

INTENTIONAL GRINDING AND SMOOTHING OF STONE ARTIFACTS

Abstract:

Unifacially or bifacially flaked stone artifacts

*which* that have been intentionally made more even by ~~grinding or attrition~~ <sup>attrition</sup>

*or by grinding* the faces for the reduction of <sup>functional</sup> friction, rather than a forming

action characteristic to the Neolithic implements, if present

should be noted when <sup>appraising</sup> ~~appraising~~ flaked stone tools for diagnostic

characteristics.

Intentional surface attrition is a possible diagnostic

feature <sup>which</sup> that may be useful when evaluating flaked stone implements.

To date I am not aware that this particular attribute has been

described in archaeological publications, however now there

is considerable interest in the study of wear on the functional

edges of tools <sup>which</sup> that evidently received continual use resulting

in unintentional attrition.

Abrasion, grinding and polish <sup>have</sup> has long been observed

and described on the basal margins of projectile points and the <sup>use</sup>

preparation <sup>trace</sup> of platforms prior to flaking. It is interesting

to note that grinding is evident on the <sup>surface basal portions</sup> Clovis <sup>points</sup> and other

paleoindian projectile points of the New World while <sup>the</sup> grinding

and ~~the~~ abrasion of platforms on blade cores <sup>generally</sup> has a universal

distribution.

Neolithic implements are <sup>generally</sup> ~~formed~~ <sup>shaped</sup> by grinding all surfaces to form the end artifact, sharpen the artifact. Some are prepared from by ~~first~~ <sup>initial</sup> chipping and then ground while others are formed entirely by an intentional abrasive action.

On the other hand we find unifacially & bifacially flaked flaked stone artifacts which are sometimes made more evenly by grinding or attrition but this is not a forming action but, rather, a means of making the artifacts smoother for easier penetration, & withdrawal. <sup>& cutting, action</sup> In other words - the Neolithic implements are formed by grinding & the bifaces <sup>are</sup> formed by chipping but only ground for ~~the purpose~~ functional purposes.

For the purpose of <sup>the</sup> correctly evaluating diagnostic features of stone implements it is <sup>essential</sup> ~~important~~ that we be capable of separating the various implications of grinding & attrition. <sup>on stone artifacts</sup> Some grinding & attrition is the result of the ~~mfz~~ process. <sup>But generally it is a modification</sup> For example Neolithic implements are formed & shaped by grinding & abrading all surfaces to form & sharpen the end.

*abraded the platform surface*

~~Abraded surfaces aid the stoneworker in detaching flakes and~~

~~blades by strengthening the platform part thereby preventing crushing of~~  
*the platform which would only allow*  
~~and partial removal of the flake or blade, to be detached. The~~

~~smoothing and rounding of the ~~part~~ acute edge of the~~

*profimal end*  
~~part of the projectile to be inserted into the shaft no doubt~~  
*was no doubt smoothed + rounded*

~~to prevented severing of the lashings or servings when~~  
*inserted +*  
~~affixed to~~

~~the shaft . Intentional abrasion appears to have been quite~~  
*was quite*

~~prevalent among the paleoindians because of the possible use~~  
*due to their advanced tech*

~~of thrusting spears and an advanced technology of precision~~

~~platform making. The artifact generally classed as an arrowhead~~  
*+ possible use of thrusting spears*

~~seldom, if ever, shows any basal grinding because after one flight,~~  
*exhibits*  
*due to the rarity of*

~~an intact un damaged point would be unusual. An exception is~~  
*recovery of an*  
*which survived even one flight*

~~the Hopewell beveled notch used repeatedly as a knife, an example of the~~  
*knives for*

~~Hopewell beveled points that were evidently affixed to handles~~  
*These*  
*with fastening to handles*

~~by lashings, they show polishing at the ~~part~~ that is hafted.~~  
*hafted*

*We can hypothesize then*  
~~One can then project the thought that there would be a separation~~  
*of projectile points +*  
~~of the implements intended for continuous and repeated use would~~  
*but the grinding or look of polishing on basal portion*  
~~These intended for hafting + sustained + repeated use would be~~  
~~have the part to be hafted specially prepared by time consuming~~  
~~intentionally ground at the basal portion - those intended~~  
~~grinding and polishing to insure the longevity of the tool.~~  
*for a one shot kill would lack this basal grinding + polish*

