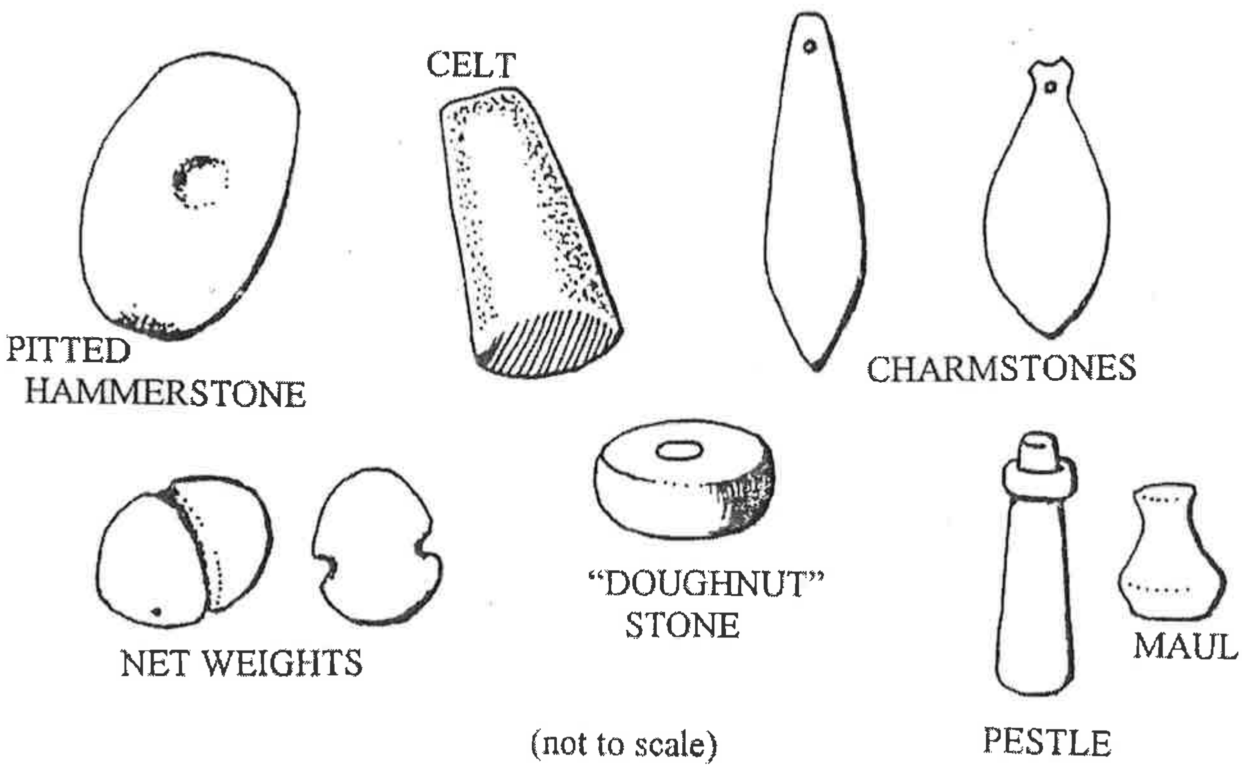
b. Celts. Unperforated and ungrooved blades of axes or adzes are referred to by the generic term celts. These are either polished all over or along the bit only, the rest being flaked or pecked. They are generally elongate, tapering to the butt end, and have squared or rounded cross-sections.

c. Charmstones may be made of moderately soft as well as hard materials. They are usually cylindrical or plumbate in form, with a perforation or suspension groove at one end.

d. Net weights or sinkers. These are usually pebbles minimally modified with pecked notches or grooves for typing on lines.

e. Digging stick weights. Torus or "doughnut" shaped, these are generally thought to be weights attached to digging sticks to improve their efficiency.

f. Pestles. Pestles vary in the amount of modification they bear—some are natural cobbles modified at one end only by use, others are shaped all over and provided with decorative flanges. The diagnostic criterion is a flattening of one end due to pounding action in a mortar. Look for a shoulder on well used pestles.



(not to scale)

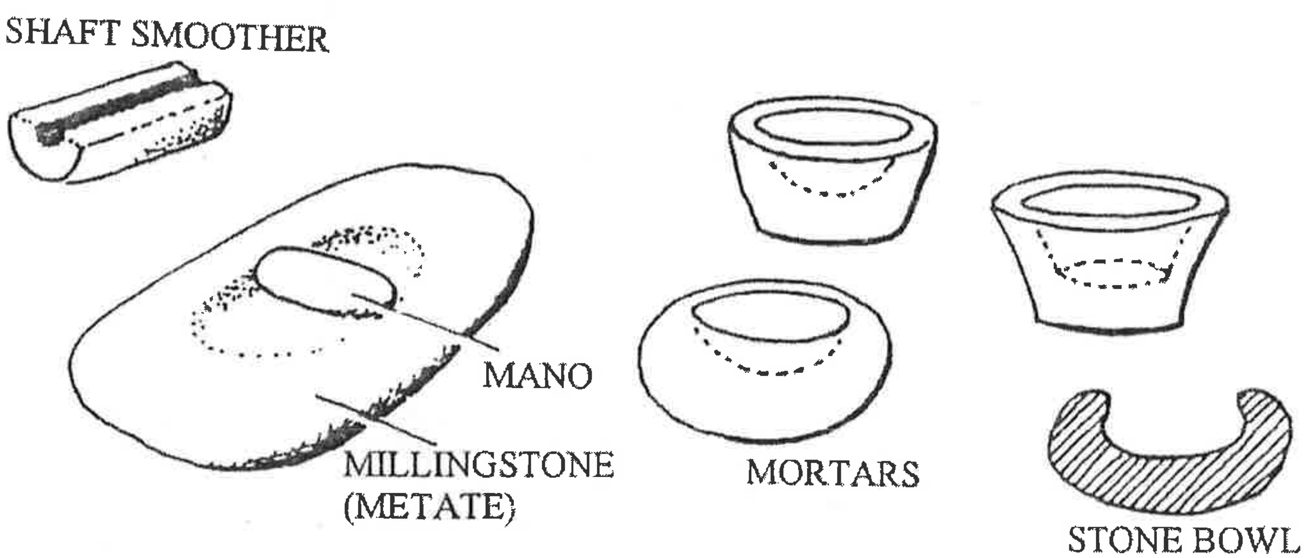
3. Coarse textured stones – (e.g. granite, sandstone, etc.)

   a. Manos. Generally ovoid stones held in the hand and used with a back and forth or circular motion to grind seeds on a metate (milling stone). Look for convex wear on broad surfaces and shouldering on ends. There may also be pecked sharpening marks on the wear surface. (Commonly of granite and similar materials).

   b. Metates or millingstones. Large slab to basin-shaped stone, the nether piece in the mano-metate seed grinding combination. (Commonly made of granitic materials, less often of sandstone, schist, etc.). Look for shallow, gently curving concave surface.

   c. Mortars and stone bowls. Mortars are grinding stones with deep circular concavities, designed to be used with pestles. In form they grade into stone bowls, which tend to have broader concavities, thinner or lower walls, and sometimes incurving rims.

      The amount of shaping on the outside is variable from none to extensive. Size is also variable—from small medicine or pigment mortars to large ones up to two feet in diameter. Mortars tend to be made of the harder materials—granite, basalt, etc.—while stone bowls tend to be made of less hard or less compact material like sandstone, steatite, etc.



d. Shaft smoothers. Typically northern (rather than southern) Californian, these were used singly or in pairs to rasp arrowshafts smooth. Commonly made of sandstone or pumice, these are elongate and rectangular or half-cylindrical forms with a longitudinal groove in which the shaft is rubbed smooth.

e. Abrader or whetstone. Irregular pieces of sandstone or pumice or other abrasive material with worn surfaces usually concave or undulating, used to sharpen bone awls, fashion ground slate points, etc. Tend to be elongate, but may be irregular in form.

