

MAYAN FLAKED KNIVES VERSUS FOLSOM POINTS

After much study of the flint cores of Mexico, and after many trials, errors and discouragem^{ent} in trying to duplicate their work, I have finally succeeded in reproducing the work of the Mayans in making a core and flaked knives, and now feel that I have achieved a duplication of their work and a partial knowledge of the methods used in the flaked knife manufacture. I now know that it must have taken even Ancient Man years of trial and error experimenting before he achieved perfection in removing flaked knives from a block of obsidian.

In researching this ancient art, I would like to recall a very interesting article. This article states that "early man made many things with his hands which, because of their destructible nature, have not survived. But it is doubtful if he did anything that required a higher type of cerebration than does the preparation of fine flint instruments. The Anthropologist, Leichy, had to spend several years in experimentation before he could chip a flint ax equal to workmanship of that turned out by men in the late Paleolithic. He found that success depended on the knowledge of the cleavage planes in the rough stone and on the ability to strike a blow with just the right amount of force and at just the right angle, and at the proper point. He found it also important that the maker of the knife select the proper striking tool. It would seem that by random pounding a man might learn the relative hardness of various stone, and thus come to choose flint in preference to softer material for his weapons, but it is inconceivable that, without instruments, he could, in the space of a single lifetime, discover how to chip flints equal to the neolithic scrapers. Actually, the art of developing flint chipping spread over nearly a million years and this in spite of the fact that no animal is more curious, more impelled to feel things, handle them, bite them, tear them to pieces, pound them and to experiment with them in every conceivable way than are apes and children. Curiosity and

manual restlessness have been the chief forces that have impelled man's exploitation of the world and ultimately has enabled him to win what control he has ~~at~~ at the present time. It is interesting to note how long it took man to come into his own in the prolog of "Man and His Gods" by Homer W. Smith.

I have been studying and experimenting with flintknapping since childhood, but it has just been since I have accomplished the art of duplicating the flaked knives and their resulting core that I have felt I was really getting a good working knowledge of the art of stone chipping. Flaked knives, of course, are the single prisms that are removed from the resulting core. There are ~~so~~ many factors involved in producing one of these knives, but one of the most important is choosing a piece of material without a flaw and as near perfect as one can find.

The next important step is proper blocking of the stone in preparation for removing the knives. The block should be ~~S~~quared up, or at least have a perfect right angle side established for the initial removal of ~~stone~~ ^{flake}. The removal of flakes from the four corners of the cube is of the utmost importance. Removal must be done correctly for it serves as a guide for the next two flakes and will assure removal of further knives and an ultimately perfect core. When removing this initial flake, the angle must be perfect and cannot vary even one degree or the flake will "kick out" or break ~~off~~ short. Of course, if this happens, one must start all over again. If the first flake is properly taken, and you have followed the correct angle from the top of the core to the base, you will have established a guiding ridge to follow in removing the next flake. If, at any time, one fails to remove the flake the entire length of the piece of stone being worked, and the flake should break off

or hinge, then one must start over, for one cannot remove the ~~FLAKE~~ other than from the top of the stone being worked. Once the hinge has occurred, or the breaking off of the flake, there is not sufficient material left at top - where you apply the pressure - to bear the strength necessary to break the stone the full length of the flake. When applying pressure at the top of the stone, you must have a platform or you must have a surface which will hold this pressure. The small area on which you apply the pressure is much smaller than the actual amount of stone broken. Therefore, your tool, and the placement of your tool, is important. If you try to remove a flake which is larger in proportion than the established platform, your tool will probably slip or kick out and, if it does this, it will splinter the edge which would create the same problem as if you had broken a flake off short. This judgement of platform size and the grinding and roughing up of the platform does help to relieve the flake and start it parting. You might compare it to tearing a telephone book in half. You actually only tear one page at a time, although it would seem all pages are torn at the same time. Removing a flake works in very much the same way, your material having a certain amount of flexibility. One must pull away from the stone at the top for guiding the flake. It is, actually, peeling the material off with a direct thrust. This thrust is carried all the way thru - it is not stopped. You can feel it go, and you have to follow it right on thru all the way. Otherwise, it will flex and will break off short before you have completed the full flake.

