BLADE TECHNOLOGY

The technology of blade making has much to offer archaeology because of the diverse diagnostic features. Many old world cultures were based primarly on blade industries. The blades were used as they were removed from the core, some slightly modified and others drasticly altered and modified into a vast aray of implements, many specialized forms of tools being made into implements coresponding to a particular enviroment and designed to perform a particular function. There are occasions when the blade was flaked and reflaked on both faces and both margins until the original blade is difficult to identify it's original character or to determine if it was a core or a blade tool. Small projectile tips often lose their inenity to wether they were derived from a core , flake or blade.

Professor Francois Bordes and Jacques Tixier, both eminent French archaeologists and typeologists have based a great deal of the typological findings on the technological features of the blade making industries of Europe and North Africa These men are not alone in the interpretations of Old World prehistory but have made many important and valuable contributions to the profession. Their contributions have a technological basis that results in factual rather than theoriotical conclusions.

Since the Conference on Lithic Technology held in Les Eyzies, France in Nov. 1964, ten years have now transpired and one can now look in retrospect and apraize the developements that have taken place in experimental archaeology as a means of a better understanding of prehistoric technology. One part of experimental archaeology is that pretaining to working stone with emphisis on the fracturing techniques used in forming stone with the properties of isotrophisim, that is ### lithic (lithos, Greek meaning stone) materials that when subjected to force that exceeds the elastic limits of the material fracture in any direction in a predetermined manner. The most desirable materials to be used by prehistoric and ##### recent technology are those silicious, vitrious, cryptochrystalline ####S flint## or flintlike rocks. Manny of the materials with these qualities respond to controlled fracture much better than others. Some have great sharpness but are extremely friable, while others are extreemly tenacious and difficult to control predetermined fracture but are ideal for tools that are subjected to rigorous abusive tasks. Materials are selected to corespond with tools that are designed to perform a specific function when they are available. Material qualifications for blade making canot be stressed too much and for precission blade making good material is a Requisite.

Blades have an almost universial distribution, much more in Old world technologies than the New World. In the past there was thought to be almost no blade making in North and South America,but as further archaeological investigation progresses blade making is in evidence over a considerable time span and possibly more evident among ~~########~~ paleoman than among the later times. One of the reasons that New world blade technology is in so little evidence is the rareity of finding cores, it is indeed rare to find a well formed percussion blade core, however pressureblade cores are common in Mesoamerica ~~###~~, Upper Missippi vally and the Arctic. The percussion blade cores appear to have been utalized for the making of smaller artifacts.

How is a blade or blade core identified? Often the blade has been modified by flaking, broken into sections and changed into tools that make imediate rechoginition difficult or impossible. What is the difference between a blade and a flake. The archeologist is confronted by these and other problems, first one should be concerned with the intention of the worker and his techniques of removing a long specialized flake with parallel sides that upon removal falls into the catagory of a blade. (Blade technology is not to be confused with uniface or bifacial flaked artifacts.) ~~######~~ A blade upon removal from the core is unmodified by additional flaking with sharp parallel lateral margins, usable as is for unlimited cutting and sliceing functions or hafted to protect the workers hand. Too the blade may be modified into a vast array of artifacts, particularly industries based on blades. Time and text does not permit a breakdown of the numerous varieties of tools that can be ############ derived from blades. The blades can be designed in all sizes from the moste minute micro blades to those of Grand Pressigny that may exceed forty centemeters in length. The worker may also control the width and thickness. The dorsal surface may also be characterized by one or more ridges the most common are those blades that have a single ridge and are/triangulate or sub triangulate in transverse section or trapozoidal with two ridges. Blades with more than two ridges on the dorsal surface are not uncommon , generally thicker at mid section and sometimes assosiated with a rejuvinationof the core face, particularly when a previous blade failed to detach the full length of the core. Too upon detachment of a thick blade with more than two guiding ridges often terminates by removeing ### a portion of the distal end of the core. A blade of this character bears the term of otrepasse' a French term by Tixier meaning over and beyond. Blades like flakes will have variations of curvature , termination and platform character directly related to the technique involved in the detachment of blades.

Some time and some wheare in the dim past a biped called man suplemented his teeth and nails by using sharp fragments of stone. With the passage of time and slowly developed skills of designing implements conforming to his survival and enviroment started a phylogeny of stone tool making that became increseingly more sophisticated until the introduction of metals. It may be taken for granted that simple direct percussion using a hammerstone was first used to detach flakes from flintlike materials rather than using indirect percussion and pressure. The early worker in stone was confronted by the problem of repiticiously removing flakes that had certain dimention and attributes. Usable flakes with sharp cutting edges were in no way as complex to produce as making blades. Through trial and error eventually experience was gained to control the length, width, thickness, curvature and termination of specialized flakes. Certain specialized flakes fall into the catagories of blades. In order to accomplish control of the flake dimention the surface character of the object being worked on was ## the major factor, becomming increseingly more obvious as the making of choppers, handaxes and flake cores progressed through time. The developement of the Levaloise[1] core and flake is an early example of controlling flake character.