4. Steatite (talc stone, soapstone). Steatite has two properties that attracted the attention of the primitive craftsman: ability to retain heat without fracturing, and softness such that it can be carved, scraped, and ground easily to form. Common objects made of this material include:

   a. Beads - recognized by their rounded or cylindrical body and central perforation. The perforation typically biconical.

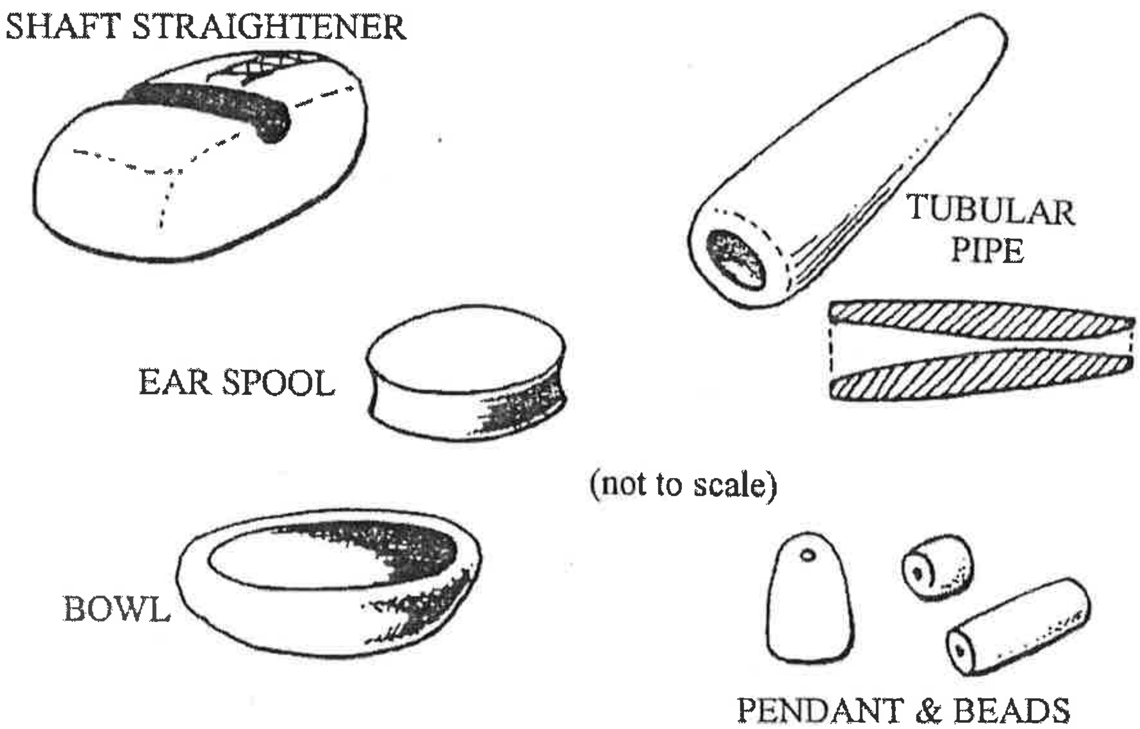
   b. Pendants – circular to rectangular in form, provided with suspension perforation at one end.

   c. Bowls – generally circular or oval in form, varying from shallow to deep.

   d. Shaft straighteners – These are block-like forms with a transverse half circular groove, usually highly polished. In use, these were heated in the fire, the bent shaft rubbed in the groove, and bent back to shape. Typically southern Californian, some are decorated with incised designs and ridges on their upper surface.

   e. Ear spools – These are thick circular discs with concave sides used for ornamental purposes. Sometimes faced with shell discs. In California occurs mainly in Central Valley.

   f. Tubular pipes – generally cylindrical with expanded midsection or tapering sides. Sometimes fitted with bone stem and/or decorated with incised designs. Can be made of other material; central perforation usually biconical.



VII. OBJECTS OF BONE, ANTLER, AND TEETH

The Eskimo cultures of the arctic area are especially noted for the production of articles of bone, antler, and walrus ivory, but elsewhere these materials were also widely used. Techniques of working these materials were similar. Segments were scored or chopped transversely and broken. Long bones were grooved longitudinally with a burin or similar tool and split with a hammer or pried loose and then further shaped by scraping, grinding and drilling.

A. In handling bone specimens, do the following:

1. Examine the ends of pieces for transverse marks that might indicate that the bone was cut or scored and then broken off.

2. Inspect for a broad concave longitudinal groove parallel to a convex outer surface indicative of a long bone split open.

3. Feel all broken edges for blunting and polish from use or deliberate grinding.

4. Examine all broken edges for concentrations of flake scars indicative of percussion shaping technique.

5. Examine all perforations and grooves for tell-tale striations and sharp edges; natural grooves and perforations (fossae) rarely have sharp edges or ridges that would cut into parts passing through them.

B. Make a special effort to become familiar with unmodified mammalian (especially deer) and bird skeletons, concentrating on those parts commonly used in artifact manufacture.

1. <u>Bird and mammalian long bones</u>

   a. Used unsplit for beads. "sucking tubes", whistles, and ear ornaments.

   b. Used split for awls, pins, gorges, harpoon heads, skin scrapers, gaming pieces, etc.

2. <u>Mammalian scapulae</u> – used with acromial process removed and blade reduced as grass cutters, fish scalers, etc.

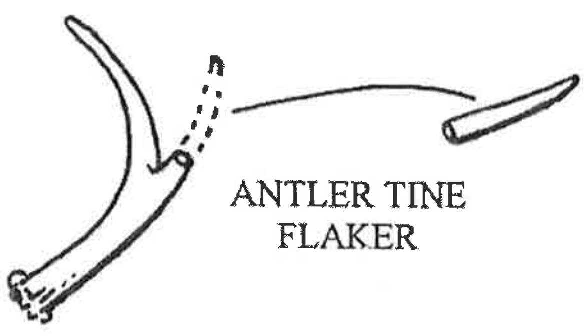
3. <u>Teeth</u>

   a. Canines used as ornaments, sometimes perforated.
   b. Incisors of porcupine and beaver used as cutting instruments.

