EDGE-GROUND COBBLES AND BLADE-MAKING IN THE NORTHWEST

Edge-ground cobbles have been reported from archaeological sites in the Pacific Northwest (Butler 1962; Kressman) Swanson 1962) as well as from other areas of the New World(e.g. Lewis 1941; McGimsey). They are variable in type and problematic in origin and function. All are commonly water-rounded, oblong river cobbles with one ground or polished edge parallel to the long axis of the cobble. The material is usually quartzite or gneiss or rhyolite or fine-grained basalt. Variations in form include the possession of more than one ground long edge; the presence of two tangential rather than one perpendicular facet on a long edge; pounding of one or both ends in addition to the grinding of the long edges; facets which are sometimes roughly ground and abraided to facets which are extremely flat and so highly polished as to form a new surface on the cobble.

The production of such tools has been thought to involve some degree of deliberate preparation as well as some degree of wear as a result of use. Oscar Lewis suggested in 1941 that specimens with two or more tangential facets were used on the northern Plains in the working of skins, especially bison skins. It is entirely possible that the rubbing of skins in early stages of tanning might produce the high polish on the facets of some edge-ground cobbles, and it is an aspect of edge-ground cobbles which should be tested by experimenting with contemporary river cobbles and skins. Another function has been suggested by Butler (1962) as a result of the discovery of anvils with convex but striated and polished surfaces in the same deposits as edge-ground cobbles. He has suggested that edge-ground cobbles and anvils were associated with the processing of root crops such as camas and kouse. Here too a simple experiment with cobble and anvil and camas bulbs might provide some insight into the possibilities for some edge-

ground cobbles. Those found in the Columbia Plateau are more often single faceted along one edge than were those reported on the northern Plains by Lewis so that at least two functions may be responsible for the production of edge-ground cobbles.

There is a third explanation for some of the edge-ground cobbles found in archaeological sites in the Pacific Northwest; and this may very well be because the long edge of some of these cobbles ~~were~~ was used as the striking area for blade detachment. During the past year, experiments in the production of blades from prepared cores have included several methods of direct and indirect percussion as well as the production of blades by pressure (Crabtree,1968) One of the direct percussion blademaking methods - which we shall call the "edge-ground cobble technique" - involves using the long side of an elongated and ovoid cobble with one or more natural (straight to curved) ridges longitudinal to the transverse section as the striking part of the hammerstone. The cobble which is triangulate in transverse section is comfortable to hold and it is relatively easy to align the edge with the pre-established ridge of the core. Size of the cobble must be in proportion to the area to be fractured and to the desired size of the blade. Cobbles can range in size from one and one-half to three and one-half pounds. Cobble material is selected to suit the nature of the material being worked - the more vitreous the material, the softer the texture of the hammerstone. For example, obsidian is best worked with semi-hard sandstone, limestone, or non-vesicular basalt; while the more resistant varieties of silicous materials are best worked with cobbles which are of a more durable texture, such as granite, diorite,etc. Always, the hammerstone must be softer than the material being worked. For the edge ground cobble technique, this is an essential requisite, for it allows the harder stone of the platform to "bite" into the softer edge of the cobble. A cobble which is too hard would merely slide across the leading edge without detaching a flake or blade.

The edge-ground cobble serves as a multi-purpose tool; (1) The ends of the cobble are used to preform the core, i.e. prepare platforms, margins, remove cortex and non-homogeneous parts, make the core regular and form a ridge to guide the first blade. This gives the ends a battered appearance; (2) The longitudinal edge is used to remove the overhang left by the bulb of force and to slightly abrade and round the platform; Longitudinal edge is used as the striking area to accurately detach blades from the core. This flattens the striking area along the longitudinal ridge, or ridges, forms another facet, and the cobble becomes edge-ground. (Fig.)

For some time, one of the anomolous techniques of blademaking has been the aboriginal method of detaching from cores blades which have very small platforms in relation to the large ventral fracture surface. Mechanically, it would not seem feasible to repeatedly strike off such blades by the ordinary direct percussion technique without a collapse of the small platform; and, physically, it would seem impossible to attain the degree of repeated accuracy necessary for detachment. Experiments have shown that by using the long edge of the cobble, the worker can more accurately guide the detachment pattern and overcome these mechanical and physical problems. True, the punch technique will remove blades with small platforms when the area for seating the punch is specially prepared by orientation and, sometimes, by grinding. (Bordes and Crabtree,1968) However, blades made by the punch technique will not have the same characteristics as those detached by direct percussion and, in this case, by using the edge of a cobble as the striking area.

Core Preparation:

If a natural plane surface is not present on the rough material, the core is prepared by using the end of the ridged cobble to remove a large flake from the top of the proposed core to make a platform.

Generally, the platform area is made at right angles to the long axis of the core. Then the platform is roughened by dragging the edge of the cobble across the platform face and over the leading edge of the core to eliminate any overhang and permit purchase of the hammerstone. The edge of the cobble is then pressed on the leading edge of the core and pulled toward the worker causing small flakes to be removed from the dorsal side of the platform part. This action is repeated several times until the center of the striking platform is aligned and oriented with the proposed blade. The core is preformed by establishing one or more ridges longitudinally from the proximal to the distal ends of the core. Ridge is established by alternately removing flakes from the margins. (See Bordes and Crabtree,1968) The ridge prevents the blade from spreading and its scar establishes two ridges to guide the subsequent blades from the working face of the core.