The Levallois core and flake tradition w#### was disseminated over a large area of Europe and Africa and not unknown in other parts of the world. The Levallois technique has many diversified technological approaches, a possible explanation for such wide spread blade and blade core techniques . The Levallois core and flake production was generally a wasteful method of toolmaking in order to only get one and occasionly two usable flakes . Their advantage being that all but the basal area had a sharp usable margin, without the nessity of modification, and a usefull tool of predetermined size and form. It was found that when the Levallois core was fabricated with the right degree of convexity the width and length of the Levallois flake could be controlled. Such a controll in all likelyhood progressed into blade and bladecore technology. It was found the the degree of convexity and the angle or angles on the faces of a core were in direct control of the spread of the flakes or blades. The angles on the faces could vary from the acute to the obtuse, but as the obtuse approached hundred and eighty degrees the blade would spread excessively, margins would not be parallel, eradicate marginal ridges on the core and make worthless for the removal of more additional blades. Some levallois cores were prepared longetudnally rather than from around the perimeter. The cores prepared around the perimeter are characterized by a convex surface, the degree of convexity controlling the expantion of the levallois flake to be detached. The convex surgace core demonstrated control of the flake but ### had no guiding ridges that were present on the cores that were prepared longetudnally and from these cores it would seem thet blade technology developed. After preparing a longetudnal levallois core it would seem reasonable that instead of removing one or two bladelike flakes, one would make a larger and thicker core and remove numerous blades sucessively. Upon learning the principal of using preestablished ridges to control the length and dimentions of the blade , the techniques became more and more refined and sophisticated with the advancement of time. With the advanced techniques numerous techniques were developed With a wide distribution in in many parts of the world. The longetudnal levallois technique may have been a stepping stone and instrumental in developeing some blade techniques but other approaches and independent techniques #### are i#################### evident in time and space where there was no history of the levellois core and flake. There will probably never an exact orientation of the beginings of blade technologies. There is little question that it originated from a percussion technique rather than a pressure technique. To cite a few examples of blade making it would be well for me to relate the results of my first experiments in replicating blades of prehistory. First I did not invent the blade, but was furnished examples of the end results by the examination of blades described in various archaeological journals and publications. Upon examination of the prehistoric models in numerous museums and University archaeological collections it was discovered that one had only the last and final blueprint of the finished artifact. Gone were the multiple stages of manufacture , tools and techniques and origns of the raw materials. The problems were indeed perplexing, how to change a chonchoidial expanding flake into one that has the form of a prism with paralell sides and a dorsal surface bearing typical blade scars . An example that comes to my mind is that of a modern housewife in a New York High rise recieving the inheretance of a spinning wheel from a long past ancester and imediately making homespun fabrics for her neighborly occupants. The example has little to do with flintworking , but only illustrates how soon comparatively simple manipulative manual proceedures are soon forgotten. It is of interest to review a recent publication by Eric Sloane, A Museum of Early American Tools, a special members edition of the American Museum of Natural History, New York, To see how soon are forgoten common everyday tools, many are hard to identify without the caption, let alone the consideration of a modern craftsman using them. This paper is not to be one concerned [illegible] of stone tool with use and function of the stone tools but the techniques and methods by which they were made. Upon understanding these processes it will aid in difrenciation/of differences and identifying blades produced in assorted societies in time and space. ## Eric Sloane in his ######## book on ##### Ear.y American Tools has a chapter titled " An Ax is an Axe!", we too upon an apraizial of a blade is a blade find many identifyiable varations.

Previously stated/as a possible inception of blade making was the Levallois longetudnal preparation which may have been instrumental in blade making. There are also other possible approaches. These may in part depend on the sources of raw ## material and the nature of the deposit. Flintlike materials that occur in dikes or ########## horizontal or blanket veins often er#ode or are mined in the form of subrectangular blocks blocks and angular pieces. Pieces of flint/or other allide lithic materials with natural ridges or corners on the blockey material can often be used as cores with a minimum of modification. The ridge being the guiding factor nessary to make a prismatic flake or single ridged blade. The intentional removal of the bladelike ridge causes two additional ridges to be formed which can also be used to guide aditional blades from the corelike block. It should be mentioned here that natural pressures, diastrophisim and expantion can cuase an exfoliation that can be compared to the first blade removed from a core. However if the first blade bears flakeing on the dorsal surface at right angles to the longetudnal axis of the blade or if flake scars appear on one or both sides of the ridged dorsal surface or if the flake scars are alternated to either establish or straighten the ridge prior to the removal there is little question of wether the blade was made by man or nature. The second and third blades may retain one half of the dorsal surface covered by cortex or the natural surface but the other side of the single ridged blade will bear the negative blade scar of the previous removed blade. the removal of a second or subsequent blades is very unlikely by natural occurances.

Another beginning to blade manufacture, but somewhat more complex is the reduction of cobbles, natural concretionary masses and spheroid masses to core forms with a flat top that will serve as a striking platform. Upon removal of the core top from a rounded surface requires considerable skill of the workman and the intention must be preconcieved . Simple battering or throwing will usually render the material useless because of making non homogeneous areas that would inhibit the removal of a series of blades. Upon the removal of the top of a kidney shaped nodule of flintlike material, the worker will appraise the ekingated margins and select the area presenting the most convex surface