4. <u>Antler</u>

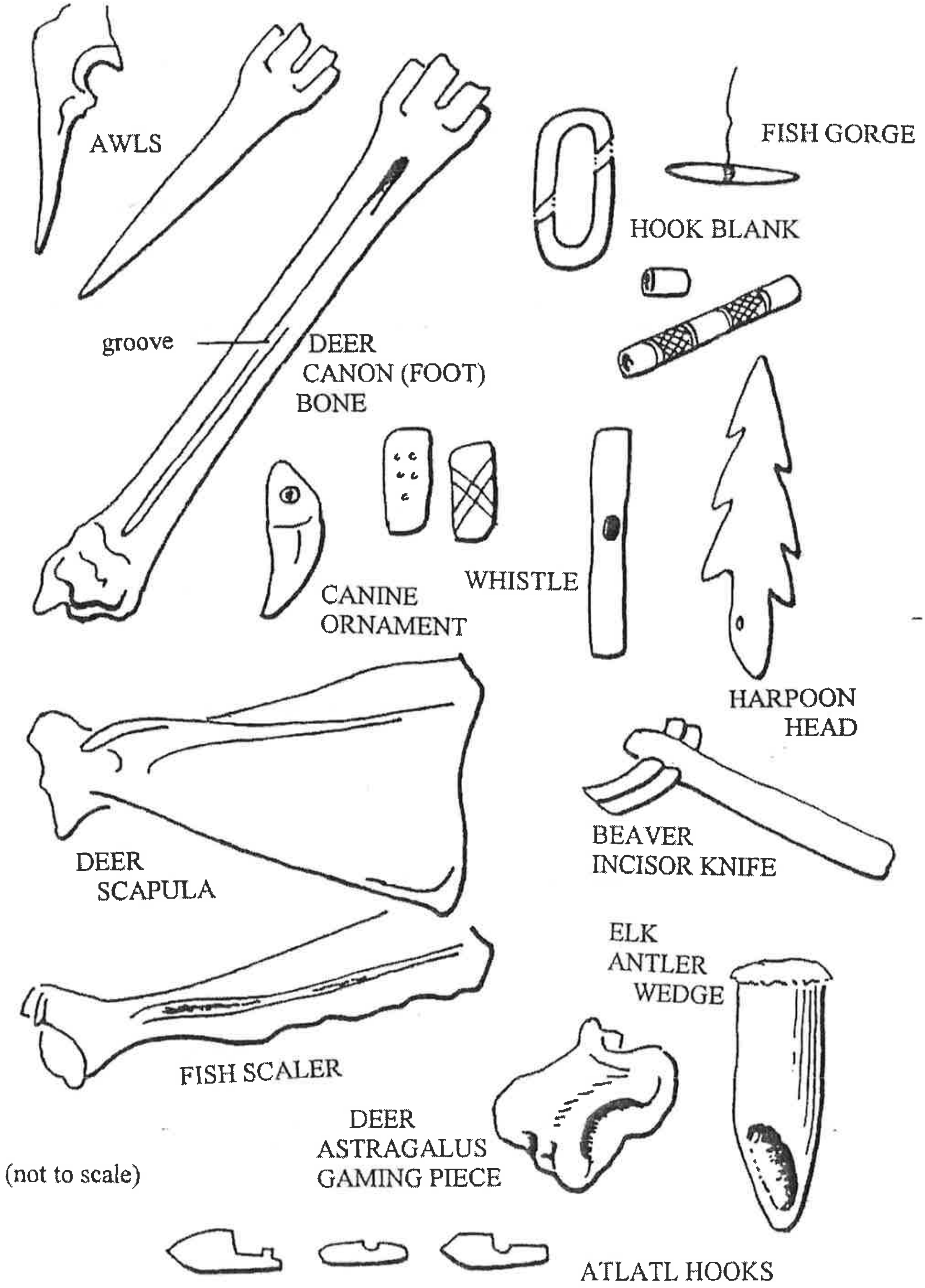
   a. Individual times used as pressure flakers.

   b. Beam used as splitting wedges.



ANTLER TINE FLAKER

BONE FLAKER TIP


AWLS
FISH GORGE
HOOK BLANK
groove
DEER
CANON (FOOT)
BONE
CANINE
ORNAMENT
WHISTLE
HARPOON
HEAD
DEER
SCAPULA
BEAVER
INCISOR KNIFE
ELK
ANTLER
WEDGE
FISH SCALER
DEER
ASTRAGALUS
GAMING PIECE
(not to scale)
ATLATL HOOKS

VIII. OBJECTS OF SHELL

Aside from being an important source of food, shellfish provided raw material for the prehistoric craftsmen. Most prized were those of marine origin; several species were traded far to the interior from early times.

Shell was shaped mostly by a combination of scoring and breaking, delicate percussion, grinding, and drilling. Though used as containers, ladles or spoons, shell was mainly worked into beads and other articles of adornment.

A. Olivella sp.

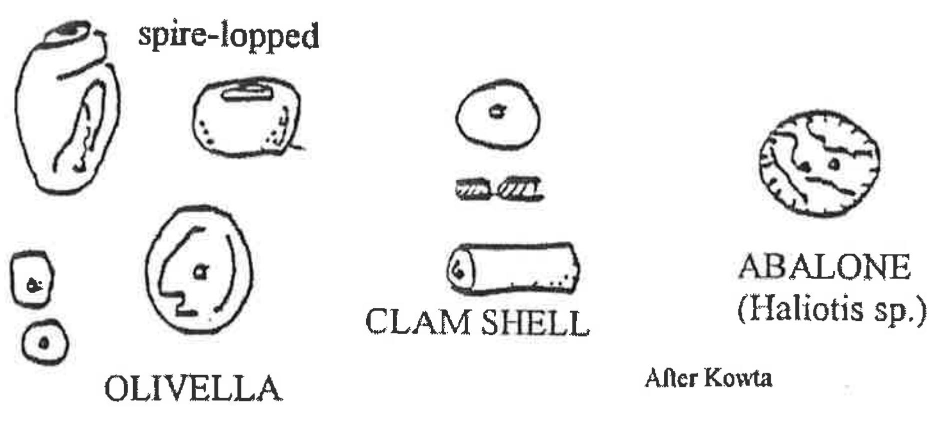
1. spire-lopped bead
2. barrel-shaped bead
3. half-shell bead
4. disc or rectangular bead
5. lipped bead

B. Saxidomus sp. (clamshell)

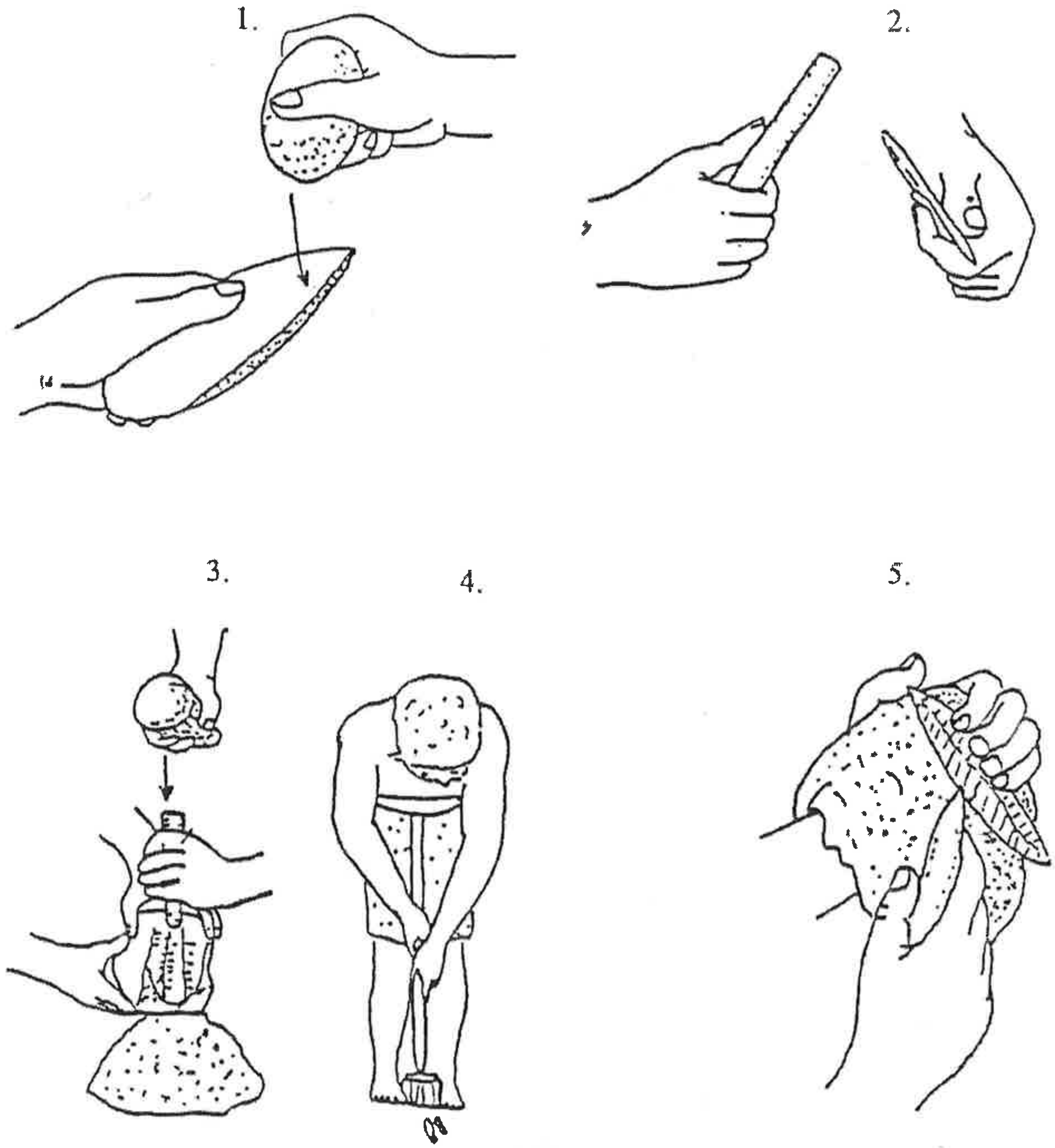
1. disc bead
2. tubular bead

C. Haliotis sp. (abalone)

1. pendants-various forms: square, circular, trapezoidal, etc.
2. "banjo-shaped" pendants
3. gorgets-various forms