Surface attrition of one <sup>face</sup> (uniface) or two <sup>faces</sup> (biface) surfaces

~~is not~~ ~~has not commonly been observed or at least not described as one~~

of the diagnostic traits of prehistoric people. <sup>However this can</sup> I have noticed

~~this particular feature when examining collections of lithic artifacts~~ <sup>be a pertinent diagnostic feature</sup>

~~is observed in collections~~  
The ground and polished faces, have generally been on paleoindian

artifacts. <sup>appear to be an intentional smoothing of the surface rather than the result of function</sup> It was recently brought to my attention again by an  
~~Recently, Gene Titmus, secured an~~

exquisitely ~~worked by~~ parallel diagonal flaking <sup>ed</sup> chalcedony knife  
~~in mint condition. This was a surface found~~ <sup>found on the surface in mint condition by Gene Titmus while on a</sup>

~~deer hunting expedition in the~~ <sup>the</sup> in Shoshone Basin located in

South Central Idaho. The knifelike Oviate <sup>is</sup> was approximately

twelve Cm. long <sup>with</sup> five Cm. wide and four Mm. thick and having

very sharp margins. ~~What is interesting and significant is the~~

~~surface of the artifact is that that~~ the ridges of the flake

<sup>on end face</sup> scars, have been ground and polished. <sup>with accuracy + precision</sup> When the surface <sup>is</sup> has been

prepared by <sup>this</sup> the smoothing process, friction and drag <sup>are</sup> have been

substantially reduced ~~there~~ by allowing repeated deep cut <sup>is action</sup> with

a minimum ~~amount~~ of effort. When deep penetration is desired, <sup>whether</sup> whether

<sup>the implement is used as a</sup> by knife or thrusting spear, the smooth surfaces of both faces <sup>facilitate</sup> aid

<sup>the cutting or thrusting</sup> the user immensely. The spectacular Clovis points from the Simon Site

in Idaho ~~as~~ described by Swanson (Tebiwa ????) are superb

examples of <sup>intentional</sup> surface smoothing, <sup>are</sup> they being of a design suited ~~for dispatching of large game animals by the deep~~ ~~penetration of thrusting spears, as opposed to those that are~~

~~penetration of thrusting spears, as opposed to those that are~~

~~were~~ affixed to a foreshaft and propelled by the throwing stick

or atlatl. Once a spear is thrown or cast the hunter is weaponless <sup>it is even possible that these the Simon points were used for butchering in which case the surface smoothing would make the foreshaft</sup>

and unless the projectile scores a <sup>fatal</sup> hit the stone point will

likely ~~to~~ be fractured, <sup>requiring</sup> therefore a backup supply of spears would

~~to first accomplish the kill~~ ~~seem to be imperative to the final demise of the beast.~~ A single <sup>it would seem unlikely</sup>

throw or cast of the spear would seem unlikely to put an animal

~~result in the instant kill of an animal as large as~~

like the giant bison or an elephant, in ~~the~~ death throws. ~~However~~

a shorter spear fitted with the classic Simon, <sup>polished</sup> fluted point with

<sup>ideal</sup> polished faces is ideally designed for ~~infighting and repetitive~~

deep thrusting of the spear <sup>a closer proximity & resulting in a quicker kill</sup> causing a ~~hasty demise of formidable~~

<sup>A skillful</sup> opponents. The skill of the hunter could <sup>use this type of implement</sup> prolong their usefulness

indefinitely barring accidental breakage from mishandling or <sup>the tip</sup>

striking bone. When one considers, <sup>the soft shell & meticulous precision necessary to produce these fluted faces with ground surfaces is a great endeavor that it</sup> the securing of the lithic material <sup>was</sup>

<sup>the steps would to arrive at the end product under many stages of mfg.</sup> the ~~meticulous~~ manufacturing stages, plus the grinding

and polishing <sup>indicating the worker was trying to produce an implement that would endure thru many kills</sup> in themselves are time consuming. Too when one

~~it was not an easy task to secure the proper~~ considers the securing of the abrasive media <sup>for</sup> and the rubbing