The edge-ground cobble technique allows the worker to remove blades or flakes with or without an anvil support; or he may rest the core on the inside of the left thigh. However, if the left thigh is uses as a rest, the flakes and blades will be strongly curved and often the distal end of the core will be removed with the blade. But the thigh support is very satisfactory for the initial preforming and preparation of cores prior to using a more rigid support for blade detachment.

After the core is preformed and platform prepared, it is placed on an anvil - either stone or log. If the anvil is stone, it must be covered with a protective medium such as leather, bark, etc. to prevent damage to the distal end of the core. The worker assumes a kneeling position in front of the anvil for the proposed blademaking. With the left hand, the worker supports one edge of the distal part of the core on the anvil and leaves the working edge unsupported and overhanging the anvil to permit clearance for the blade detachment. The cobble is held

(in the) right hand with the long axis parallel to the forearm and the ridge of the percussor facing the core for striking. (Fig.) To get the "feel" of the striking pattern and to properly align the edge of the cobble with the ridge on the core, the cobble is placed at a low angle on the leading edge of the platform face of the core. Several passes are made without actually striking until the worker computes the path of flight and gauges the weight of the hammerstone. The long edge of the cobble acts as a guide and allows greater tolerance and accuracy than is possible when using the hammerstone in the conventional manner.

The amount of force imparted by the percussor to the platform is relative to the size of the hammerstone and the velocity of the blow. Amount of force is also calculated to correspond with the type of material being worked and the size of the area to be fractured. Decreased velocity approaches pressure and is used to an advantage in the edge-ground cobble technique. One cannot emphasize too strongly the importance of practice to obtain the "feel", rhythm, coordination of muscular motor habits, and velocity of the blow when applying the percussor to the objective piece.

In this case, when the proper velocity is attained on the downward stroke and the edge of the cobble contacts the platform of the core, the hammerstone is pressed inward to detach the blade. The result is a blade with a very minute remnant of the striking platform. Repeated detachment of blades by this method will widen the edge of the cobble and, therefore, it must be slightly tilted, or turned, to expose a more defined edge to contact the small platform area on the core.

After each blade is removed, the platform is re-prepared in the above described manner and the next blade removed in the same way

as the first. This preparation and blade removal is repeated until the platform area is exhausted, or until the worker errs in his calculations or encounters previously undetected non-homogeneous parts in the material. This technique erodes and abrades the edge of the cobble hammerstone due to friction between the core and the percussor. The cobble will ultimately become quite flat and too wide to accurately detach blades and, therefore, is discarded.

Blade Characteristics:

Blades removed from the core by the edge-ground cobble technique will generally have very small platforms - scarcely one millimeter from dorsal to ventral side - and on some blades the platform is non-existant. The width of the platform is determined by the amount of surface contacted by the hammerstone. If the blow is accidentally delivered too far into the platform, the blades will have a larger platform and generally will have eraillure flake scars on the bulb of percussion. Blades with very small platforms are generally without eraillure scars and the bulbar part is usually diffused and quite flat. Blades detached by the edge-ground cobble technique have very little curve and the distal ends terminate by feathering. They are generally without compression rings on the ventral side - unless the blade is made exceptionally thin. If the thigh is used as the support for the core with the edge-ground cobble technique, then the blades will be strongly curved. But if the padded stone or log anvil is used as the support, the blades will be quite flat with only a very slight curve on the ventral side.

Conclusions:

The edge-ground cobble and blades produced experimentally (Fig.) replicate archaeological specimens in the Northwest (Fig.) In Idaho, blades with small roughened striking platform remnants and tiny bulbs of percussion occur in the Weis Rockshelter near Cottonwood (Butler 1962). However, it should be pointed out that the cobble showing functional edge ground scars as a result of being used as a hammer in the manufacture of blades from prepeared cores does not effectively replicate all of the edges on edge-ground cobbles found in the region.

The cobble which is used in the edge-ground cobble blade manufacture technique is abraded rather than polished whereas many of the archaeological specimens have finely polished faces which represent new surfaces on the cobble as a result of their special use. Further, the abrasion on the edge-ground cobble hammerstone tends to be more irregular in distribution and does not have as flat a facet as is found on many of the reported edge-ground cobbles. Still the cobble which is edge-ground as a result of blademaking is an adequate replica of a number of archaeological specimens, and it may well be that the edge-ground cobble as a recognizable form has two or three functions rather than a single one. This may, in time, lead to some distinctions within the type as it is now recognized in the Pacific Northwest.

Additional experiments are necessary with the edge-ground cobble technique to more accurately define the characteristics which will identify blades manufactured by this method.

Edge-ground cobbles were noted at the Goldendale site by Warren, True and Touhy (Tebiwa 1963,Vol6#1) and Distribution of Metates and Mullers by Malcom Farmer (Tebiwa,Vol 3 #1,2,1960)

Note: This paper should be accompanied by an outline map of the Northwest showing archaeological sites which have yielded edge-ground cobbles