After Kowta

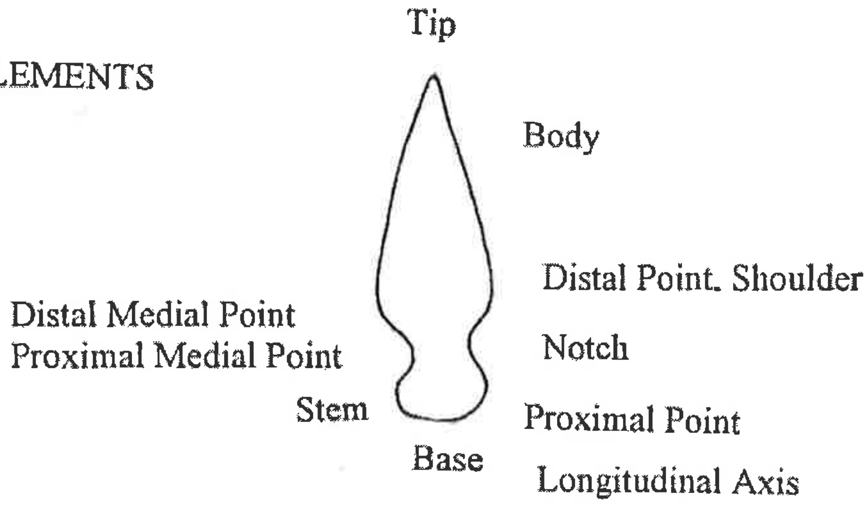


Techniques for Manufacturing
Chipped Stone Tools

(1) Direct percussion technique with hammerstone. (2) Direct percussion technique with resilient hammer (bone or antler). (3) Indirect percussion technique. (4) Pressure flaking technique for obtaining blades from core. (5) Pressure flaking technique for retouching blank.

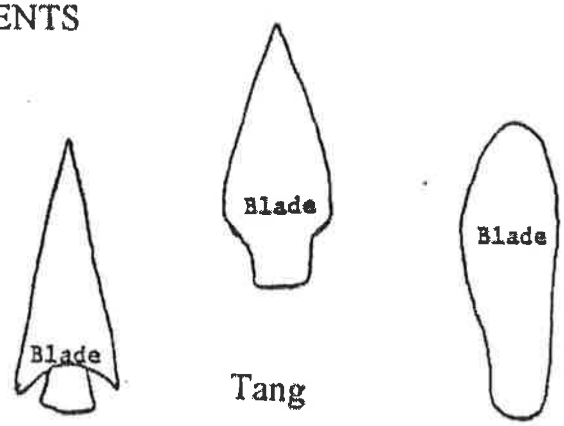
IX. PROJECTILE POINT PARTS, POINTS OF JUNCTURE AND SHAPES

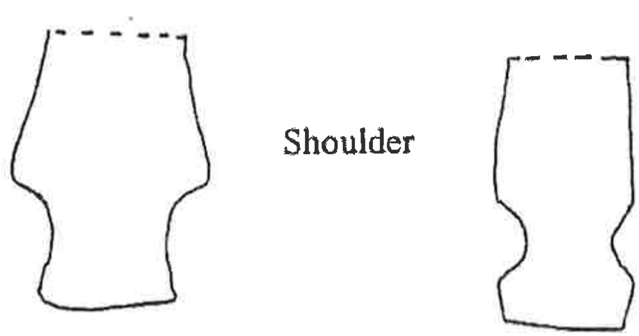
ELEMENTS



After Binford

SUB-ELEMENTS

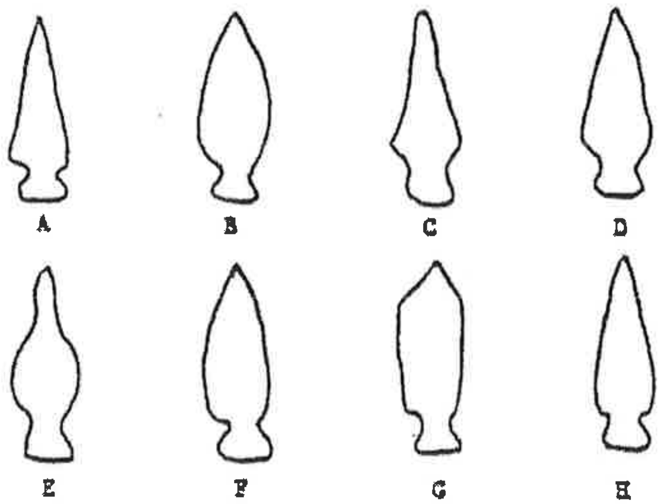




Modified
Sub-element of the Tang

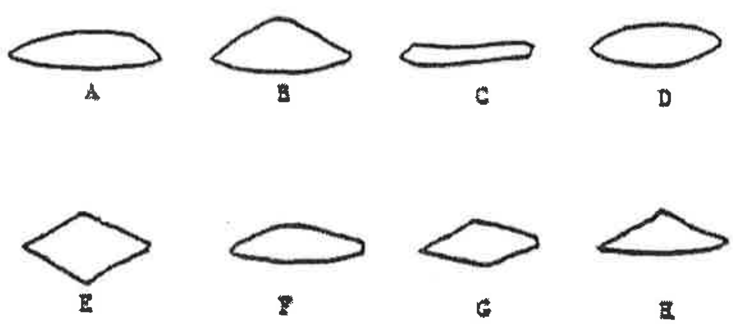
Unmodified Sub-element
of the Tang

BLADE SHAPES



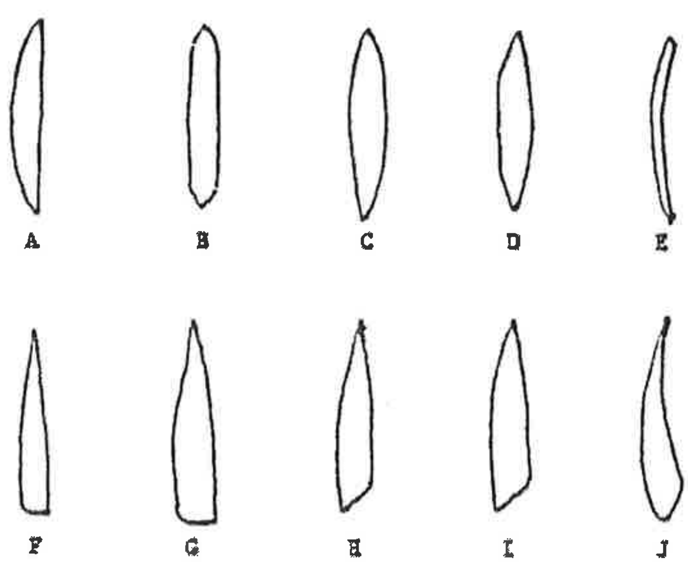
A. Triangular
B. Excurvate
C. Incurvate
D. Ovate
E. Excurvate-encurate
F. Parallel-ovate
G. Expanding-ovate
H. Contracting-ovate

