TECHNOLOGICAL TRAITS

The aspects of typeology based on technological traits, form, function, materials, tradition, and distribution in time and space, are many and varied. Certain typeology models based on technology, form, and function may be unique in that they will include only one of these characteristics; or they may be stereo-types including all three of these attributes. Due to the blending of the many subtle features and characteristics of the specimen, it is difficult to establish hard and fast typeology rules to include the numerous cultural traits of a specific type. This paper ~~will be~~ is concerned with the technological traits of the aboriginals' stone tools and their relationship to typeology and is intended to assist in separating flakes and blades for the purpose of relating them to cores and techniques by an interpretation of their mode of manufacture. For purposes of analyzing assemblages, all flakes and blades will be called flakes although existing literature does use the term splinters, chips, spalls, blades, lamellar flakes, lamelles, bladelets, prismatic blades, flakes and blades.

Experiments carried out over the past years have afforded a basis for some conclusive evidence regarding the mode of manufacture. Hopefully, these experiments will shed some light on the aboriginal lithic industries and will point out the magnitude of debitage study. Results of various experiments will be cited to project the need for additional research on types not yet fully understood. Those not fully understood will be hypothecated on the basis of conclusions drawn from the experiment and possible techniques will be postulated. Experiments have decreed that before final judgement or analysis can be made, one must replicate both core, flakes and blades in all aspects and characteristics. Further, unless a replica of the original can be duplicated by the same technique — not one but many times — one can go far afield with theory alone. There are definite laws of physical and mechanical properties of materials and applied force which remain constant and if the experimental results are the same as those of the aboriginal then we may conclude that the techniques used will be much the same. The hand-holding method may vary, but the

technique of flake removal should be duplicate. ~~Sometimes~~ The holding method ~~may~~ vary the direction of flake removal and mechanical principals ~~technique~~ of platform preparation & applied force remains constant. Caused variation in flakes & flake scars but the actual

My attempts to replicate flakes and cores have shown that materials, muscular motor habits of the worker, distinctive traits, human behavior patterns, evolution and phylogeny, conscious planning, traditional development, outright invention, pride of workmanship, and the need for superior tools provides an insight into the lives and economy of the prehistoric people who skillfully fabricated stone tools so necessary for their existance. My attempts to replicate the tools of this very complex industry has increased my respect for prehistoric mans' knowledge of materials and their sources and mastry of fashioning stone into a formidable weapon or useful tool. He had unbelievable control of muscular coordination; an ability to visualize the artifact within an irregular block of sonte; understood how to overcome the mechanical and physical problems necessary to produce a useful end product, and he had a consistent and precise ability to calculate angles for projecting forces of variable intensities.

Typeology based on technological traits will have a greater consistency of habits and rhythms of flake removal whether it be an individual blade, flake or a complex artifact. Technology also demonstrates not one but many traits whether the analysis be of a simple flake, blade, or even the more complex phases of tool-making. ~~Upon~~ close examination of both flakes and flake scars, technological traits will readily reveal the which ~~will be obvious~~. Debitage can indicate definite technological traits and techniques that may be useful in distinguishing at least one phase of a cultural complex. ~~Technological traits~~ associate themselves with tradition, environment, and distribution in time and space and ~~close observation~~ may resolve ~~reveal~~ such traits developing into more refined techniques in different geographical regions and periods of time. There appears to be both singular and parallel technological trait phylogony based - in part - on environment

and showing a need for a definite tool to perform a certain function. An infinite variety of core, flake + blade forms must be considered to separate the tools used over a great span of both time & space, & the useless feeling that flake study will resolve certain types of flakes patterned to certain groups of people in certain periods of time and certain geographical areas

Typeological manifestations pertaining to techniques and technological traits should consider the adaptation of material varieties to both techniques and function because certain materials have a direct bearing on the technique used and the proposed function of this material. Since the aboriginals material preferences encompassed both technology and function, this could well be a diagnostic trait. For example: Many times ~~and~~ for technological and functional purposes, ~~he~~ man preferred and chose granular and coarse-textured rocks when obsidian or a vitreous stone was readily obtainable.

Sorting artifacts into form categories is useful for rapidly classifying certain artifact types such as projectile points and their related forms, but it cannot be used alone as a basis for typeology. Artifacts - other than unifacial and bifacial implements - are too variable to have form alone considered. Measurements and shape can and do vary with the individual problems of function. Or, during manufacture, it may be necessary to modify them because of imperfections in the material or a miscalculation by the worker.

Functional analysis

The functional category of typeology should be related to both form and technology. Functional analysis of tools - except hafted artifacts - will probably always be a matter of conjecture, but flakes removed by use will indicate the manner in which the tool was held and ~~how it was used~~ in what manner it was drug or propelled. However, the form of the tool must conform ~~with~~ to the specific function for which it was designed. Many unmodified blades and flakes were used freshly struck from the core and are a definite tool type - such as a backed knife. These tool types require special techniques of detachment and only through examination of the use flakes can their function be determined.