<sup>and</sup> or lapping <sup>stone which would have to have</sup> of a material with a hardness of seven on the Mohs

scale, of relative hardness. The minerals that exceed the hardness

of seven are limited to only a few minerals when one eliminates the use of diamond. Metamorphic rocks are the usual sources of minerals with a hardness of eight or nine, Garnet probably being the most common. <sup>are</sup> Corundums being harder ~~(9)~~ than garnet <sup>(9)</sup> and ~~by the same token being harder to find because of their limited~~ <sup>have a</sup> distribution. The <sup>Columbia River Plateau</sup> Northwestern United States has a predominance of extrusive basalts <sup>which</sup> that are comparatively recent geologically. ~~the area is known as the Columbia River Plateau a geological~~ <sup>which restricts</sup> situation that limits the exposures of metamorphic rocks and consequently limits the ready availability of adequate abrasive materials. <sup>it was undoubtedly</sup> Good abrasive material was probably more difficult to obtain ~~than good~~ <sup>abrasive material than to secure for the proper stones for artifacts</sup> good artifact materials. I am aware of only one archaeological occurrence of abrasive material in situ, <sup>is</sup> this was a piece of <sup>mica</sup> mica shist containing ~~many~~ garnet crystals, <sup>which was</sup> excavated by Dr. Marie Wormington at ~~Kersey Colorado~~, an Agate Basin butchering Site. <sup>in Kersey Colorado</sup> The <sup>artifacts</sup> points at this site bore evidence of grinding and smoothing of the basal parts. I do not recall <sup>a</sup> any smoothing of the faces, however a reexamination of the artifacts may reveal that the points were designed for repetitious use, or <sup>to</sup> serve <sup>the</sup> a dual purpose ~~of being used as knives at the butchering station as well as tips for spears.~~ <sup>as</sup>

Unintentional or functional attrition should be considered

before <sup>making a final</sup> ~~passing judgement in~~ an appraisal of artifacts. It is

<sup>common to find in collections</sup> ~~not uncommon~~ to observe large pointed bifaces that <sup>which</sup> would appear to

<sup>have functioned</sup> have been used as hafted digging or planting tools that <sup>showing attrition on</sup> have both margins

and both faces <sup>apparently</sup> attrited from repeated thrusting into the ground.

Silica sand and grit <sup>has</sup> will have an abrasive and burnishing action

<sup>stone</sup> on the artifacts. Flints and silicious materials <sup>used to make</sup> from which the

artifacts are made ~~have~~ approximately the same hardness as

~~the~~ quartz sand and the abrasive action is very slow <sup>as</sup> when compared

<sup>the worker</sup> to <sup>with</sup> intentional grinding using an abrasive material harder than

<sup>also</sup> quartz. The character of ~~the~~ functional abrasion is quite

different than ~~the~~ intentional smoothing. Striations <sup>resulting from</sup> of functional

<sup>functional</sup> alteration start at the functional end and are directed towards

the base in one direction <sup>and</sup>. The leeward side of any protusions

<sup>will not be altered by</sup> <sup>on the other hand,</sup> is absent of the abrasive action. The intentional smoothing is done

from both directions <sup>by</sup> for the use of a rotary motion and <sup>will have</sup> corresponding

striations <sup>and</sup>. The margins are not affected by <sup>intentional</sup> the surface smoothing.

Details of functional ~~polish~~ and attrition of implements

other than projectile points should be noted in order to <sup>and compared</sup> differentiate

<sup>basis for</sup> between the the intended function. <sup>from a</sup> Corn polish or silica deposits

acquired from reaping grain, grasses or other ~~vegetal~~ materials

*having*  
with a high silica content are not to be confused with other

wearing away attrition and intentional abrasion. ~~For~~ *A separate & display study* unintentional

wear and functional attrition *found* on scrapers, adzes and their flakes,

hoes and other *cutting* tools with acute angle margins of ~~cutting~~ tools

*This study is not included here for it is*  
is another complex study of stone implements and how they were held *the tools*

, hafted, used, and the tasks performed by them on what materials.

*We also find*  
~~Also to me mentioned~~ is unintentional abrasion *on* of the

faces of elongated bifaces *which* that have the appearance of knives

or spear points that could *& this easily* be confused with *the* intentional smoothing

of thrusting spears and knives. The article in the ~~Museum Journal~~ *Idaho State University*

~~#####~~ "The Obtuse Angle as a Functional

Cutting Edge" *Tebina* Vol. 16, No. 1, 1973 explains *how such implements* the use of these *such*

*were used as* implements as files, hones and rasps. The surface of the *This article also explains how*

biface is characterized by a series of flake scars directed

inward from both margins to and across the median line.