TRAVERSE CROSS-SECTIONS



A. Plano-convex
B. Plano-traingular
C. Biplano
D. Biconvex
E. Bitriangular
F. Asymmetrically biconvex
G. Asymmetrically bitriangular
H. Convexo-triangular

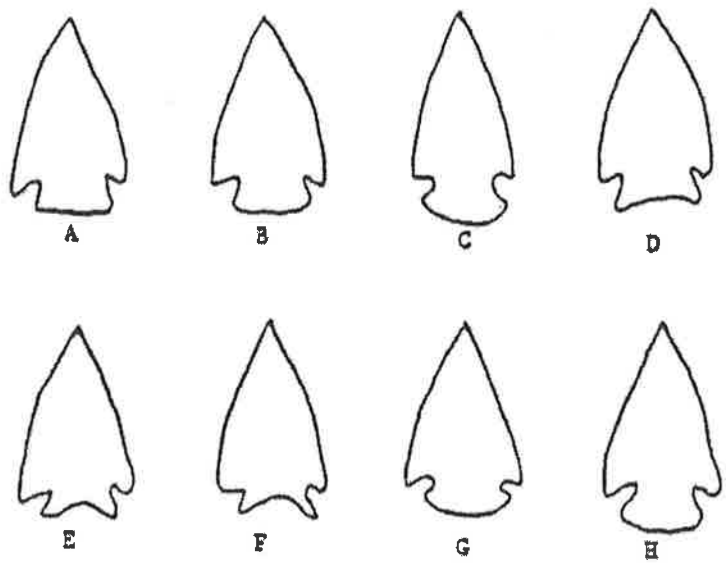
LONGITUDINAL CROSS-SECTIONS



A. Plano-convex
B. Biplano
C. Biconvex
D. Asymmetrically biconvex
E. Concavo-convex
F. Excurvate
G. Ovate or triangular
H. Asymmetrically ovate
I. Asymmetrically excurvate
J. Asymmetrically concave-convex

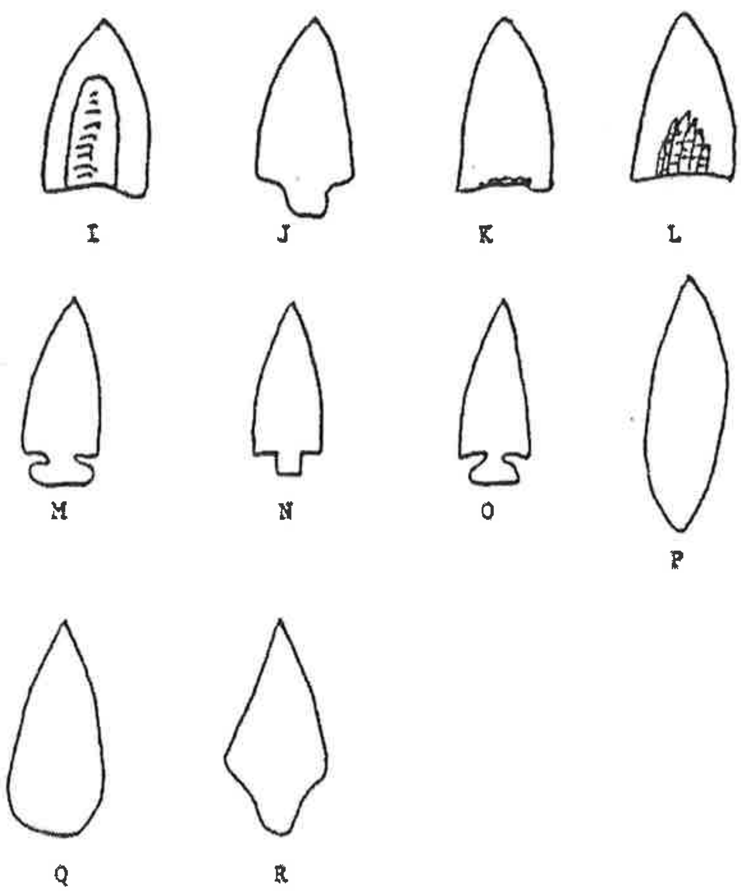
(after Binford)

BASE SHAPES



A. Straight or flat base
B. Subconvex
C. Convex or round base
D. Subconcave
E. Concave
F. Triangulo-concave
G. Bivectoral
H. Trivectoral or barbed

POINT SHAPES



I. Fluted
J. Contracting Stemmed
K. Basal Grinding
L. Basal Thinning
M. Side Notched
N. Straight Stemmed
O. Corner Notched
P. Symmetrical Bipoint
Q. Asymmetrical Bipoint
R. Shouldered Bipoint

X. FINAL SUGGESTIONS FOR ARTIFACT RECOGNITION

A. Make use of every opportunity to closely examine already recovered archeological specimens.

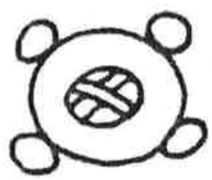
B. In examining specimens, consider not only the overall form but also the minute details of the types of modification they bear.

C. Be familiar with the archaeological literature pertaining to your region.

D. Examine unmodified natural objects – bone, stone, etc. – whenever you can and be familiar with the forms they exhibit.

E. Remember that the artifact types illustrated here are only examples of the more frequently encountered forms and are not intended to represent the total range of possibilities.

F. By actual experiment, try replicating some of the artifact forms to gain knowledge of manufacturing processes.



GUIDE TO FLAKED-STONE OBSERVATIONS

The collection of useful information using the procedures specified in the sparse lithic scatter program depends upon a basic understanding of lithic technology. California archaeological training should include schooling in the fundamentals of flintknapping and lithic analysis. Over 90% of the archaeological material we examine in California consists of flaked-stone; most of that comprising the residues of stone tool manufacture.

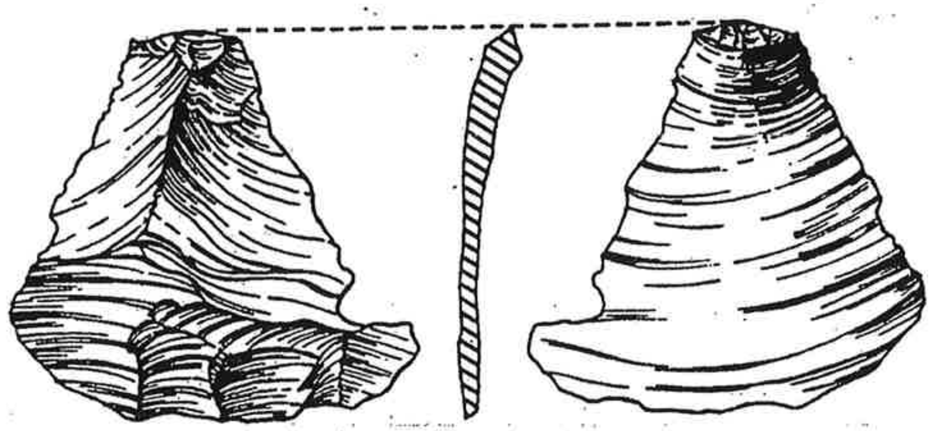
While we encourage agencies and archaeological contractors to employ archaeologists with lithic training for implementing this program, it is unlikely that this will occur in the immediate future. Therefore, this appendix has been developed to accomplish two goals. The first goal is to afford field archaeologists without formal lithic training that intend to use the program, with some basic guidance in making basic observations. The second goal is to begin to develop generally accepted definitions for various flake types and reduction technologies that can be used by California archaeologists and lithic analysts. We anticipate that this appendix will evolve into a much more comprehensive manual that defines basic terms and definitions for lithic analysis.

In the interim, fieldschools and training sessions on lithic analysis are offered annually and we encourage all those who wish to employ this program to examine the following discussions concerning flaked-stone debitage types. Those trained in lithic analysis will immediately notice that many flake types are not mentioned or discussed, and others are discussed as ideal types. From the numerous flake types and definitions that could have been discussed, we have selected only a few as both technologically sensitive and easy to teach with little training. The omission of certain flake types or observations should not prevent more experienced archaeologists from developing procedures and incorporating more flake types as well.