Holding your material to be worked presents another problem, and one must have the material properly supported. For support, Ancient Man, no doubt, used a piece of log. He probably split it at one end and placed the stone in the split portion or drove a wedge in and removed the wedge and then used a rack stick with perhaps leather thongs similar

to a tourniquet. He used this type of holding device for twisting the stone tight and, at the same time, he was able to take it loose to keep turning the block of stone he was working, for you must have the working surface of the stone towards the outer edge. Ancient Man probably chose a site where there was sand or soft dirt to catch his knives as they were removed, for they come loose from the working stone with considerable force and when they fall they would shatter and break unless they would fall on soft ground. Ancient Man might even have used wadded up buck-skin or brush for catching the knives as they were removed.

When applying pressure, it is important to know just how much pressure to use in order to determine how to set the tool on the leading edge after one has established a platform. In establishing the platform, one must free the outer edge for each flake that is to be removed. This is done with a piece of horn or some hard pointed instrument and the flake must be removed to the right and to the left of where the pressure is going to be applied; yet it must be over a ridge that has been previously established. When the pressure is to be applied, one must be able to determine how much pressure is necessary to remove the size of flake he has prepared to take. One must apply both outward and downward pressure. First apply the downward pressure and then the outward pressure and, as you apply the outward pressure, you must at the same time increase the downward pressure and as soon as you feel the flake giving at the top, from the outward pressure, you will feel the flake follow thru. This, of course, happens very rapidly, but, after you have become accustomed to working the stone, you can actually feel this happen as the flake is being removed. Flakes will be removed all around the surface of the stone. If the stone is a square or rectangular piece, then one must first remove the four corners. If you fail to remove the corners it is useless to carry on. They must be rechipped, reflaked, resquared, in order to

get a sharp ridge that is true and symmetrical the full length of the working edge of the stone. After one has blocked out his working material by percussion, the stone might be bruised and fairly irregular on the edges, but this portion will be removed with the first flake. Then, after one takes off the first flake, he reshapes the platform and then takes off the next flake parallel to that one and continues this on both sides of the first corner until he reaches the center. Then you will remove the other corners and work back until you meet the other series of flakes and, as a result, you will end up with a fairly cylindrical core. Continue this method of removing flakes, going around and around the core until you make a mistake and make a hinge or step fracture and, if you do, just start on another block of stone or, if there is enough material left in the core you have been working, you can eliminate this hinge fracture and establish a new line or ridge running the full length of the stone by changing ends and pressing a flake to meet the hinge fracture.

To prepare the original piece of stone so it will be workable is, in itself, a difficult operation. When making flaked knives, one cannot use a piece of stone that has a big block of stone sticking out someplace on the working piece down the center of the core because, at the top, where you apply the pressure, there just isn't enough stone to withstand the pressure necessary to carry thru an irregular chunk someplace further down towards the middle of the core. The ideal type of flake and the one that the Ancient Man seemed to prefer was one that was beveled on both edges and flat on the surface. If the flake is removed properly, it will be similar to a hollow ground razor blade. It has a concave surface to the leading edge. If the flake, or knife, is properly made it will have a very sharp edge and will cut thru leather etc. as easy as one cuts butter. No steel razor blade seems to be as sharp

worked, such as jade or any stone of extreme toughness, in order to stand the outward and downward pressure. Some of the flakes that I have been able to remove have been as much as an inch across and as much as five inches in length. Therefore, you can readily see that the point used for removing the flake should not be of stone for it would not be strong enough to stand the pressure to remove a flake of this size.

This is an important part in removing a flake. This and having the proper platform with an abraded surface so it will clear itself from its' Mother piece and follow thru for the full length of the stone and have the desired shape.

