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DEPARTMENT OF GEOLOGY
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Dear Don -

As you can tell from the enclosed essay, I had the freakish experience of seeing so many flint-knappers making thick bifaces the wrong way this summer that I just couldn't keep my opinion bottled up any longer.

Yet, as the essay also indicates, I'm relatively unread on lithic technology and don't want to make a complete idiot of myself by getting into print with something old hat or all wet. So I'm sending copies to a few people for comment.

Your reactions would be much appreciated.

Regards -
Jack

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SOME THOUGHTS ON FLINT CHIPPING FROM A TYRO

Jack T. Hughes

I am amazed. Have archeologists who are doing flint chipping nowadays become victims of cultural conditioning? Have all of them learned how to make thick bifaces from the same teacher? Why are so many of them doing it the same way, when a much faster and easier method is available?

This summer I have had the opportunity of watching one skillful flint knapper after another produce thick bifaces from large slabs of flint. I have become more and more impressed by the fact that all of them are using the same technique, and that not one of them is using a different technique which I have found to be much more efficient and far less demanding. The technique is so simple and effective that I have become increasingly surprised at finding one experimenter after another who has not stumbled onto it. Even more puzzling is the fact that whenever I tried to demonstrate and explain the technique, there was little interest in trying it out. Have these experimenters become prisoners of their own highly developed motor skills?

I am no specialist in the "archeological subdiscipline of lithic technology replicative experimentation." In other words, I am not an expert flint chipper. Although I have done some flint chipping occasionally for more years than I care to remember (almost as far back as the Stone Ages), I am relatively untutored, unpracticed, and unread on the subject. For all I know, the flint knappers whom I have observed recently may not be typical of modern practitioners, and the technique which I am about to describe may be widely employed. If so, I apologize for trying to teach my betters.

When I was an undergraduate anthropology student many years ago, some long-forgotten mentor showed me how a slab of flint could be shaped by getting a firm grip on one edge, holding the slab horizontally, and striking the upper face near the opposite edge with the corner of a hammer in a downward motion, thus beveling the edge on the lower face. This is essentially the technique being used with remarkable skill by all of the flint knappers whom I have recently observed, not only for roughing out thick bifaces but also for thinning them down. An added refinement which all of them employ is blunting a sharp edge in one way or another to produce a stronger striking platform.

I never practiced this technique enough to acquire any skill with it until some years later when I became a geology instructor and began teaching courses in petrology. For use in these courses, I set out to assemble a reference collection of rock samples from geological formations in Texas and bordering states. For convenience in storing, petrologists customarily trim their rock samples into "hand specimens" - rectangular blocks about 4 inches long, 3 inches wide, and 1 inch thick. Over a span of several years, I prepared hundreds of hand specimens of all kinds of materials, gradually acquiring some skill at trimming them to proper shape and size with a rock hammer (not the same thing as a hammerstone!). The job can be rather difficult when the material has little or no conchoidal fracture.

I began by using the technique which I had previously learned, but soon found myself making more and more use of a radically different technique, at first for straightening edges and squaring corners, but later on for most of the work. This technique consists of cradling the slab vertically in the cup of the hand and striking the upper edge itself with the full face of the hammer in a downward motion, peeling a flake from either face of the slab by leaning the slab very slightly in the direction of that face.

The two techniques may be contrasted by saying that in the first, a face is clipped near an edge with the corner of a hammer moving across the edge, while in the second, the edge itself is bashed with the flat of a hammer moving into the edge. In the first, or clipping, method, a flake is removed from the downward face at a high angle to the direction of the blow, while in the second, or bashing, method, a flake is removed from a lateral face in line with the direction of the blow.

The bashing technique has several advantages over the clipping technique. The slab is more firmly supported, both faces are visible, placement of the blow can be less exact, direction and force are more easily judged, and the blow prepares its own striking platform. The main advantage is being able to slap the edge with the full face of the hammer, whether it be steel, stone, or billet. With a little practice at tilting the slab slightly to right or left, flakes can be peeled rapidly from both faces with a continual tapping of the edge. For these reasons, the bashing method is much easier and faster than the clipping method. A minor disadvantage is that the flakes fly out to both sides rather than downward.

Using the bashing technique, sometimes in combination with the other, I soon became able to reduce a slab of almost any material to a hand specimen of the desired shape and size, in minimum time and with minimum breakage. After learning how to chip any kind of rock into a hand specimen of rectangular outline and specific dimensions with a steel hammer, I discovered that chipping flint into a hand ax of ovate outline and whatever dimensions with a hammerstone is comparatively easy.

My occasional attempts at thinning a thick biface with the bashing method have resulted in breakage. It may be that the kind of precise control which the practitioners of the clipping method are demonstrating so impressively is difficult or impossible with the bashing method.

The clipping technique requires so much more manual dexterity than the bashing technique that one wonders if the clipping method may have been an invention of _Homo sapiens_ for thinning thick bifaces and trimming flake edges, while the supposedly clumsier _Homo erectus_ may have been limited to thick bifaces produced by bashing. An even simpler variation of the bashing technique may consist of whacking the edge of a slab against an anvil stone. Is this how _Australopithecus_ sharpened the edge of a pebble?

Like anyone using the clipping method, I was well aware that it produces a fracture at a high angle to the direction of the blow. Furthermore, I was satisfied with the well-known explanation of the conchoidal fracture as part of the surface of a cone whose apex points in the direction from which the blow came. I was puzzled by the bashing method, however, which produces a fracture parallel to the direction of the blow, and does not seem to be explained by the conical fracturing of glassy materials.

A convincing explanation of both kinds of fracturing was provided by Billings in his textbook, Structural Geology. He describes experiments on compression of blocks of homogeneous solids which indicate that two kinds of fractures are produced. One kind occurs at an angle of about 60 degrees to the direction of compression and is called a "shear" fracture. The other kind occurs in line with the direction of compression and is called an "extension" fracture. Thus the clipping technique seems to produce a shear fracture, while the bashing technique produces an extension fracture.

The Aztec method of peeling long narrow blades from an obsidian core with great pressure from a crutch-like device may be a case of extension fracturing as opposed to shear fracturing.

Although I have not compared extension flakes with shear flakes, it seems that the extension flakes would be more likely to have crushed platforms, and that the platforms would be at right angles to the fracture rather than 120 degrees. The extension flakes might also be flatter and have a smaller bulb of percussion.