Flake Type Definitions

Biface Thinning Flakes

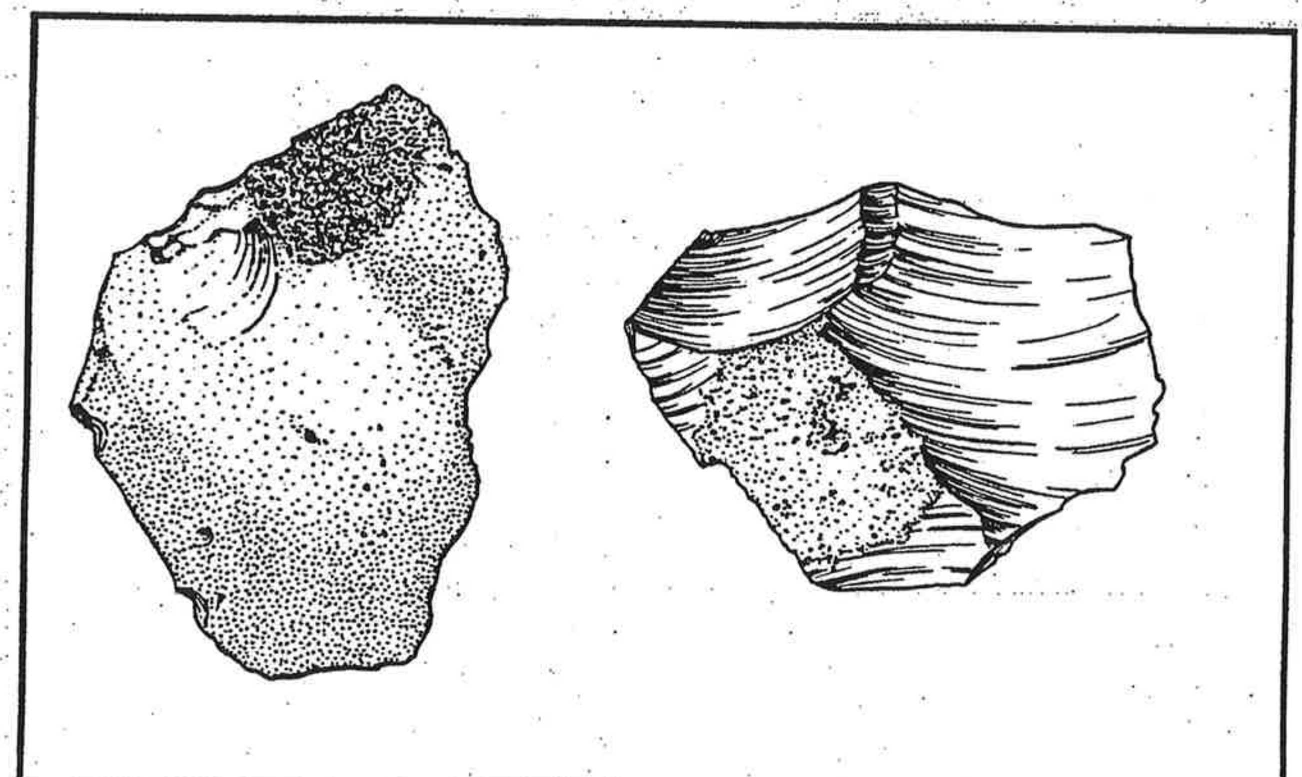
The manufacture of bifacial tools was probably the most common objective of prehistoric stoneworking. Biface reduction involved a variety of specific techniques and stages. While much of the flaking debitage resulting from biface production is difficult to discriminate from



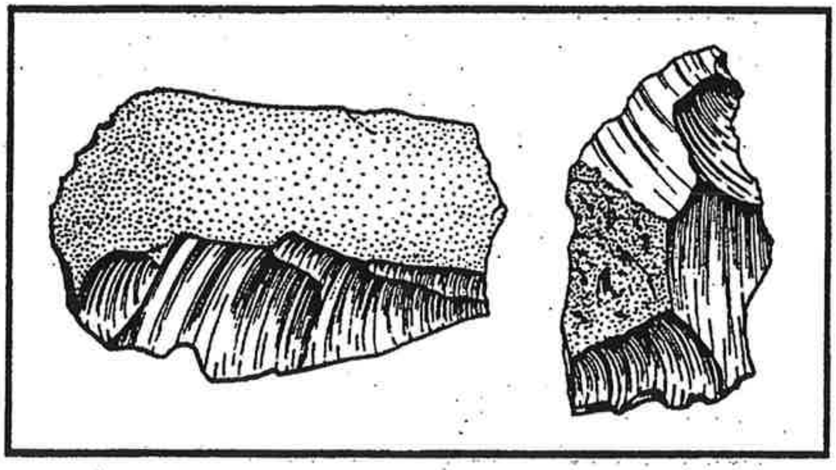
that resulting from other reduction technologies, some stages of biface reduction produce technologically diagnostic flakes. Biface thinning flakes are characteristically produced after the biface has obtained at least a rough oval to leaf-shaped plan profile and lenticular profile. Biface thinning flakes are produced by percussion thinning and shaping. Obvious biface thinning flakes exhibit platforms that bear the remnant flake scars representing the proximal ends of thinning flake scars on the opposite face of the (pre-detachment) biface. This rather confusing technological definition means simply that one can see evidence on the flake platform that flakes similar to those on the dorsal face were detached from the opposite side of the biface. Such flakes may also have an excurvate longitudinal cross-section, and may also have distal dorsal flake scars representing the terminations or distal ends of flakes detached from the opposing edge and same face of the biface. Any two of these characteristics are adequate for classifying a flake as a biface thinning flake. Many flakes classified as interior flakes were often produced during biface reduction, although they lack the necessary characteristics to confirm their technological origin. The most important characteristic for identifying biface thinning flakes is large remnant platform scars. The characteristics that distinguish biface thinning flakes described above are best manifested in obsidian or other highly siliceous, homogeneous material.

Cortical Flakes

Cortical flakes are among the easiest to identify. Cortex is the outer rind or weathered surface of unmodified stone, analogous to the rind or skin on an orange. Cortex often contains cracks, impurities, and irregularities, in addition to obscuring the often attractive visual qualities of the stone. Therefore, an early goal of stoneworking often was/is the removal of this outer cortex. This process is termed "decortication". Flakes that retain cortex on their dorsal surfaces are called cortical flakes. Cortex varies in appearance greatly, depending upon the type of material involved, the geologic formation in which the stone formed or was deposited, or the duration and type of weathering to which the stone was subjected. Cortex can exhibit pitting, rough texture, patination, dull surfaces, crustiness, or embedded impurities. It is important to note that some of these features, such as heavy patina and embedded impurities, are not exclusive to cortex. Cortex will, however, generally lack evidence of concoidal fracture. Cortex on some materials is difficult to distinguish from interior stone, requiring familiarity with regional geology or the parent material to identify.

