Flint Knapping:
Fluting & Notching

Compiled/Edited by Michael Lynn

Photo of Tim Dillard teaching me at the Center for American Archaeology in Kampsville, IL

Dedicated to all those who have taught someone else about the art of flint knapping, especially to my primary teachers – Bruce Boda, Tim Dillard, Mike McGrath and Steve Nissly. This is my attempt to pay forward.

Flint Knapping: Fluting & Notching

Fluting Instructions

by Gary Merlie

This series of pics are a composite of work on 2 different preforms. After each of the flake removals in the first few pics, remember to clean up the little overhangs just like you do when making a biface. There are many critical variables that I could not cover in these few pics. Nipple grinding, cross section of preform, and placement of the lever just to name a few. You will just have to experiment. All of the knapping/fluting was done with copper and modern tools. Fluting abo style is a whole different ball game, a game I have never played. I would love to see a similar layout like this one dedicated to abo style fluting by one of the good abo knappers like Bob Patten. (hint hint) Rockhead

Bevel base toward side to be fluted.

Remove flakes 1 & 2 on the side to be fluted to define nipple. Remove flakes 3 & 4. These are guide flakes to help flute flare out correctly.

Turn point over and remove flakes 5 & 6. These removals isolate nipple.

Remove flakes 7 & 8 from side to be fluted. These removals act as guides, and further isolate nipple.

Turn point over and remove flakes 9 & 10 as needed. These removals regulate the width of the nipple. Remember when making nipples: Define, isolate, regulate, and grind.

This nipple is ground and prepared for fluting. The guide flakes could be better, but it is good material from Harrison Co. Ind. and the flute will probably go.

View of overall preform. Note how nipple is isolated and out towards face to be fluted. Ears are back away from face to be fluted. I grind the ears at this point to keep them from snapping during fluting.

Preform in jig ready to be fluted. Note tip of copper lever on top of nipple. Side to be fluted is facing jig.

Copper lever. This tool has 4 working faces so you don't have to dress it as much.

Close up of copper lever on nipple. Ready to flute.

Preform and flute spall immediately after fluting. This flute ran about 4".

Here's the finished point after the other side was fluted and much pressure flaking was done to give it the distinctive Cumberland fishtail shape. Length is 4 1/2". I rubbed a little mineral oil on it to give it the nice glossy look. Total time to make this point? A lot less than it took to edit and post all these pics!

From http://www.ssrsi.org/Onsite/fluting.htm, March 31, 2010, copied with permission

Hand Fluting

By Bob Patten (aka knapperbob)

I picked a tough piece of raw Utah agate to make a Folsom. The weathered surface is deceiving.

You can see that the stone tears rather than breaking smoothly, but works well otherwise. The unweathered interior looks quite different from the weathered outside.

I used antler baton percussion until the thickness was even and relatively thin. Some length was lost due to careless work.

After the surface was selectively contoured by antler pressure, I gave the base a bevel.

A little more work and the platform is isolated. I set up a 2 mm gap between the platform and a straight edge to control flute thickness. At this time, I make sure that there are no gaps between the straight edge and the preform crest.

The first platform is ready for fluting.

You can see my view of the fluting anvil, a moose billet resting on top of my calf muscle.

Here, the preform is in place atop the anvil. The blow follows through to land on a heavy leather pad near to the action I normally use while doing regular percussion. My avatar demonstrates the approximate positioning for fluting.

Backlighting shows the translucent nature of this agate.

Unfortunately, I held the preform off center and the first flute peeled to one side.

With just a small adjustment, I have a new platform near the edge of the preform base. Ready for another try in under a minute.

As we say, "the operation was a success, but the patient died." Although the flute went full length, an unfortunately-placed crystal pocket caused the point to snap. With a few thousand years of weathering, this point could have taken on the relatively smooth appearance of the starting quarry blank.