It, no doubt, took Ancient Man many years to perfect the making of these knives, or it may even have been a carry-over from the Folsom point. However, the Folsom point is even a more complex tool than the Mayan flaked knife, and yet Ancient Man was apparently able to accomplish these arts ^{many thousands} ~~at least 12,000 to 25,000~~ years ago. History shows that, instead of Ancient Man improving on his flintworking and reaching a greater degree of skill, he apparently degenerated in the art - for the acme of all flintworking is the Folsom Point.

Folsom man removed one of these flaked knives - you might say - from each side of his previously chipped projectile point. He had to establish not only his ridge down the center of his point in order to guide the flake, but he also had to establish his platform for removing the large flakes. Bear in mind that he had only a thin piece of material to work on, for he had already made a shaped and flaked point. The Mayans were working with a heavy chunk of material to remove their flakes, Folsom man had only a ~~thin~~ thin, shaped point on which to work. Folsom man had to remove this broad flake ^{on both sides} and do so without hinging or snipping the

end off his point. Remember, as the flake being removed spreads to the outer edge, it will, like a concoidal fracture, have a tendency to make a cone and, as the flake moves out, it will spread and tend to snip off the end of the point. To guide the flakes and leave the hollow ground effect which one finds on Mayan cores and Folsom points, one must exert a tremendous amount of pressure which will leave the removed flake with a slight curve. As this curved flake is being removed, one must properly support the stone so the flake will not crush. Folsom man had to exert more pressure to remove his flake than did Maya Man when he removed his flaked knives from his core. Folsom man, in removing the large flakes from his previously chipped artifact and, at the same time holding his single blade securely enough to withstand this tremendous pressure and permit control and guiding of downward and outward pressure, shows a great deal more skill than the removal of flaked knives from a core. Yet these two operations are very closely related.

In trying to make Folsom points, I work first with flaked knives from a core and then try doing the same thing on a chipped point. Although they are closely related, there is a very definite difference and problem for, with the Folsom point I am working with a much smaller and much thinner piece of stone. Whether it is a specific touch or a little different holding problem, I have not as yet determined, but I do find the tops of the folsom points will crush. I have tried to abraid the top of the folsom point to free the flake, but this will weaken it too much and will allow it to crush. However, polishing the platform will give it more strength.

It seems like it takes a lot more force to remove a flake from a thin flexible piece of stone like the projectile point, and if you are successful in fluting one side, you have so weakened your stone by taking off perhaps a third of it, that you will break the point when you start to remove the flake from the opposite side. Yet Folsom man was able to do this repeatedly with a great deal of precision and all I am trying to do is make a replica or copy of Folsom point and learn their

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technique. The more I learn about this method, the more I feel that Modern man is really just a "copy Cat" and did not really develop anything on his own. I have made some Folsom points as good as some of the Folsom points found, but I have never achieved the classic style of many of the points found showing superior workmanship. Folsom points had a polished edge and they were polished for the purpose of holding them in their clamps or vises and also to keep the edges from cutting the lashings when secured in a shaft. A polished piece will stand the pressure and it won't chip and will not set up internal strains if there is some sharp projecting point on the edge or somewhat of a saw effect from the fresh flaking. Unless this irregularity is removed, it will set up internal strains and when you apply the pressure at the top and these strains are present, your longitudinal flake will not come off in one piece. In fact, your point will nearly always break. When working a point, if I break it, I keep right on breaking them in the same way until I am sure that what I am doing is wrong and that it is not just an accident or some imperfection in the stone. Sometime, by this process of elimination, I hope to learn their exact technique and understand better how they were able to free these flakes from the Folsom point.

A Folsom point has certain characteristics that I have not been able to interpret properly, for one would have to have both the detached flake and the point to determine just what did happen. When one has only the flake or only the point he can just guess at what happened. Had I had the opportunity to study more Folsom or Clovis collections which would not only contain the point but also the removed flake, I, perhaps, could better understand what was taking place. As it is, I have to just guess what happened and that is what I am doing - guessing and guessing. I have been doing this for many years and sometime I hope to be able to guess as well as they did.

