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 stereotypes 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 concerned with the technological traits of the aboriginals' stone tools and their relationship to typeology. It 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 flake study and their relationship to technology. Results of experiments with various techniques will be cited to project the need for additional research on types

not fully understood. Those not fully understood will be hypothesized on the basis of conclusions drawn from the experiment and possible techniques will be postulated. Experiments have confirmed the theory that before final judgment or analysis of technique can be made the stoneworker 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. In toolmaking there are definite laws of mechanical and physical properties of materials and applied force which remain constant. Therefore, if the experimental results are the same as those of the aboriginal, then we may conclude that the techniques used were much the same. The holding method may vary the direction of flake removal and cause a variation in flakes and flake scars, but the actual mechanical principals of platform preparation and applied force remain constant.

My attempts to replicate flakes and cores have revealed a neglected concept in the study of prehistoric man, i.e., that the lithic materials of his tools, the muscular motor habits of the toolmaker, technological 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 existence. My attempts to replicate the tools of this very complex industry have increased my respect for prehistori mans' knowledge of lithic materials and its source and

his mastery of fashioning stone into a formidable weapon or a useful tool. His stone implements exhibit unbelievable control of muscular coordination; an ability to visualize the artifact within an irregular block of stone; he 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 toolmaking. Debitage can indicate definite technological traits and techniques that may be useful in distinguishing at least one phase of a cultural complex. Assiduous examination of both the flakes and their scars will readily reveal the technological traits and techniques which associate themselves with tradition, environment, and distribution in time and space; and may reveal these traits developing into more refined techniques in different geographical regions and periods of time. There appears to be both singular and parallel technological trait phylogeny bases, in part on environment, and showing a need for a definite tool to perform a certain function. An infinite variety of core, flake and blade forms must be considered to separate the techniques used over a span of both time and space. It is the writers' feeling that flake study will resolve definite types

of flakes pertinent to only diverse groups of people in various 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 for certain materials have a direct bearing on the manufacturing technique 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 preferred and chose granular and coarse textured rocks when obsidian or a vitreous stone was readily available.

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 the implement because of imperfections in the material or a miscalculation by the worker.

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 in which direction it was drug or propelled. The form of the tool must conform 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 conduct 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. 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. Their task: will attempt the analysis of flakes and cores by outlining the variables in stoneworking and explain how they are overcome and controlled by different techniques. Consideration of the debitage flakes found at the occupation site and subsequently relating this waste material to 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 manufa cture. Admitedly, 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 artifact. 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 stepf of fabrication. Proper flake analysis should show the development of techniques traditional with each generaion and 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 of the workshop or campsite 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 core technique using direct percussion.

By comparison of their diagnostic attributes, flakes are determined to be similar, or the same, and then one may select one or two as being representative of form

and technique. Studying flakes and ultimately relating them to various tool types will indicate the cultural technological traits in modes of manufacture and will greatly assist in obtaining a sharper definition of a complex in a cultural area. The debitage flakes from the making of just a single artifact may number several hundred, whereas the artifact is often considered individually without placing too much emphasis on the surface flake scars. When these surface scars are evaluated, they usually cover only the last stage of fabrication, whereas the debitage flakes which occur in conjunction with this would give us the true picture ofmanufacturing. The flake is far more useful in determining the technique than the flake scar for the platform and part of the original lateral edge of the artifact was removed with the flake. Sometimes a remnant of the platform may remain on the artifact, but it is no way represents the contact surface of the flintknapping tool. Further, although the flakes removed from the artifact can be uniform, they may leave scars on the surface that are multi-directional. Uniformly flaked artifacts bear scars that appear to duplicate artifact types, but in reality there is no exact fascimile.