From http://paleoplanet69529.yuku.com/reply/126388#reply-126388, April 4, 2010, copied with permission

Folsom Workshop Fluting Experiments

by Tony Baker

In the afternoons of the Workshop we would adjourn to the loading dock of the Texas Archaeological Research Laboratory and the knappers would demonstrate their methods of fluting a Folsom point. All the knappers can make the preform from which the channel flakes are removed. It is the removal of the two channel flakes that are the most difficult steps of Folsom point manufacture. Most of the knappers brought some prepared preforms ready to be fluted (channel flakes removed), so the first day there were many fluting demonstrations. After the pre-workshop preforms were exhausted, then the knappers would spend an hour or so making a new preform and then the fluting demonstration would take only a few minutes. So the pace of the afternoons could be described as mostly slow and relaxing with an occasional burst of excitement.

Those of us who could knap were involved in these activities and the rest watched with envy. Besides making Folsom points, the group made Clovis points, ultra-thin bifaces and mesoamerican blades. These were some of the activities that were captured on film by Dick Boisvert. Thanks Dick.

Assisted Indirect Percussion -- Bob Patten

The tools Bob used are visible in this image. They can be used for both assisted and unassisted indirect percussion. The tools consist of a large block of wood with two pegs, a bone tipped punch (immediately above the block of wood), a second punch (the straight stick lying on top of the block), a large rock for the hammer, and the strap of leather (for unassisted fluting). This image also shows some of the fluted preforms from the day's efforts.

In this image, Bob is performing unassisted fluting. The leather strap has been used to fix the preform against the two pegs. The bone-tipped punch is placed on the platform and its other end is held between Bob's knees. The straight punch is then placed on top of the bone tip punch and this is hit with the hammer. Bob says he really doesn't hit the straight punch with the hammer. He just lets the hammer fall under its own weight. If the technique was assisted, a second individual would hold the preform against the pegs, and the leather strap would not be used.

This image captures Bob at the instant the channel flake was removed. Notice the bone punch is now on the block of wood.

This is his preform prior to fluting ...

and this is the preform after fluting.

Direct Percussion -- Phil Geib

Phil's technique of fluting a Folsom point was one of the simplest methods used at the workshop. His tool kit for fluting consisted of a hammer-stone and a rock anvil.

Phil would hold the preform and anvil in his left hand. The anvil was pressed against a large massive surface and the preform held horizontally and against the anvil. He would then strike the channel flake platform with the hammer-stone, held in his right hand.

This is the result of the effort in the previous image. Although the channel flake hinged through the preform at the distal end, there was still enough fluted preform to build a Folsom point.

Direct, Freehand Pressure -- Eugene Gryba

Gene's technique of fluting is even simpler than that of Phil's. He just uses pressure. In this image he is creating his preform.

In this image he is actually fluting. You can see the strain in his face as he applies the pressure to remove the channel flake. One would think Gene had hands of steel.

However, they are only skin and bone. See the callus that Gene developed over the couple weeks of practicing prior to the workshop.

This is Gene's tool kit; very simple, small antler tools.

Indirect Percussion with Vise -- Gene Titmus

Gene's technique is very similar to Bob Patten's. Here the preform is held in a vise instead of being fixed with a leather strap. However, Gene delivers his blow directly to the punch in contrast to the double punch arrangement of Bob. The piece of railroad tie is to add mass to his assembly. In the image, Gene is using a copper pointed punch. He also demonstrated the technique with a walrus ivory punch. Gene's results.

Indirect Pressure with Rest -- Kenneth Rozen

Ken's technique requires the preform to stand (rest) vertical with the distal end on a hard surface (rock). Ken creates this condition by digging a small hole in the ground and placing a flat sandstone rock in the bottom. Two flat rocks cover part of the hole and touch in a manner as to create a corner of 90+ degrees. This is an image of the assembly.

With the preform resting in the corner of the two rocks, the channel flake is removed with pressure applied by a long antler tool. This is an image of John Clark aligning the tool in preparation for removal of the channel flake. Unfortunately, the image of Ken performing this act was too dark to display so this one of John trying the technique was used. Apologies to Ken.

This is an example of the results of Ken's technique.

Levered Pressure with Rest -- Dennis Stanford

Dennis' technique has its roots in the idea that the Folsom people carried no extra baggage or devices to flute their points. To demonstrate the posibilities of this, Dennis has built an atlatl with a slot in the side to hold and flute a preform. The assumption is that the Folsom people would normally carry an atlatl. This image shows a preform resting in a slot that is too long for the preform.

This image shows a spacer added to the slot so the preform is correctly positioned.

