COMMENTS ON USING THE LOW OR OBTUSE ANGLE OF STONE TOOLS AS A CUTTING EDGE

The interpretation of the diverse functional uses of stone tools has long been a theoritical enigma. What materials was ancient man forming, altering or modifing with his stone tools and at what angle did he hold the working tool. Were they held just in the hand when performing these tasks or were they affixed to a handle or holding devise, adhered to other materials, or lashed to stocks and shafts?. Many stone artifacts have been placed in typological categories which imply function. Some are correctly typed because of actual observation and ethnographic accounts. Other functions are based on theory which ~~types~~ places like implements bearing certain technological characteristics into useful Typological categories. As a result, artifacts not conforming with these catageories are said to be non-diagnostic and are often discarded as debitage and lithic debris, flakes, EXAUSTED cores and general manufacturing by-products.

The use of the obtuse angles on artifacts as a working edge has generally been overlooked or ignored, ~~and r~~ Recent functional experiments indicate these low angles provide additional diagnostic traits. Careful study of the obtuse edge on artifacts may reveal functional scars and wear patterns. We know from experiment and archaeological evidence that the acute angle on a flake or blade is a very adequate cutting edge for yielding materials, but have failed to consider the functional value of the obtuse angles of more than ninety degrees and less than one hundred and thirty degrees.

Functional experiment reveals that the obtuse angle on stone tools can perform tasks impossible to complete with stone tools having edges of ninety degrees or less. The innovation engraving tool resulted in the core slipping and its corners breaking after a few passes - generally when the tip was lifted upward to terminate the cutting action. After a minimum amount of work on hard material, the right angle edges of the burin core would crush due to micro step flake scars forming on the margin causing the edges to crush. However if the burin blade was removed at more or less than a 90° angle to the margin of the core, both acute and obtuse angles were formed on the core's edge. The acute angle was excellent for working soft woods and the obtuse angle was good for forming more resistant materials. Failure to adequately use an angle of ninety degrees or less is probably due to a lack of understanding of the proper use of the many prehistoric styles of burins.

The natural facets on quartz crystals can also be used as forming tools but are not as efficient or effective as the artifically made obtuse angles on cores and other tools. The natural facets on the crystal are plane surfaces, while those made by removing a blade or flake from a core leave concave surfaces between the obtuse angles giving a sharper cutting edge. If the crystal is made into a blade core by removing blades longitudinally, the obtuse angles of the blade scars are a far more efficient cutting tool than the natural facets. However, a quartz crystal from Bandarawela Celon showing bruises on the natural obtuse angles may well be the result of function. (Illustrated in "The Stone Tipped Arrow", Bridget Allchin, Fig. 30, No. 34, Barnes and Noble, New York, 1966).

Another functional experiment was the use of a strangulated blade. Archaeological specimens from the El Inga site in

Eucador were brought by Carl Phagan to the 1970 Lithic Technology field school. We made replicas of the originals from obsidian. Archaeologically, the strangulated blade has been functionally categorized as a spokeshave. We attempted to use it in the manner of a modern spokeshave by placing the concavity of the blade on a wooden shaft and pulling the ventral side of the blade toward the worker. This removed only a slight amount of wood and left a very irregular cut on the shaft. If additional pressure was applied to the blade, it would break. We then noticed striations on the ventral side of the El Inga specimen between the two opposing concavities which comprised the strangulation. Both concavities sere well as a cutting surface. The striations gave us a clue as to how the implement was held and used. The striations indicated that the slightly convex ventral side of the blade was placed flat on the wooden shaft being shaped. The convex surface acted as a bearing and aided the adjustment of the depth of the cut being made. When we used the strangulated blade in this manner, it made a flat smooth cut and required little force to remove a clean shaving. The opposite concavity on the blade permitted the worker to tilt back the blade to terminate the cut. When used in this manner, the blade did not break because little force was necessary to remove shavings from the material being formed.

Further functional experiments showed that the angle of the cutting edge of a blade can be made acute for soft materials or obtuse for cutting harder materials. But if the cutting edge is too acute or is used improperly, use flakes were removed from the ventral side of the blade rather than the concave portion of the strangulation.

Obsidian polyhedral cores from the Metro excavations in Mexico, D.F. were shown to me by Dr. Jose Louise Lorenzo 1970. Again, the cores showed apparent use of blade scar ridges, including one core showing that the distal end was used as a drill until the core had become completely cylindrical.

Through Personal communication with Dr. Denise de Sonneville Bordes (1970) I learned that she has noted evidence of functional scars on the dorsal ridges of blades from the Upper Paleolithic of Southern France.

Personal examination of a blade from the Clovis site at Murray Springs, Arizona (1969) showed intensive wear and polish on the dorsal ridge while the lateral margins were still quite sharp. This suggests that the ridge was used as a cutting implement before the blade was detached from the core and when ~~it~~ THE RIDGE became dulled was detached from the core.to expose two fresh useful ridges.

The core with multiple low angle ridges would have been an ideal implement for rapidly shaping the shaft wrench made from the long bone of a mammouth ~~and~~ found at Murray Springs. (Science, Jan. 12, 1968, Haynes and Hennings)

Obsidian polyhedral cores from Teotihuacan, ~~Pubela~~ Puebla, Colima, and on the coast in the State of Nayarit were personally collected by the writer and bear evidence of use of the blade scar ridges.

Obtuse angle burins derived fromspecially fractured thin expanding flakes. Found it impossible to make this style of burin by conventional techniques. Wooden pressure tools for removeing blades.

Stationary percussor technique,the greatest amount of kinitic energy with the least velocity. Core top removal, blade making.

Back hand percussion flaking, blade making.

Attempts to rejuvinate core tops by heat and cold differential, no success.

A number of experiments on function, at no time did the experiments cause polish on the use edge, four hours of grass cutting only caused a trace of polish where the stone scikle was held in the thumb and fingers.
The experiments involveing the obtuse angle edge was highly successfull. The obtuse angle edge would modify hard materials like horn antler and bone with ease. Varieties of several hard woods were planed with about the same ease as if a steel plane wasused.
Fire pits were used for altering minerals with considerable success.

Flakes were studied for characteristics related to tools techniques and stages of manufacture. Platforms were examined for angles and a variety of different preparations.
Aboriginal specimans were studied, replicated, and related to pertnint techniques.

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