I saw some of the flakes that Dr. H.H. Roberts excavated from the Lindenmeir site in Colorado. These flakes had a polished surface on the platform and

indicated that they were removed from the original projectile by pressure. If they had been removed by percussion and struck, they would have had ripple marks and, also, percussion would have knocked the far end off the point because the operation works on the same principle as a teter board. If you strike on one end, the other end receives the same amount of shock. So the Folsom point was probably made by pressure and was held in some sort of a vise arrangement and there was a prepared platform which was polished to withstand the pressure. They had a method of figuring the angle which enabled them to remove the flake out at the bottom rather than having it turn back under which is the natural tendency of a flake - to curve towards the one applying pressure or towards the piece of stone being worked. A flake is part of a cone and it has a tendency to spread out and become cone-like in shape and even though you carry the flake the full length it still has a tendency to pull back underneath. There is a certain amount of tearing as a flake is removed and it must be remembered that flint is a somewhat flexible material. Flint will do some bending before it will break. Ancient man was able to bend the material and when the folsom point was finished they had a perfect convex effect similar to a lens. If you run your fingers the full length of the flutes on both sides, you will find that it swells and comes back in - fairly close towards the basal portion of where the pressure was applied. They were able to remove this bulb when they polished this little projection at the top of their point or at the basal portion of the flake. That established a portion of the platform which you might say would be a portion of the cone. And with this cone, they were able to hold it in fairly close. And by making this close enough, it kept it from spreading out and they were also able to guide this flake with a little more precision and accuracy. There is no apparent way of placing it on the ground, if it was, or putting it in the sand or placing the foot on it, or something like that, for removing this flake because, if you do, with the amount of stone that is broken, it would completely shatter the point.

There are times when I have applied pressure on these materials when a flake will run the full length of the point and it will come to the surface there will be almost no outward pressure. I will attempt to do the same thing again and it will just crush and it will break off short and kick out. And yet, as near as I can tell, my method of doing this is exactly the same, my stone is the same, all conditions are apparently the same, but there is something lacking in my technique to produce the accuracy and thinness of the Folsom point. I shall continue my practice until I someday understand exactly what is happening to accomplish this. After I understand it, I might find that it is even a simpler process than I am now using, but there are certain mechanics and laws of physics in these materials that will always remain the same. If the stone is the same, the laws will remain the same. Ancient Man had a knowledge and understanding of these materials that we, today, even with all our skills and chemistry, cannot match. There were some Ancient men that were not just workmen making a tool, but were actually artists in their skill. There were even tribal characteristics that definitely show in some points. You will also find carelessly made points. Some of the Ancient Men took pride in the making of their points, while others were not so adept and not so particular. Some of these men developed a skill in making these points that we cannot understand in this present day. Even our Plains Indians and recent Indians were not able to do this fluting and make flaked knives. Even as high a developed culture as the Hopewellian peoples and the Mound Builders of Ohio could not do this type of work. They made some little flaked knives - very tiny and very simple things compared with the Aztecs and the Mayans. The Mayans, too, did simple work compared to the Folsom Man. To understand why the art of flintworking changed is hard to understand. Maybe in Folsom time the game were more plentiful and man had a lot of time on his hands and some of his work was done for arts sake as well as utilitarian. The Folsom point was a very satisfactory tool.

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When it was hafted, it held very firmly and he could use it as an attle attle or a spear and he may have been able to kill Sabre Tooth Tigers and we know that he killed elephants and giant bison - a now extinct bison - much larger than anything that lives today. Piles of bone containing as many as hundreds of these animals have been found that were killed by Folsom man and his point. This point was his only weapon against these huge beasts and apparently it was adequate.