This image shows Dennis removing the channel flake. This was done by applying pressure to the platform with a narrow antler inserted through a hole in the atlatl. With this lever arrangement, Dennis was able to generate the necessary force.

This is the result of his attempt. The preform in this experiment was made by Bob Patten.

From http://www.ele.net/workshop/images.htm, September 24, 2010, copied with permission

MAKING FLUTED POINTS WITH THE SOLLBERGER JIG

by Woody Blackwell

Photographs courtesy of Dave Rauschenberg

Side 1

Side 2

Fluted points are one of the highlights of lithic technology. We all know that they date to the earliest known occupation of the Americas, but for a variety of reasons, the reproduction of fluted points ended about 8,000 years ago. That is, until a few master craftsmen such as Don Crabtree and J.B. Sollberger began to attempt replications several decades ago.

Now there are almost as many fluting techniques as there are modern knappers, but one of the earliest methods is arguably the most successful. Working almost entirely on his own, J.B. Sollberger spent many years perfecting the three components of his technique: the preform, the platform, and the jig. (From here on, I'll refer to 'him as J.B:-due to my mediocre-typing-skills and not a lack of respect for this quiet genius).

Besides being one of the best knappers of our time, J.B. is also extremely generous in sharing his discoveries. This article and the one to follow, is based squarely on the techniques he developed and then taught to a new generation of knappers. I was very fortunate to have been one of them.

Now that credit has been given where credit is due, let me say that I'm better at showing than at explaining. If this article confuses the daylights out of you, grab me at a knap-in and I'll be glad to try to clear things up. The Waldorfs also have a video available which has a section on J.B.'s fluting technique, which is also called the "Sollberger Jig".

The first thing to tackle is the preform. This is a three dimensional challenge. Although there is considerable variety in the size and silhouette of Clovis points made with J.B.'s technique, they all share some common traits in the preform stage. Those traits deal with the cross-section and contours, which we'll cover now.

First off, make the preform as smooth as possible.
Good contours are absolutely essential to long, successful flutes, so examine the preform closely both lengthwise and widthwise. The median ridge's contour from base to tip should be gently convex. The same goes for the side to side contours. Basically, the preform should be bi-convex with a cross-section in the ballpark of Fig. 1.

FIG 1.

If you want a flute that goes to the tip, keep that cross-section from one end to the other. Preforms, with flattened cross-sections usualIy fail: the flutes run wide and cut through to the other side (this is not good).

FIG 2.

Overly steep cross-sections (see Fig. 2) often result in shallow, narrow "skimming" flutes (and you can do better than that -- remember, the whole purpose of fluting is to thin the hafting area). Also. if a long flute is your goal, the thickest part of the preform should be about 1/3 of the way between the base and the tip as shown in Fig. 3. One strong warning: don't create a "steep climb" between the base and the thick section: as I learned the hard way (with about 125 consecutive broken performs), if the climb is too accentuated, the flute will dive, resulting in a cloven Clovis (properly known as a reverse hinge fracture). This is a good way to examine the lengthwise contour: place something long and straight (like your Ishi stick) on the preform's median ridge and then look at the preform from the edge. The high spot (where your Ishi stick contacts the preform) should be 1/16th to 1/8th inch higher than the basal edge. Generally, longer preforms need greater height differences, but differences greater than 3/16" are bad juju .. ,

FIG 3

Also, that high spot should be between 3/4" and 1 & 3/4" from the basal edge, depending on the length of the preform. One of J.B.'s rules of thumb was that the high point ought to be about 113 of the way back from the base to the tip for very long flutes.

Lengthwise, both high spots and low spots can cause a flute flake to stop (see Fig. 4 & 5). If that's your intention, great; you can use high and low spots to control flute length, but your flutes will terminate differently. A flute stopped- by-a-high- spot-will- result- inÂ· a-hinge fracture. A flute that ends in a low spot will typically "feather out" . Personally, I prefer a steep hinge, similar to the points from the Lamb and Vail sites.