It would be difficult for any one person to condust experiments on all core and flake types or to understand fully all the permutations of the features that go into the making of cores and their flakes and blades. But we can broaden our knowledge and resolve certain types by a careful study and analysis of flakes, blades and the debitage resulting from their manufacture. Flake analysis is basic to a concept of technological studies and is an important factor of flake, blade and artifact analysis. The analysis of flakes and cores in this text will hopefully outline the variables encountered in stoneworking and show how they are overcome and controlled by different techniques. Consideration of the debitage flakes found at the occupation site and relating this waste material to the stages of flaking techniques required to produce the desired size and type of flake, blade, or artifact is almost a necessity for it will give a true picture of the various technological stages of manufacture. Admittedly, debitage flakes are not as glamorous as the stone tools or cores, but they can be just as interesting and can furnish information not found on the core and the artifacts. These usually only show the last stage of the several steps of manufacture whereas the waste flakes can give clues to the primary, secondary or intermediate steps of fabriation. Proper flake analysis should show the development of techniques traditional with each generation and any parallelisms in development as well as other techniques which are highly specialized for particular functions.

As more flake assemblages are analyzed in different geographical regions and related to different periods of time, the need for such a study will become apparent.

Flake tool industries are represented by residue and debitage of the various stages of development of the artifact from the initial break of the raw material to the completed implement. The quality and size of the flaking residue will normally be proportionate to the distance from the source of raw material but an occupation site located near a large quarry is more likely to have flakes representing all phases of their particular techniques of manufacture. Should the archaeological site be of some distance from the source of raw material then several stages of manufacturing are apt to be absent. This is due to roughing out, blanking and preforming of the artifact at the quarry. In this case, the flakes representing these phases of tool manufacture will occur in the proximity of the material source. Unifacially and bifacially worked preforms found at the quarry are generally made by the direct core technique using direct percussion.

Because of the nature of the material being worked and the human element of change and error involved, there are many variables and, therefore, stereotype of flakes and artifacts cannot be expected but we can look for consistency. Consistent differences reflecting minor and major changes in techniques of flake and blade removal can be noted when the flakes are separated into the stages of their taxonomy. Each stage will readily demonstrate the rhythm attained by the worker and then there will be a greater consistency of flake types. Categories, similarities, and like attributes will show the development of patterns which will denote the phases and stages of the part they played in the development of artifact types which will greatly assist in the interpretation of the cultural traits. Because of these slight variations and variables, the flakes should not be appraised individually but rather by the manifestations of their traits and techniques.

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which would serve no functional purpose and are not of the proper size for modification or artifact manufacture. Then isolate the whole flakes which are useable or perhaps may even show signs of function. 2. Flakes are then arranged in rows with the platforms at the proximal end facing the sorter, for these ends provide the bulk of the information pertaining to technology. 3. Then the mid-sections and the distal end of the flakes are arranged in a like manner. 4. The proximal ends (those bearing the platform of applied force) are then regrouped by segregating those with like platform characteristics. These characteristics are further explained in this text.

Flake assemblages fall into two classes - the debitage flakes from artifact manufacture and flakes and blades made either to be used freshly struck or to be modified into tool types characteristic to blades and flakes.

It is not the intention of the writer to infer that there is a major cultural difference between debitage flake assemblages derived from artifacts made by the core method and those derived from the modification of flakes or blades. Both techniques can be used by a single group of people and it is only important to be able to recognize these techniques when they make their appearance. However, the core method is a wasteful technique and discards a greater amount of debitage than does the modification of a flake or blade.

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There are numerous types of flake specializations. Many now existing in collections have no terminology, yet they could have considerable diagnostic value in the interpretation of technological traits. At present, the only separation of flakes seems to be blade-like forms, yet there are numerous technological techniques and flake specializations used to remove blades from cores. The term "blades" encompasses a vast array of flakes with parallel sides with "their length being two times their width" (Francois Bordes, Les Eyzies Lithic Technology Conference, November, 1964) Individual analysis of such assemblages will readily demonstrate that they fall into two technological patterns which are distinctive to that group alone. The two technological patterns of flakes and blades appear to be their mode of manufacture and the refinement of their production. One cannot separate flakes and blades according to whether their manufacture was by pressure or percussion but must evaluate the techniques and even then there will be a blending of form when shape alone is used to separate flake and blades. Size should also be considered as both percussion and pressure flakes range from the dimunitive to the more massive and it is not enough to assume that because a flake or blade is massive that it was produced by percussion. Consider the prismatic blades from Meso-america which may be an inch wide and eight inches long and yet are made by pressure. These blades have a consistency in form with two or more scars running the longitudinal axis, on the dorsal side the result of previous blade removal. They are complete tools within themselves, or they can be altered into geometrics, microburins and other forms characteristic to blades. Their preparation and pressure removal represent a variety of technological traits. (See Polyhedral Core Paper)

Old World blade forms are much the same in shape as the prismatic blades but undoubtedly various forms of percussion techniques - such as indirect percussion - were predominant in their making. Normally blades are considered to be the result of a refined technique and of a definite form, however, some

classify long narrow flakes with parallel and sub-parallel sides to be blades. There are specialized flakes removed by simple direct percussion that could technologically be glades but they lack the refinement of form which is the result of exacting core preparation and method of removal. So there can be no sharp lines of demarkation between the blade industry and indiscriminate blade making. The main differences are technological ones. Future study will, no doubt, indicate certain parallelisms and traditional traits in flake stone technology.