WORKED PIECES OF STONE

Much can be learned of the art of working artifacts by studying the chips of stone which were manually detached by Ancient Man from the mother rock when he was making his blades and points. These chips and flakes can be found at quarry, campsites, cave habitations, hunting grounds, or indiscriminately found in areas occupied or transversed by ancient man. An interpretation of the flakes and their character may add many missing chapters in the history of man.

Chips found on the surface of the desert and the plains have certain characteristics that will make it easy for one to identify them from just ordinary pieces of stone. These flakes will have a bulb of precussion, they will show the ripple marks of the fracture caused when the working of a point was done, and they will usually be found in an area where there are no other rocks of this material. These pieces of stone, or flakes, have definite identification marks, which prove that they have been worked by prehistoric man. Some are single chips, spalls and flakes, and some are just fragments of flint that might have been removed from the original stone in preparation for removing the regular flake to produce an artifact.

These discards from man's toolmaking can be found scattered over the desert, for, apparently, when ancient man was making these tools, he sometimes worked on them as he walked across the desert in search of game. This probably accounts for one finding just single chips of stone and flakes in ~~some parts of the desert~~ CERTAIN OCCUPATIONAL ZONES.

From these chips and flakes, we can see that there has been a series of flakes removed from the artifact. There will be evidence that one has been taken on the outside and it might be the second or third or even fourth flake removed from the original nodule. The first or second flake will leave scars on the outside of the stone and the second flake will indicate additional work. The chip will show a platform or a place where the stone was struck and will also indicate the angle at which the stone was ~~struck~~ STRUCK. Sometimes Ancient Man used the outside heel of a nodule, or a tumbled river stone, for his artifacts and these, too, will show the bruises FROM NATURAL CAUSES. The outside rind of such a stone must first be removed before a point can be made, as the natural bruises on this type of material would set up little fractures and also because the outside of a stone of this kind has many weak places. Therefore, the first thing the man would do would be to peel the outside of the nodule,

and preserve the inside portion of the stone, if he was going to use a core method. However, if he was going to use a flake method, he would take several spalls off of the stone, and, in this way, he could work it a little more efficiently and maybe even get several tools from a single object of stone. When working this stone, he would prepare the edges of the stone in preparation to remove the next flake and this work must be done to keep his ~~point~~ FLAKE symmetrical- say a long, flat, straight, narrow blade. He would also have to remove a portion of the stone in order to ~~thin this~~ PREPARE HIS NEXT PLATFORM FOR THE CORRECT ANGLE.

The flakes or pieces of stone that one finds are portions that he has removed from the mother rock. Each flake or piece of stone found will show evidence of whether it has been removed from a blade or from the mother rock. Sometimes, in order to remove a flake from the original piece of stone, it was necessary for ancient man to knock off a corner of the nodule in order to split the stone lengthwise or sidewise or whatever angle he desired.

One knows that these flakes found do not occur naturally in nature, for something must support the stone before a flake can be removed. Either

it must be held by hand, by the foot, placed on the ground, or held in some other way, for the removal of a flake from stone cannot just happen naturally from frost or freeze, and this is evidenced by the pressure marks still showing on the flake. If this did happen naturally, it would have to be, for example, a rock in a stream bed held between two boulders and then another rock come tumbling along and strike it to remove the flake and this would have more of a tendancy to crush the rock and the flake removed would not have the same character that it would have if it had been held in the hand.

If the stone is held in the hand, one uses several different angles for each flake, as each flake removed is planned and prepared and, when this preparation takes place, each angle will be a little different than the following one. Therefore, for a removal of flakes by Mother Nature, there are a very limited number of things that could cause this to take place. In tumbling stone the sharp edges of the stone are worn and ground off and one notices this even in river gravels. If stock or cattle step on a flake, it will be broken in the middle and it will not have the bulb of precussion or the pressure line either from pressure or precussion.

Consider gravels on the road - even with hard tires and heavy wheels running over the gravel, one will notice that this weight will break the flint and cause it to fracture, but these fractures do not have bulbs of precussion and they haven't an apex of the flint that shows the scars where a small platform on the apex of the flake was struck off or pressed off. Pressure and precussion flakes have different characteristics entirely. The precussion flake has undulating, wavy lines where the material is compressed from a sharp blow. The pressure flake is peeled and pulled off from pressure applied downward and outward. Stone is a semi-plastic and there is a certain amount of flexing when it is being worked. There will not be the undulation and the compression marks in a pressure flake that there will be in precussion. In preparing the edge of a blade, the edge is turned back and the angles are figured similiar to playing billiards, the force striking at one angle, and the flake being detached at another.