FIG 4

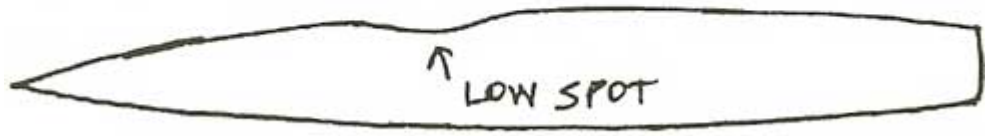


FIG 5

If it's a long flute you're after, don't try to "blow through" a high spot. You're likely to get a much shorter Clovis when the flute dives through, cutting your preform in half. If you can't lower the high spot with pressure flaking, try grinding the high spot down with a fine abrader.

Don't try to flute into a concavity that occurs in the first inch or so of the preform. I speak from experience: it will be a disaster. One of several things may happen, all of them bad. If the preform survives, you will have a Clovis with an extremely short flute. At worst, you'll have a two piece Clovis. I recommend extensive "remodeling" of that preform face to build proper contours. A few more minutes of pressure flaking may save a couple of hours' work. But more importantly, it may save that nice piece of stone.

To develop the side to side contours, I run at least two passes of pressure flaking on each face after all percussion work is done. Deep gouges and high spots behind hinges will result in flute scars that "wander" as in Fig. 6. A smooth preform will give you a flute scar with relatively straight sides. By J.B.'s exacting standards, the straighter the better, as that indicates finer workmanship. (There is another factor which can affect flute scars which will be covered in another article).

FIG 6

At this point, you should have a preform that is close to the final silhouette you're after. Clean up any remnants of pressure flaking platforms that might be left on the edges, double check the contours, take another bite of the cheeseburger you bought two hours ago, and get ready to build the fluting platform.

The first step in making the platform is to pressure flake a 45 degree bevel across the base (Fig. 7). This

might take several passes. Flake away from the face you intend to flute. After grinding lightly, drive pressure flakes on the face you want to flute from the basal edge toward the tip of the preform. Do not flake down the median ridge: leave that part of the basal edge alone. That's the area you're trying to isolate: it will become the platform, also called the "nipple". Take short flakes near the preform's basal, corners, as that area is thin and fragile. As you approach the midline, you can get aggressive and remove a lot of material (Fig, 8)). If you need to, regrind the two sections of the basal edge and take more pressure flakes. Basically, you're now beveling in the opposite direction. The goal is to leave the median ridge/nipple intact and "high and dry" -meaning well isolated from surrounding material.

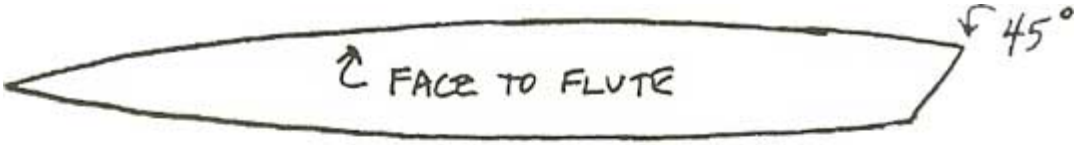


FIG 7

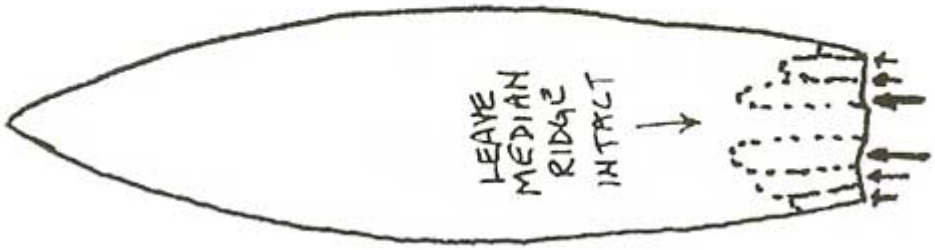


FIG 8

Now for the little part of the basal edge you left intact. It should be between 1/8" and 3/16" wide (Fig. 9). With a sharply pointed pressure flaker, gently "square up" the area around the nipple (Fag. 10). With the same sharp pressure f1aker, you need to take at least two flakes off the back side of the nipple (the side you're not trying to take the flute off of right now). Start the flakes at the "corners" where the back of the nipple joins the preform. Run the flakes toward each other, it may take several flakes and some delicate "nibbling" to properly relieve the platform. Clear as mud? See Fig. 11, which might be easier to understand. These important little flakes relieve the back side of the platform and should reduce the thickness of the platform by roughly half. Because it's impossible to make identical platforms every time, generally, a wide platform should be thin; conversely, a narrow platform should be thick. The quality of the material is a player here, as very "tender" material requires a stouter platform. Obsidian, for example, requires some of the heaviest platforms, meaning both wide and thick. Determining the optimum platform size is a skill that will come with practice. Keep in mind that the object is to build a platform that will absorb/store a great deal of energy (pressure) and then release "cleanly" (meaning the right place at the right time), allowing the flute to travel down the preform at the proper depth and speed.

