

January 29, 1970

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Dear Don:

Enclosed is one new section dictated by Dr. Swanson, with the Preforming section incorporated on the end. This section, which has not been named, will follow the introduction or first part of the paper, and precede "Lithic Materials."

On page 5, I hope I have your pages numbered the same as my copy, second sentence down, after "thrusting" we have in parantheses, "a sudden application of force." Also on page 5, second paragraph, the first sentence as follows: "One peculiarity of Kimberley points (Fig. 2) is the steep bifacial marginal retouch (flakes removed on both faces at a steep angle along an edge) on the base. Also, where you used the word thermal, as in thermal treatment, Dr. Swanson put heat, like heat treatment. Okay?

That's all up to now, but he'll work on it again next week.

Yours truly,

SUBTITLE HERE-Don't know exactly what it will be right now. jb

The most enduring identifiable artifacts in the camps of prehistoric man are those made of stone. The earliest men can be identified as human as much by their associations with stone tools as by their anatomy. For this reason the techniques of making stone tools are of great interest in the study of human origins and dispersals. The stone tools recovered in the earliest as well as in later archaeological sites were made by detaching flakes from a block or mass of stone. These rocks or lithic materials are marked by having a conchoidal fracture when a blow is struck against a surface. Such a fracture may also be obtained by exerting pressure against a surface or platform, whether prepared or naturally occurring. The striking of a blow or the exerting of leverage forms a cone which may be used to control the detachment of a flake. That is a flake may itself be deliberately shaped by the kind of force applied by the stoneworker. At the same time the way a flake is shaped and removed affects the character of the block of raw material from which the flake is detached. The flake is sometimes called a primary flake and may be further worked in order to make a finished tool, while the block of raw material is termed a core or nucleus.

The character of the raw material or lithic material affects the way in which a flintworker carries out his flaking. A wide range of glassy rocks was used in prehistoric times, including various chalcedony (i. e. flint or jasper), obsidian, ignimbrite, quartz, quartzite, siltstone, and glassy basalt. In each instance the core should be free of internal breaks

or flakes will detach improperly and the object itself may be shattered. Obsidian lends itself to pressure flaking while naturally occurring flint or basalt may be easier to work by percussion. At some time in the past men discovered that some glassy rock could be changed by heat treatment (reference here to "Heat Treatment of Silica..." article) so that pressure flaking was easier. Thus, heat treated flint, jasper, or quartz can be worked far easier than the untreated material, and the changes which take place can be found in archaeological sites and duplicated by laboratory experiments. D

Since variations in lithic material affect the outcome of flaking, prehistoric man used different flaking tools (reference here to "The Flintworker's Raw Materials," article). For striking a blow a percussor or hammer can be made of stone, antler, bone, or wood. In each case hardness plays an important part so that stone hammers tend to leave larger negative cones of force on the core or along the edge of a primary flake which is being shaped by percussion flaking. On the other hand, a billet or hammer of elk antler will defuse the cone so that the negative scar on the core or along the edge of the flake being worked may be shallower and less well marked. Pressure flaking tools, called pressors, compressors, or fabricators, were made of antler, bone, ivory, and copper, each being suitable for a particular kind of work. The kind of work done with any one percussor or pressor may overlap with the effects of other tools,

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but the skilled workman can execute a wide range of flaking with a variety of implements at hand.

Recent experiments have suggested some of the possibilities for using different tools and different raw materials but the possibilities have only begun to be realized. In trying to solve a problem presented by the characteristics of some prehistoric stone tool, I find it necessary to use alternating methods in replicating the flakes and the flake scars marking the artifact to be copied. It is important to understand that the flintknapper is not copying just the finished object. He is necessarily concerned with the sequence of steps which can be deduced from the succession of flake scars on the prehistoric tool or which can be reconstructed by examination of the flakes found at the archaeological site where the object was recovered. The result of experimental work is usually a reduction in the number of ways by which the prehistoric object can be replicated. Most often two or three solutions remain as suitable explanations of the techniques used by prehistoric man, and a number of other methods have been discarded all together.

The involved process of preforming is not explained here because it has been adequately described in detail elsewhere (reference to "A Stoneworker's Approach to Analyzing..."). However, it should be noted that a preform resembles the shape of the finished tool and represents a deliberate intermediate step in constructing. As a result it has

distinctive characteristics in flaking and edge grinding which set the stage for finishing work. The proper use of a wooden percussor is covered in the text under "Hammerstones and Billets."

This paper is primarily concerned with the use of wooden pressure flakers. However, it is well to note that when a wooden flaker, rather than one of bone, antler, or metal is used in pressure flaking, the last stage of preforming must be done with considerable care. The surface of the preform should be left as regular as possible, for it is difficult to remove step or hinge fractures left by careless percussion preforming when the worker is using a wooden flaker.

If the worker employs the core ~~top~~ technique he can use a hammerstone; antler, bone, or wood billet; or a punch and direct or indirect percussion to remove all surplus material from the mass until it is preformed into the proper form. But for the final forming, thinning, and sharpening the wooden flaker and pressure technique is used.

A simpler method is to obtain blanks by using a hammerstone and percussion to detach simple flakes from the core and thereby eliminate the preforming stage. A blank has the right characteristics for making, but may or may not resemble the shape of a finished tool. Flakes intended for bifacial points are designed to be straight with the distal end pointed and feathered and, of necessity, must be slightly larger and thicker than the intended artifact. All flakes detached from the core may not have these requisites, so the worker selects only those which are suitable

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for pressure work and discards the other flakes or uses them for other purposes.