Mexican Polyhedral Cores

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In researching this ancient art, I would like to recall a very interesting article. This article states that "early man made many things with his hands which, because of their destructible nature, have not survived. But it is doubtful if he did anything that required a higher type of cerebration than does the preparation of fine flint instruments. The Anthropologist, ^{L.S.B. LEAKE} Leakey, had to spend several years in experimentation before he could chip a flint ax equal to workmanship of that turned out by men in the late Paleolithic. He found that success depended on the knowledge of the cleavage planes in the rough stone and on the ability to strike a blow with just the right amount of force and at just the right angle, and at the proper point. He found it also important that the maker of the knife select the proper striking tool. It would seem that by random pounding a man might learn the relative hardness of various stone, and thus come to choose flint in preference to softer material for his weapons, but it is inconceivable that, without instruments, he could, in the space of a single lifetime, discover how to chip flints equal to the neolithic scrapers. Actually, the art of developing flint chipping spread over nearly a million years and this in spite of the fact that no animal is more curious, more impelled to feel things, handle them, bite them, tear them to pieces, pound them and to experiment with them in every conceivable way than are apes and children. Curiosity and

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I have been studying and experimenting with flintknapping since childhood, but it has just been since I have accomplished the art of duplicating the flaked knives and their resulting core that I have felt I was really getting a good working knowledge of the art of stone chipping. Flaked knives, of course, are the single prisms that are removed from the resulting core. There are ~~so~~ many factors involved in producing one of these knives, but one of the most important is choosing a piece of material without a flaw and as near perfect as one can find.

The next important step is proper blocking of the stone in preparation for removing the knives. The block should be squared up, or at least have a perfect right angle side established for the initial removal of ~~stone~~^{FLAKE}. The removal of flakes from the four corners of the cube is of the utmost importance. Removal must be done correctly for it serves as a guide for the next two flakes and will assure removal of further knives and an ultimately perfect core. When removing this initial flake, the angle must be perfect and cannot vary even one degree or the flake will "kick out" or break ~~off~~ short. Of course, if this happens, one must start all over again. If the first flake is properly taken, and you have followed the correct angle from the top of the core to the base, you will have established a guiding ridge to follow in removing the next flake. If, at any time, one fails to remove the flake the entire length of the piece of stone being worked, and the flake should break off

or hinge, then one must start over, for one cannot remove the flake other than from the top of the stone being worked. Once the hinge has occurred, or the breaking off of the flake, there is not sufficient material left at top - where you apply the pressure - to bear the strength necessary to break the stone the full length of the flake. When applying pressure at the top of the stone, you must have a platform or you must have a surface which will hold this pressure. The small area on which you apply the pressure is much smaller than the actual amount of stone broken. Therefore, your tool, and the placement of your tool, is important. If you try to remove a flake which is larger in proportion than the established platform, your tool will probably slip or kick out and, if it does this, it will splinter the edge which would create the same problem as if you had broken a flake off short. This judgement of platform size and the grinding and roughing up of the platform does help to relieve the flake and start it parting. You might compare it to tearing a telephone book in half. You actually only tear one page at a time, although it would seem all pages are torn at the same time. Removing a flake works in very much the same way, your material having a certain amount of flexibility. One must pull away from the stone at the top for guiding the flake. It is, actually, peeling the material off with a direct thrust. This thrust is carried all the way thru - it is not stopped. You can feel it go, and you have to follow it right on thru all the way. Otherwise, it will flex and will break off short before you have completed the full flake.

Holdng your material to be worked presents another problem, and one must have the material properly supported. For support, Ancient Man, no doubt, used a piece of log. He probably split it at one end and placed the stone in the split portion or drove a wedge in and removed the wedge and then used a rack stick with perhaps leather thongs similar

to a tourniquet. He used this type of holding device for twisting the stone tight and, at the same time, he was able to take it loose to keep turning the block of stone he was working, for you must have the working surface of the stone towards the outer edge. Ancient Man probably chose a site where there was sand or soft dirt to catch his knives as they were removed, for they come loose from the working stone with considerable force and when they fall they would shatter and break unless they would fall on soft ground. Ancient Man might even have used wadded up buckskin or brush for catching the knives as they were removed.