The pieces and flakes that we find are the rejects, or the castoffs, or the portions of stone that are not needed. Some of the reject flakes will have sharp edges and they will be used as knives and blades and one can

sometimes determine from these flakes that they have been used, for you will note that the cutting edge has been abraided from use. Possibly ancient man selected these sharp-edged flakes from his discard pile and carried them with him until they became dull from use, at which time he would discard them.

One thing that is important to study on these chips is the point of impact, the platform, or the portion of the flake which received the blow or pressure where the instrument was applied to the stone to detach the flake. If you will take special notice of these flakes at the thick end, that would be the point that would receive the pressure or impact. The rest of the flake will thin out from there, making a conchoidal fracture. Some of these are not "shell-like" fractures, which conchoidal implies. Many of these flakes are long narrow prisms - others are flat andom pieces, some having irregular marking on the surface. There are very few flakes that are exactly alike.

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exactly the same size and shape flakes on both sides - and spaced the same - preparation must be made beforehand for each and every flake. The pressure exerted to remove each flake must be compatible with the size of the flake and the platform. From the point of a blade, there will be small flakes removed and the flakes will graduate in size to the basal portion of the blade. Therefore, the pressure or precussion must be increased according to, or in proportion to the size of the flake that is to be detached.

A perfect ~~point~~ ARTIFACT would be one without hinge fractures, one without crushed edges and everything symmetrical, and this would be a great demand on even the most skilled artisans. The work of ancient man has progressed thru the ages, as the skill was taught by father to son and it is also true that some of the ancient men were better artists than others and, therefore, able to produce better and more perfect blades.

At the Smithsonian Institute, Dr. Roberts showed me some of the material that was found at the Lindanmeir site in Colorado that was produced by Folsom man from eight to ten thousand years ago, and, as you know, some prehistoric animal remains were found at this same site. The Folsom

points found at this site are some of the finest examples of this culture that have ever been recovered. A large flake was removed from each side of the Folsom point. To remove this much stone to produce a single flake, required much preparation and figuring on the part of ancient man. There wasn't a phylogeny that took place in the production of the Folsom point, it was figured out mentally. It wasn't a haphazard work, but required a great deal of skill. I find that there are some thirty-two complexities in order to produce the two flakes, or a single flake from each side of the Folsom point. To make the Folsom point, it is necessary to prepare a platform and the point had to be shaped correctly in order to guide the flake. At the distal end of the blade, the flake had to leave the point itself. It had to be detached all the way thru, so that it would not turn and snip off the end of the point. There is a curve on both sides, as there was a flexing of the stone from the point of pressure to the end of the stone where the flake left the original artifact. To control the removal of this flake takes a great deal of skill, as well as much preparation. Part of this preparation was a polishing of the platform in order that the platform would withstand the tremendous pressure that was applied on this small area of stone on the base of the point to remove this large a flake. P

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Polishing this portion of stone gives it much greater strength and this seems to be the reason why Folsom man polished his platform before removing the large flake. To polish a piece of material, such as agate or flint, takes quite a bit of time, but it does give the stone greater strength at the point where pressure is applied. The points that I saw from the Lindanmeir site were of agate and they were polished and ground smooth in order to withstand the pressure. If one measures the amount of cubic centimeters of stone that are broken and the amount of stone that has to support that pressure, he will find that the amount of stone removed is many, many times greater than the area used as the platform for removal of this flake. This problem was overcome by Ancient Man by polishing the platform.

Preparing a platform is also necessary to produce a Yuma, or Yuma-style, type of point with parallel flaking. The Yuma point is made up of perfect, lateral flakes carrying across the artifact. The thickness of these flakes is probably a third the thickness of an eggshell and yet they may be one-half to an inch long. These flakes are fragile and, therefore, to apply pressure at the edge of an artifact and force a flake

and break an area of stone, one must have a sufficiently strong edge, or a prepared platform in order to accomplish the removal of the flake. Possibly Ancient man used a piece of sandstone that he found in camp to use in abraiding his stone to round the edge so that it would withstand the pressure. I have used this same method and this is almost the only way that one can produce entirely regular flakes. The original blank used to make an artifact must be very regular, it must not have any hinge fractures or any uneveness for when the stone breaks it has such a very tiny portion of a pressure point to withstand the pressure to force a flake clear across the flint object that it must be exactly the same. I have also noticed that there has been polishing toward the basal portion of some of the points which may be only to keep the sinews from being cut when the point is secured to the shaft of either an arrow or a spear point or an atl-atl point.

Sometimes from the study of flakes found, one will notice that, instead of polishing the platform or striking edges of the stone, that it was abraided and that it will be abraided by repeated blows - very light blows - and it will cause the edge to crush down very slightly, but not deep into the stone. Ancient man would repeatedly keep striking light blows -

not the blow that removed the flake - but a series of blows until the edge was rounded. Then he would strike the main blow that would detach the flake. This would produce a nice thin flat flake rather than a big course thick one at the basal end. If they wanted a thin flake for the full length, like scrapers, they used this method.