*The detached flakes leave a series of*

The scars are a series of ridges and troughs *which make an adequate* and serve admirably *implements*

*use* well as a forming tool when used on hard resistant materials. Upon *when*

*they are continually* continuous use on a hard surface *such as* jade for an example, the

ridges will become rounded and smoothed until they resemble

bifaces *which* that have been intentionally ground and smoothed to reduce friction and drag.



When one is evaluating artifacts <sup>to determine</sup> for intentional or <sup>attrition</sup> unintentional attrition due to facial smoothing or, <sup>unintentional attrition</sup> due functional

processes. <sup>we should also</sup> ~~##~~ Also be considered is attrition due to natural

causes. One <sup>perplexing</sup> example that may prove to be perplexing <sup>due to the</sup> because of

<sup>Lack of</sup> the provenience in which it is found are the <sup>unhafted</sup> artifacts that have <sup>which</sup> been transported in an unhafted state and that have been allowed

to become burnished and abraided on all surfaces from being <sup>as a result</sup> of rubbing together in a transported long distances when a number of them are carried from

place to place in a pouch or yielding container. When they <sup>pouch</sup> unwrapped <sup>unwrapped</sup> and unprotected and allowed to jossel against one another their

<sup>panch the</sup> continous movement against one another will result in abrasion

<sup>on both</sup> of their surfaces and in particular the margins and ridges of the <sup>acts as an</sup> flake scars. Even tho the materials are of simular hardness

<sup>be more pronounced on</sup> the surfaces, <sup>from such movement</sup> they will become burnished and worn. This type of wear is more

characteristic to blanks, preforms and unhafted artifacts. The

large ~~ovate~~ <sup>Simon</sup> oviate bifaces from the clovis ~~Simon~~ site in

Idaho bear <sup>these</sup> ~~out~~ this characteristic, this does not apply to

~~the~~ finished projectile points <sup>which exhibit</sup> that bear the evidence of intentional

<sup>we have noted examples</sup> smoothing. Another situation of smoothing and polishing may <sup>surface</sup> be on occasion noted on superb examples of flaking on sections <sup>on projectile points broken sections of points which are,</sup> which were out of context with associated artifacts, of possibly broken projectile points that are out of context

I have on several occasions worked found these/pieces on the surface

of comparative recent indian campsites in association with arrow points •

*The arrow points were made entirely by pressure from simple flakes, and randomly flaked by an inferior knapping technique, often curved on the ventral side with a minimum amount of*

flaking on that side. The recent points show a lack of skill and

impatience in their making that cannot be compared to the parallel

, precision pieces that were, no doubt, held in esteem, because of either

*ascetic value or fetishes of the medicine man. These beautifully so discordant with the arrow points associated with the worked pieces were no doubt carried with other treasures over a considerable*

*period of time until they became smoothed and polished an other example of unintentional attrition.*

Another circumstance or condition hardly worth mentioning

because of the obvious context in which artifacts are found. It is

unintentional and natural attrition ~~due to~~ *can also be the result of* obviously due to

natural action of the elements. To list a few is the action of the

wind blowing abrasive sand associated with eolian conditions and

ventifacts. Another group of circumstances is the water action

in association with abrasive sands as on the beaches of seas and lakes,

The turbulence and movement of sand and water in streams and river

bottoms, false boiling springs can induce a polish. These are but a only

It is to be considered when making a final evaluation

of attrited/flaked stone artifacts.

*the surface was found in green. These pieces by the owner since they are were. Campsite it is safe to assume that they were smoother + polished. Another circumstance or condition hardly worth mentioning because of the obvious context in which artifacts are found. It is unintentional and natural attrition due to natural action of the elements. To list a few is the action of the wind blowing abrasive sand associated with eolian conditions and ventifacts. Another group of circumstances is the water action in association with abrasive sands as on the beaches of seas and lakes, The turbulence and movement of sand and water in streams and river bottoms, false boiling springs can induce a polish. These are but a only*

*and*

*as of*