When applying pressure, it is important to know just how much pressure to use in order to determine how to set the tool on the leading edge after one has established a platform. In establishing the platform, one must free the outer edge for each flake that is to be removed. This is done with a piece of horn or some hard pointed instrument and the flake must be removed to the right and to the left of where the pressure is going to be applied; yet it must be over a ridge that has been previously established. When the pressure is to be applied, one must be able to determine how much pressure is necessary to remove the size of flake he has prepared to take. One must apply both outward and downward pressure. First apply the downward pressure and then the outward pressure and, as you apply the outward pressure, you must at the same time increase the downward pressure and as soon as you feel the flake giving at the top, from the outward pressure, you will feel the flake follow thru. This, of course, happens very rapidly, but, after you have become accustomed to working the stone, you can actually feel this happen as the flake is being removed. Flakes will be removed all around the surface of the stone. If the stone is a square or rectangular piece, then one must first remove the four corners. If you fail to remove the corners it is useless to carry on. They must be rechipped, reflaked, resquared, in order to

get a sharp ridge that is true and symmetrical the full length of the working edge of the stone. After one has blocked out his working material by percussion, the stone might be bruised and fairly irregular on the edges, but this portion will be removed with the first flake. Then, after one takes off the first flake, he reshapes the platform and then takes off the next flake parallel to that one and continues this on both sides of the first corner until he reaches the center. Then you will remove the other corners and work back until you meet the other series of flakes and, as a result, you will end up with a fairly cylindrical core. Continue this method of removing flakes, going around and around the core until you make a mistake and make a hinge or step fracture and, if you do, just start on another block of stone or, if there is enough material left in the core you have been working, you can eliminate this hinge fracture and establish a new line or ridge running the full length of the stone by changing ends and pressing a flake to meet the hinge fracture.

To prepare the original piece of stone so it will be workable is, in itself, a difficult operation. When making flaked knives, one cannot use a piece of stone that has a big block of stone sticking out someplace on the working piece down the center of the core because, at the top, where you apply the pressure, there just isn't enough stone to withstand the pressure necessary to carry thru an irregular chunk someplace further down towards the middle of the core. The ideal type of flake and the one that the Ancient Man seemed to prefer was one that was beveled on both edges and flat on the surface. If the flake is removed properly, it will be similar to a hollow ground razor blade. It has a concave surface to the leading edge. If the flake, or knife, is properly made it will have a very sharp edge and will cut thru leather etc. as easy as one cuts butter. No steel razor blade seems to be as sharp

as an obsidian flaked knife. These were, indeed, satisfactory tools for Ancient Man. These knives, or flakes, can be hafted and used as knives, spears, or for any type of cutting instrument. How to hold the stone to be worked is very important. The stone is supported in a clamp or wooden vise for holding it perfectly still for flaking. The stone cannot rest on any solid object or it will cause a compression of the stone and, when the pressure is applied, it would give pressure in two ways, both up and down. The stone should be held in the vise tightly, but resting on nothing and the side of the stone being worked should protrude from the vise so the flake can run off free on the working side. If the stone to be worked is supported against the ground or any solid object, all you would be doing when the pressure was applied would be to cause a compression and the flake would not be removed and all you would accomplish is to crush a portion of the stone and the flake would break off short and one could never remove the flake in its entirety.

Ancient man, no doubt, supported himself against a tree or ledge and held the wooden log vise between both feet when removing the flaked knives. Since ancient man's wooden log vise has long since disappeared, we must guess at his method of stone holding and position, but my experience in making these knives leads me to believe that such was his method. My holding device is a wooden clamp and could be duplicated, as explained before, by making a cut in a log to hold the working stone. One would then stand on the log to keep it from turning. The stone must be secured very firmly in the vise with the working edge protruding beyond the edge of the vise. The body of the person working the stone must be held upright and very rigid. For my chipping tool, I use a wooden staff or crutch with a point affixed to the end. The point can be of ivory or bone or metal and does not necessarily have to be of stone. Stone could be used, but it would have to be of a harder variety than the stone being

worked, such as jade or any stone of extreme toughness, in order to stand the outward and downward pressure. Some of the flakes that I have been able to remove have been as much as an inch across and as much as five inches in length. Therefore, you can readily see that the point used for removing the flake should not be of stone for it would not be strong enough to stand the pressure to remove a flake of this size.