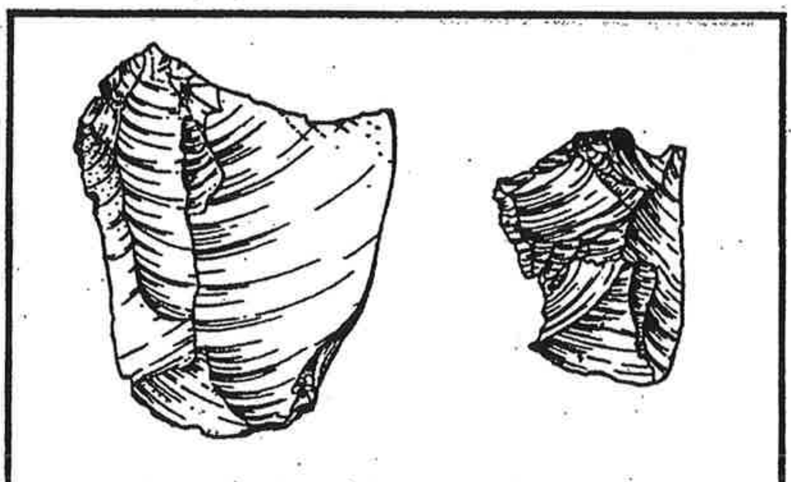


In general, the quantity and frequency of cortical flakes and the degree to which cortex covers the dorsal surfaces conveys information regarding the stage of flaked-stone reduction that occurred at a location. A large number of cortical flakes often indicates the initial or early-stage detachment of flakes from parent stone. If the examined sample of debitage contains large-size cortical flakes (relative to other flakes), the interpretation of early-stage stone tool manufacture is further supported. Not surprisingly, stone quarries contain relatively high frequencies of cortical flakes. *Cortical flakes* have also been called *decortication flakes*, and have been further classified as primary or secondary. Primary cortical or decortication flakes exhibit cortex on the majority of their dorsal surface. Lithic analysts have arbitrarily established the frequency of cortex cover, such as 50% or 75%. Secondary cortical flakes exhibit cortex covering less than half the dorsal surface. though such cover is not extensive. Caution must be excersized, however. Small portions of cortex can remain on a stone tool until relatively late in the reduction process, so the minor occurrence of small secondary cortical flakes should not be prematurely construed as evidence of early reduction.



Interior Flakes

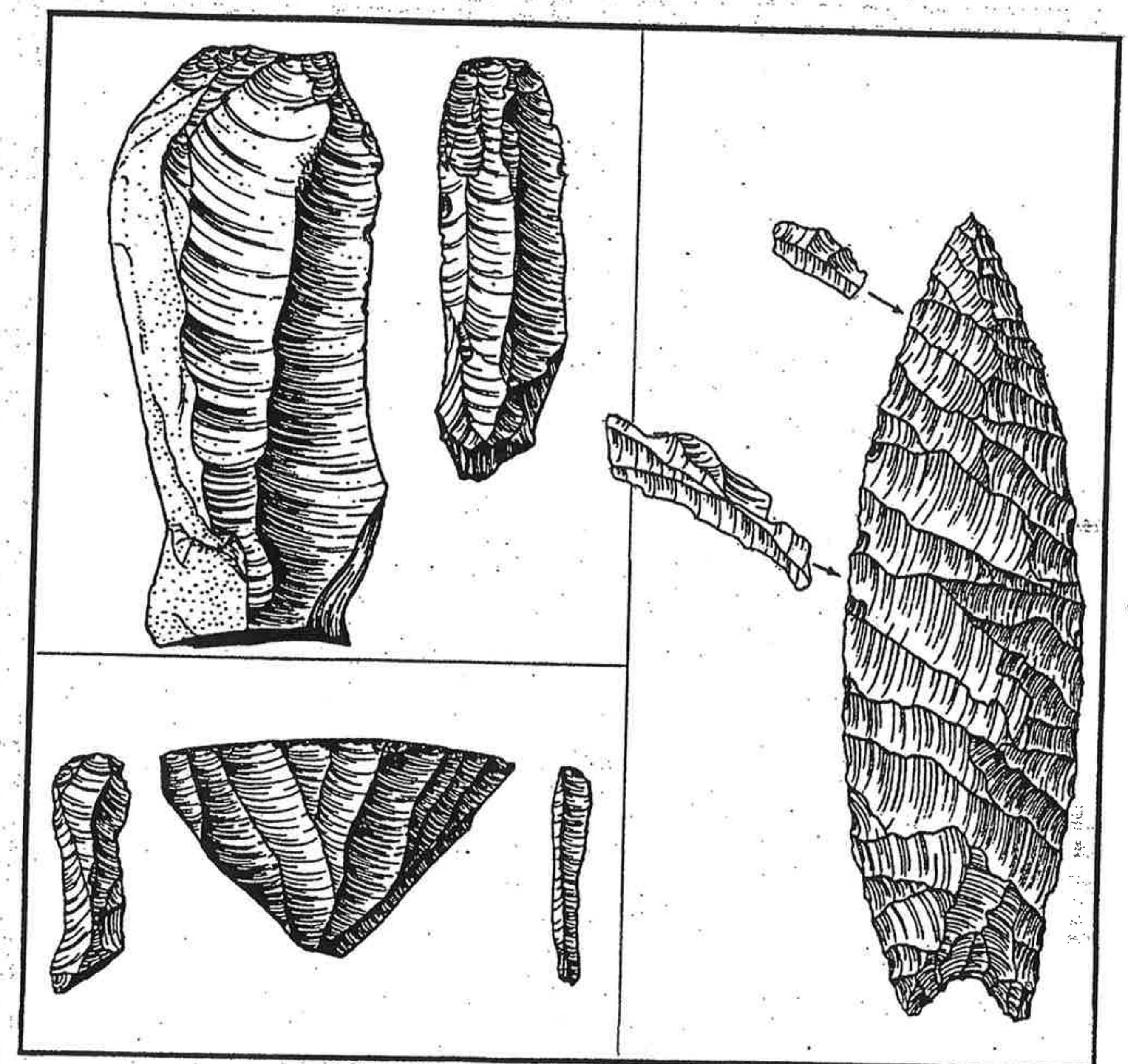
Interior flakes are usually the most common type of unbroken debitage in an assemblage. Interior flakes include a wide variety of forms and result from a number of different reduction technologies. As such, the interior flake category is a "catch- all" category that simply identifies stone tool manufacture that does not evidence initial reduction. Interior flakes often are called *thinning flakes*. Crabtree (1971:94) defines thinning flakes as "Flakes removed from a preform either by pressure or percussion to thin the piece for artifact manufacture. Thinning flakes are removed to thin a biface or a uniface. Usually shows special platform preparation." Even this broad definition is insufficiently detailed to constitute a category of debitage be useful in delineating specific reduction technologies. For the purposes of this program, interior flakes also include flakes detached during core reduction by freehand percussion, if a core tool is the object of reduction, as well as biface reduction by percussion or pressure flaking. Interior flakes could technically include biface thinning, linear, and notching flakes. These other flake types are more technologically diagnostic and should be placed in their respective category when possible, but the misassignment of biface thinning or linear flakes to the interior flake category is *not* incorrect, it is simply imprecise.



Linear Flakes

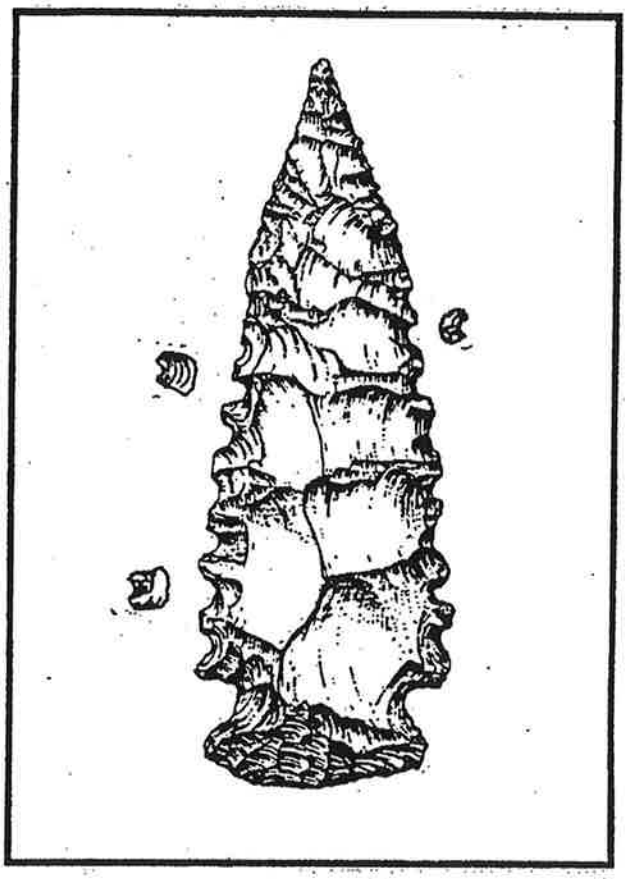
Linear flakes are physically identical to "blades" with regard to formal attributes. Crabtree (1971:42) defines blades as "flakes with parallel or sub-parallel lateral edges; the length being equal to, or more than twice the width. Cross-sections are plano- convex, triangular, sub-triangulate, rectangular, trapezoidal. Some have more than two crests or ridges."