Now with the finest grinder you can get your hands on, you need to grind a flat top on the end of the nipple. The flat spot should be roughly at a 90 degree angle to the centerline of the preform. You also need to grind a flat spot on the opposite end -the pointy end that mastodons worried about. And then lightly grind the edges of the preform in the hafting area. In the next article, I'll tell' you what all this

grinding is about. I'll also describe the Sollberger Jig. Although my friend (and fellow fluter) Joe Miller might tell you that the Sollberger Jig is a traditional Swedish folk dance, it's what you need to flute the preform you just learned to make. After you have made your first good Clovis though, I guarantee you'll definitely feel like dancing.

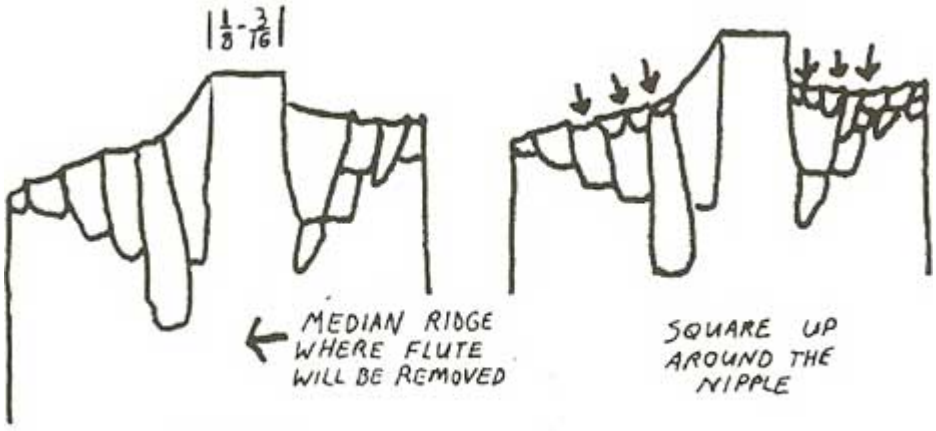


FIG 9

FIG 10

FIG 11

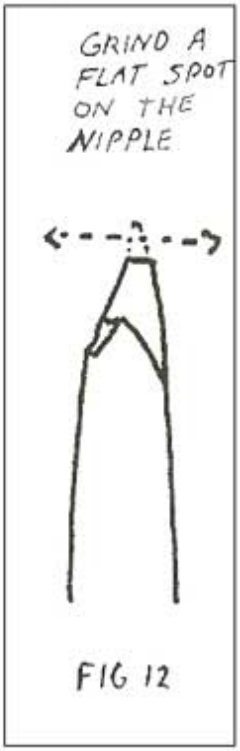


FIG 12

THE SOLLBERGER JIG

"D.C., there's only one thing from your drawings for Part One (Chips Vol. 6 #2) that I suggest changing. The back of the platform needs to be "released" a little more than as drawn. The flakes that are removed

from the bottom corners of the nipple need to meet behind the nipple, or better yet, overlap." -Woody Blackwell.

In April, a vague article on the Sollberger Jig appeared in Chips, Vol. 6. #2, (Blackwell:6-7). Let's say you spent an hour or two trying to make sense of it. Now let's assume you are still interested and want to build a jig of your own. Boy, are you a glutton for punishment, but don't let me try to talk you out of it. Read on.

In the first article, we looked at the preform. In this one we'll take a quick look at the jig. Let me stress this up front: although there are fairly close guidelines-to follow to build a good preform, jigs can be virtually any size or shape. The jig's purpose in life is pretty simple: to hold the preform steady while pressure is applied to the platform; with such a broad purpose, there's plenty of room for innovation and creativity. If you want to simply copy the drawings, that's fine, but I encourage you to experiment: improve on the design, use different materials, or be even more creative --I've thought about making a jig which looks like a mastodon, in which the preform would be held in the tips of the tusks.