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It, no doubt, took Ancient Man many years to perfect the making of these knives, or it may even have been a carry-over from the Folsom point. However, the Folsom point is even a more complex tool than the Mayan flaked knife, and yet Ancient Man was apparently able to accomplish these arts ~~at~~ ^{Many thousands of} ~~years~~ years ago. History shows that, instead of Ancient Man improving on his flintworking and reaching a greater degree of skill, he apparently degenerated in the art - for the acme of all flintworking is the Folsom Point.

Folsom man removed one of these flaked knives - you might say - from each side of his previously chipped projectile point. He had to establish not only his ridge down the center of his point in order to guide the flake, but he also had to establish his platform for removing the large flakes. Bear in mind that he had only a thin piece of material to work on, for he had already made a shaped and flaked point. The Mayans were working with a heavy chunk of material to remove their flakes, Folsom man had only a ~~thin~~ thin, shaped point on which to work. Folsom man had to remove this broad flake ^{on both sides.} and do so without hinging or snipping the

end off his point. Remember, as the flake being removed spreads to the outer edge, it will, like a conoidal fracture, have a tendency to make a cone and, as the flake moves out, it will spread and tend to snip off the end of the point. To guide the flakes and leave the hollow ground effect which one finds on Mayan cores and Folsom points, one must exert a tremendous amount of pressure which will leave the removed flake with a slight curve. As this curved flake is being removed, one must properly support the stone so the flake will not crush. Folsom man had to exert more pressure to remove his flake than did Maya Man when he removed his flaked knives from his core. Folsom man, in removing the large flakes from his previously chipped artifact and, at the same time holding his single blade securely enough to withstand this tremendous pressure and permit control and guiding of downward and outward pressure, shows a great deal more skill than the removal of flaked knives from a core. Yet these two operations are very closely related.

In trying to make Folsom points, I work first with flaked knives from a core and then try doing the same thing on a chipped point. Although they are closely related, there is a very definite difference and problem for, with the Folsom point I am working with a much smaller and much thinner piece of stone. Whether it is a specific touch or a little different holding problem, I have not as yet determined, but I do find the tops of the folsom points will crush. I have tried to abraid the top of the folsom point to free the flake, but this will weaken it too much and will allow it to crush. However, polishing the platform will give it more strength.

It seems like it takes a lot more force to remove a flake from a thin flexible piece of stone like the projectile point, and, if you are successful in fluting one side, you have so weakened your stone by taking off perhaps a third of it, that you will break the point when you start to remove the flake from the opposite side. Yet Folsom man was able to do this repeatedly with a great deal of precision and all I am trying to do is make a replica or copy of Folsom point and learn their

technique. The more I learn about this method, the more I feel that Modern man is really just a "copy Cat" and did not really develop anything on his own. I have made some Folsom points as good as some of the Folsom points found, but I have never achieved the classic style of many of the points found showing superior workmanship. Folsom points had a polished edge and they were polished for the purpose of holding them in their clamps or vises and also to keep the edges from cutting the lashings when secured in a shaft. A polished piece will stand the pressure and it won't chip and will not set up internal strains if there is some sharp projecting point on the edge or somewhat of a saw effect from the fresh flaking. Unless this irregularity is removed, it will set up internal strains and when you apply the pressure at the top and these strains are present, your longitudinal flake will not come off in one piece. In fact, your point will nearly always break. When working a point, if I break it, I keep right on breaking them in the same way until I am sure that what I am doing is wrong and that it is not just an accident or some imperfection in the stone. Sometime, by this process of elimination, I hope to learn their exact technique and understand better how they were able to free these flakes from the Folsom point.