We seldom find long, slender parallel flakes, because, usually, when this flaking took place, the point was laid on a pad and held in the palm of the hand and, as the flake was detached, it would be pressed against the pad, and seldom is an unbroken flake recovered. If it was not held in the hand, then one would get a series of long, needle-like flakes which, to my knowledge, have not been found in the campsites, or any evidence of their being found on the surface because they are usually broken in little short pieces, just a series of small flakes. But this process of abraiding the edge and to keep on striking it until a platform is established, instead of one single blow with maybe a sharp edge to set up a platform, they would use these series of easy blows on the edge until it became rounded and then the stone would have sufficient strength to carry the flake entirely across the piece of stone being worked.

I would like to see a numbering system devised for cataloging flakes. From the detached flakes found, one can determine much about the culture and processes used in the flintworking techniques. Probably just as much from some of the flakes as from some of the artifacts. These can vary from a moon-shaped flake to a hinged-off flake, and others are crushed where an "anvil method" has been used and there are many other varieties of flakes found and each one of them will tell a story relating to the point from which they were detached. For instance, if a flake is shattered at the end, it could indicate that it was an unskilled person or a child that was making the point. If the workman was sufficiently skilled in the making of points, then one will find a repetition of regular series of flakes with extremely fine platforms prepared and every flake studied. However, generally, you will notice from the chips found that they indicate study of his stone before the chip was removed. For before each flake is removed, its removal must be planned. In order to guide the flake there must be a ridge of stone designed ahead of each flake so that it will guide the flake. The surface of the stone indicates what the shape of the flake and the thickness and the type that is is going to be. This can be predetermined by preshaping the stone. For

instance, if one wants to remove a flake to be used as a knife, on his first flake he will take a series of alternate, opposite flakes. He will strike on one side of the point and then on the other side of an edge and this will give a pie-crust effect. This will give him a right angle - a sharp angle - running the full length of his piece of stone. At the top of the piece of stone, he will prepare a platform and from this, he will remove this pie-crust effect, which will guide the flake, because is is a hard, sharp ridge, the full length of his piece of stone. In doing this, he has established two other ridges, one on either side, and these will guide the next two flakes. When he removes that flake on either side, right or left, he has set up four more angles which he can take off four more long flakes. If the platform has been prepared correctly, if his blows or pressure have been applied correctly, then these angles can be set up and the flakes removed. He would do this in a series until flakes have been removed entirely around the nodule and this will produce a core.

These prismatic flakes have been found in the United States area today thru the Mississippi Valley and areas occupied by the Hopwellian and

Adena Cultures. For their prismatic flakes, these people used flint. Some of the colorful material used from Flintridge, Ohio was tempered by heating in sand and this heating process helped man to produce a sharp edge. However, the heating of stone altered the original crystal structure and this was done before flakes were taken. This altering was done to make the material a finer grain, for the quartz family materials seem to have a nuceli and, therefore, when they are heated, these series of nucli seem to become smaller and the refractive index changes and the material becomes more opal-like and of a much smoother and more lustrous structure and also it will change the color of the stone. This heating will make the stone more like obsidian, but, of course, much harder than obsidian. Heated stone will produce artifacts with a much sharper edge than if the natural stone was used. Usually, when drills were made from this flint, the stone was not heated, but left touch, in its original state. The flakes of the Hopwellian and Adena people were not removed from a core, or, at least, what we now think of as a core. Today we think of a core as a long round cylindrical object whereas the cores of tese people were usually a blocky end and was chipped back at the top surface for their platforms. They probably

held the stone between two pieces of wood or a split limb and then racked together with bindings in order to hold it while the flakes were being removed. The longest flakes removed from this culture's cores has been about 2½ or 3 inches and they are removed from one end of the rectangular piece of flint. They are not of the cylindrical shape like we see in cores from Central America made by some of the Mayan and Toltec people who were able to remove the long prismatic flakes.

For some reason, in the Western United States, we do not find too many of these prismatic flakes. We do find many flakes that were used for cutting tools. These are thin concoidal flakes that were used as knives and implements.

Next time we find a flake or piece of discarded stone, we can, by study, tell where the stone came from, how far it was carried, whether the man was walking along in search of game or sitting on top of a mountain working on some of his artifacts. We can determine what care he took to remove the flake or whether he was just roughing out blanks or he may even have been making a supply of knives or blades to carry in his pouch to complete at camp in his leisure time. Each chip tells a story as to whether

it was heat-treated, whether the color of the stone was changed, and just what type of work went into the making of a ~~blade~~ ARTIFACT.