J.B. Sollberger is the Einstein of the jig. I don't know how many spectacular points he has fluted (and he may not know either) but it's undoubtedly in the multi-thousands. His jig looks like the product of an inspired tinkerer (which it is). It's made of whatever he had laying around his garage: there's tongue and groove oak flooring, sections of broomsticks, twine, hose clamps, 'C' clamps, a copper pipe, and good intentions. My point is, the tool doesn't need to match the product, technique is what J.B. taught, and hopefully, I can get a little of it across too.

In order to get us all using the same vocabulary, here's a diagram of my jig. There's nothing magic about the dimensions -- it just happens to fit me pretty well If you happen to enjoy food and have a lifetime accumulation of apple pies, mashed potatoes, and chicken fried steaks spread around your mid-section, you might want to make the jig a little longer so you can see the end (my wife suggested that I make mine a couple of inches longer and add a tractor seat. What a funny girl!).

Use a good hardwood to build the jig. I've used cherry, maple, white oak and ash and all worked well. Joe Miller has a gorgeous jig made out of cocobolo, a brilliantly colored exotic wood from Central America. Mike Peterson of Laramie, Wyoming has an industrial strength jig made from inch thick machined aluminum. I think the only guideline is that you should avoid soft materials that flex too much or get dented easily. Also, I've used wood that was about an inch thick, although 3/4" wood would work just as well.

The tip support should be made of a material that is solid and able to take a lot of pressure, but not so hard that it breaks the tip off the preform. I use a small piece of antler from a moose palm. I've also seen some made of dense plastic and aluminum, but antler is my personal choice.
My bit is made of 1/8" copper sheeting which I bought from a metal supply house. A retired machinist cut it and drilled the holes for me, although it's possible to cut it with a hacksaw. J.B. 's bit was made from a copper pipe which he slit lengthwise with a hacksaw and hammered flat. He also had a second bit with an antler tip on it, which was held in place with hose clamps. J.B. felt that his success rate with Folsoms was much greater when he used the antler tipped bit.

The lever can be of most any material, but I use wood that matches the rest of my jig. You need to drill a hole through the narrow sides of the lever. Center this hole: the hole may split out when pressure is applied if the hole is too far to one face. You also need to put a slot in the same area, except the slot goes through the wide faces of the lever, (see drawing). The copper bit will go through the slot and a galvanized nail is the fulcrum for the lever, it's important that you use a nail that won't bend. That's why I recommend a galvanized nail, which you can buy at virtually any hardware store.

You should also cut a shallow "shelf" on the lever in this same area. It's not essential, but the end of the shelf serves as a stop, keeping the lever from sliding under the baseboard.

Glue soft leather into grooves near the end of the clamp arms. The leather is there to provide a soft but firm grip on the preform as it's fluted. The leather I use is about 1/8" thick and has a suede-like texture. The leather alone won't hold the preform securely during the fluting process, so use some kind of clamping or tightening devise. J. B. puts a C-clamp behind the leather. I have a threaded bolt that goes through both the clamp arms; a wing nut tightens them around the preform. Don't go overboard with the tightening. Just get it finger tight and then snug it up a touch more. If the preform is held too tightly, the extra pressure may snap the corners off the preform.

My riser has a lot of holes drilled in it to accommodate preforms of varying lengths. The trick here is to keep the preform at a 90 degree angle to the baseboard. Place the preform in the clamp arms and try various positions in the riser until the preform looks like its closer to 90 degrees. You can make the risers any size you want, just so they're slightly taller than the largest point you think you'll want to flute. The point here is that one jig can be used for all sizes of fluted points --Folsoms to Cumberlands to Wenatchee-size Clovis.

Now we're ready to hit the "on" switch and fire the thing up. You clamped the preform securely in the arms after you ground the basal edges lightly and ground the tip. The preform is at a 90 degree angle to the baseboard. The lever's shelf goes under the baseboard and the copper bit goes on the nipple. Being the consummate craftsman, you carefully ground a flat spot on the nipple and now you make sure the bit sits flat on the nipple -- if it doesn't, you file the bit to match the nipple.