A Folsom point has certain characteristics that I have not been able to interpret properly, for one would have to have both the detached flake and the point to determine just what did happen. When one has only the flake or only the point he can just guess at what happened. Had I had the opportunity to study more Folsom or Clovis collections which would not only contain the point but also the removed flake, I, perhaps, could better understand what was taking place. As it is, I have to just guess what happened and that is what I am doing - guessing and guessing. I have been doing this for many years and sometime I hope to be able to guess as well as they did.

I saw some of the flakes that Dr. H.H. Roberts excavated from the Lindenmeir site in Colorado. These flakes had a polished surface on the platform and

indicated that they were removed from the original projectile by pressure. If they had been removed by percussion and struck, they would have had ripple marks and, also, percussion would have knocked the far end off the point because the operation works on the same principle as a teter board. If you strike on one end, the other end receives the same amount of shock. So the Folsom point was probably made by pressure and was held in some sort of a vise arrangement and there was a prepared platform which was polished to withstand the pressure. They had a method of figuring the angle which enabled them to remove the flake out at the bottom rather than having it turn back under which is the natural tendency of a flake - to curve towards the one applying pressure or towards the piece of stone being worked. A flake is part of a cone and it has a tendency to spread out and become cone-like in shape and even though you carry the flake the full length it still has a tendency to pull back underneath. There is a certain amount of tearing as a flake is removed and it must be remembered that flint is a somewhat flexible material. Flint will do some bending before it will break. Ancient man was able to bend the material and when the folsom point was finished they had a perfect convex effect similar to a lens. If you run your fingers the full length of the flutes on both sides, you will find that it swells and comes back in - fairly close towards the basal portion of where the pressure was applied. They were able to remove this bulb when they polished this little projection at the top of their point or at the basal portion of the flake. That established a portion of the platform which you might say would be a portion of the cone. And with this cone, they were able to hold it in fairly close. And by making this close enough, it kept it from spreading out and they were also able to guide this flake with a little more precision and accuracy. There is no apparent way of placing it on the ground, if it was, or putting it in the sand or placing the foot on it, or something like that, for removing this flake because, if you do, with the amount of stone that is broken, it would completely shatter the point.

There are times when I have applied pressure on these materials when a flake will run the full length of the point and it will come to the surface there will be almost no outward pressure. I will attempt to do the same thing again and it will just crush and it will break off short and kick out. And yet, as near as I can tell, my method of doing this is exactly the same, my stone is the same, all conditions are apparently the same, but there is something lacking in my technique to produce the accuracy and thinness of the Folsom point. I shall continue my practice until I someday understand exactly what is happening to accomplish this. After I understand it, I might find that it is even a simpler process than I am now using, but there are certain mechanics and laws of physics in these materials that will always remain the same. If the stone is the same, the laws will remain the same. Ancient Man had a knowledge and understanding of these materials that we, today, even with all our skills and chemistry, cannot match. There were some Ancient men that were not just workmen making a tool, but were actually artists in their skill. There were even tribal characteristics that definitely show in some points. You will also find carelessly made points. Some of the Ancient Men took pride in the making of their points, while others were not so adept and not so particular. Some of these men developed a skill in making these points that we cannot understand in this present day. Even our Plains Indians and recent Indians were not able to do this fluting and make flaked knives. Even as high a developed culture as the Hopewellian peoples and the Mound Builders of Ohio could not do this type of work. They made some little flaked knives - very tiny and very simple things compared with the Aztecs and the Mayans. The Mayans, too, did simple work compared to the Folsom Man. To understand why the art of flintworking changed is hard to understand. Maybe in Folsom time the game were more plentiful and man had a lot of time on his hands and some of his work was done for arts sake as well as utilitarian. The Folsom point was a very satisfactory tool.

Mayan Knives vs Folsom

When it was hafted, it held very firmly and he could use it as an atlatl or a spear and he may have been able to kill Sabre Tooth Tigers and we know that he killed elephants and giant bison - a now extinct bison - much larger than anything that lives today. Piles of bone containing as many as hundreds of these animals have been found that were killed by Folsom man and his point. This point was his only weapon against these huge beasts and apparently it was adequate.