Blade-like flakes are an incidental byproducts of almost any flaked-stone technology, but are technologically salient when they comprise a significant proportion of a lithic assemblage (We won't get into what constitutes *significant*). Linear flakes can be incidentally produced during biface production, core/flake production, and bipolar reduction, to name a few technologies.



Notching Flakes

Notching flakes are produced when notches or pronounced (narrow) indentations are flaked into bifaces. The identification of notching flakes in a debitage assemblage usually signals identifies the late stages of projectile point manufacture at a site. In some instances, the size and configuration of notching flakes can yield insight into the morphology (type) of projectile point, making this flake type potentially useful for determining the time period of site use. Notching flakes are usually produced by pressure flaking. "They are characterized in their ideal form by a circular shape with a lunate platform area: 'In planar view they are shaped like a pie with 1/6 to 1/3 removed [Gilreath 1984:157]'...In reality they can be quite varied, depending upon the size and configuration of the biface being notched. The one attribute they do have in common is that nearly all are removed from an area of low mass." (Skinner 1986:491). Notching flakes are usually smaller than 10 mm in diameter.



Shatter

Shatter is defined as "cubical and irregular shaped chunks that frequently lack any well-defined bulbs of percussion or systematic alignment of cleavage scars on the various faces" (Binford and Quimby 1972:347). One can expect shatter to occur in small amounts with any lithic reduction technology, particularly during initial stages of percussion flaking when relatively large amounts of force and velocity are applied. An abundance of shatter may indicate early stages of reduction. The physical properties of specific lithic materials will play an important role in the amount of shatter that is produced. Obsidian, for instance, is extremely brittle and prone to a greater degree of shatter than many high quality cherts. Isotrophy is another important property that determines the degree of shatter. The greater the number of inclusions and impurities in lithic material, the less predictable the outcome of imparted force and the greater the amount of shatter. The difficulty with this category is discriminating shatter from naturally occurring stone when the tool stone used in the area is indigenous.

Other Flake-Stone Debitage and Artifact Types

A number of additional flaked-stone debitage and tool types could be discussed. However, this is *not* a textbook on lithic technology. We hope that users of this program will have or obtain training in lithic technology. However, the following abbreviated discussion mention additional flake types that yield information regarding the nature of lithic technology represented by assemblages. These additional flake types are included in the Flaked-Stone Attribute Record Field Worksheet. Their inclusion is discretionary but encouraged. The reader is referred to Skinner (1986, Appendix A.2), Gilreath 1984, and Jackson 1981 for additional categories and descriptions. Some salient flaked-stone artifact types that should be recorded on the Flaked-Stone Attribute Record or attached sheets are listed and briefly described below.

Cores and Core Fragments

Cores are defined as central lithic masses (they are thick relative to their length and width) from which three or more flakes have been detached. Core fragments are usually cubical and exhibit portions of two or more negative flake scars. During the course of manufacturing flakes from a core, fragments of that core may be intentionally or accidentally detached. These core fragments are characterized by two or more surfaces that exhibit previous fracture, usually in the form of negative flake scars, and are usually quite thick in relation to their width. There is some morphological overlap with shatter on occasion, but shatter is generally less patterned.

Biface and Uniface Fragments

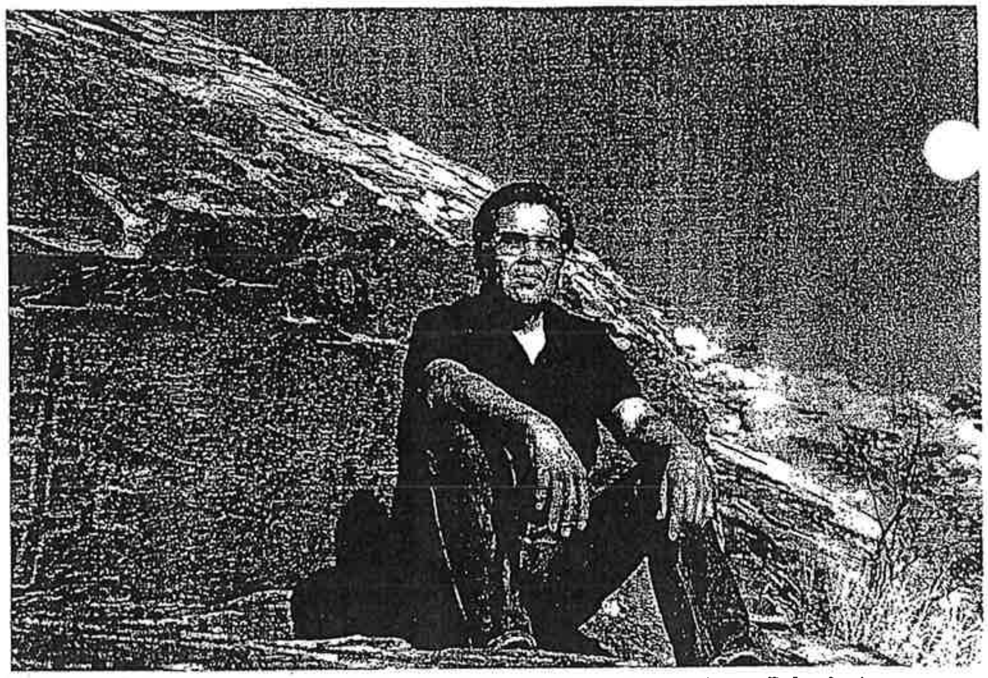
Formal flaked-stone tools are relatively symmetrical in plan outline, and usually exhibit intrusive secondary flake scars. Tool fragments are portions of recognizable and technologically complex end-products, whose forms are repeated and relatively reconstructible from the fragment. In most cases, tools and tool fragments are classified by morphological attributes that avoid functional implications. Bifaces have been defined as artifacts "bearing flake scars on both faces" (Crabtree 1971:38). In most instances, bifaces are thin relative to their width (thickness is usually less than twice the width). Unifaces, artifacts "flaked on one surface only" (Crabtree 1971:97), need not be thin relative to width or length, but unifaces are often thin and plano-convex, and exhibit intrusive, secondary flake scars.

Edge-modified Flakes

Flakes which exhibit secondary modification of their lateral edges, although the origin of that modification is unclear, are classified as edge-modified. This type of debitage may include flakes whose edges have been damaged by post-manufacture trampling, edge preparation during stone tool manufacture, purposeful but limited edge flaking, use, or detachment damage as a result of production force or unintentional contact. This group of flakes is subject to further examination for use-related damage or purposeful edge modification.

CALIFORNIA INDIANS & ARCHAEOLOGY

A Special Report



Anthony Andreas at Andreas Canyon, Agua Caliente Indian Reservation at Palm Springs

Edited by Ray Moisa and Malcolm Margolin. Design by Michelle Cole. Editorial and production assistance by Wendy Low, Yolanda Montijo, Rachel Weston, and Danielle LaFrance.

Box 9145
Berkeley, CA 94709

News from Native California is a quarterly magazine devoted to the history and ongoing culture of California Indians. Extra copies of this supplement are being printed for distribution to members of The Society for California Archaeology in celebration of its thirtieth birthday. We are grateful to the society, and especially this year's president, E. Breck Parkman, for cooperation and financial help in producing this supplement.

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