Looking from the side of the jig, place the copper bit at about a 10 to 14 degree angle to the preform (it varies according to preform length -- the longer the preform, the lower the angle). And incline the lever a little, as it will be easier to push down. Put the whole contraption on something solid, study and flat. Climb on and get "comfy", keeping in mind it's not your favorite recliner. Lean over the preform and make sure the copper bit and lever are centered on the preform. If they're off to one side, the flute will probably run that way too.

Now comes the finesse, lightly hold the top of the bit in one hand and put gentle downward pressure on the far end with the other hand. While holding the bit in place, gradually build up downward pressure with the lever. Once there's enough lever pressure to keep the bit in place, begin to apply very slight outward pressure on the bit -- just enough pressure to make the copper bit clear the preform when the nipple releases.

How much downward pressure should you use? That's a hard one. You'll have to discover that for yourself, as the answer depends on the material, the way you built the nipple and the length of the

lev~r.1 feel I have too much pressure when my lever-arm-starts to shake. Joe Miller says the pressure is too high when he bends the lever like a rainbow. Mike Peterson, with his federally-licensed atom smasher, can reduce a nice piece of Pedernales flint into neutrons and protons. With experience, you'll find the upper range that's right for you.

Just be prepared for the frustration of a learning curve.
You'll break a few nice preforms. Maybe even a lot of them. Once you've completed a few killer points though, you'll be hooked. I strongly recommend that you learn with a material that's readily available and inexpensive, like obsidian. Obsidian, being a little unforgiving, will also force you to learn good knapping skills, such as control and accuracy. And don't believe the Paleo Indians didn't use it -- there are thousands of obsidian fluted points and even entire sites filled with almost nothing but obsidian.

Just do yourself a favor. Until your fluting skills catch up to your fervor, hide the Flint Ridge, the Knife River, Crescent and root beer chert. Give yourself at least a year to get a good grip on this technique and then go for it.

Now, let's look at some of the common problems, and what might be causing them, and what you can do to cure them.

PROBLEM SOLVING

I hope that some of you have built your own versions of the Sollberger Jig and have started to make fluted points. If you're working alone without the expert guidance of a master knapper like J.B., you may have encountered any of a number of different problems. While I don't pretend to know the solutions to all the problems involved in fluting, in this article I'll try to discuss some of the more common problems and what may have caused them.

One corner of the basal edge broke off. This is a pretty common one for me. Several things could be the cause: first, check the clamp arm. The slots which hold the leather pads should be exactly opposite each other and parallel. If they aren't, they could torque the preform as clamping pressure is applied. If the clamp arms look okay, check your preform: are the ground edges nice and straight? If not, the result is uneven clamp pressure. A third possible explanation is that you used too much outward pull on the copper bit: make sure you aren't pushing outward too hard with your hand that's holding the top of the copper bit. And if you're making a Folsom, the preform may have been too thin: you might have exceeded the tolerances of the material.

Deep undulations in the flute channel. Well, at least it fluted. Dig around in the dÃ©bitage pile and find the nipple. I'll bet dollars to doughnuts it's awfully stout. You probably had to use a lot of pressure, both downward and outward, to get the nipple to release. And when it turned loose, it came off with a bang. Build the nipple a little lighter next time. Make sure it's well-isolated on the backside. And on the face to be fluted, try to run some good relief flakes parallel to the center line.
The flute dove and cut the preform in two within the first couple of inches. This is what you almost got instead of the deep undulations. Again, the platform may have been too stout. Also, the arc of the lengthwise contour may have been too great. Don't ask the flute to climb a sharp incline: it will take the path of least resistance -- straight through to the other side.

The preform split or cracked lengthwise. It sounds like the platform didn't release. Was it too stout? And did you have an angle of 12 to 15 degrees between the copper bit and the preform? If you used a smaller angle, there may not have been enough out pull to cause the platform to release; because there was a lot of pressure being applied, something had to give.
The preform fluted the wrong way, from the tip towards the base. This is an easy one. Assuming you ground the tip well before you tried to flute the preform, there could be a couple of reasons for the accident. First, the tip may have moved during fluting; sometimes that will drive off short flakes. If you've used the jig a few times, check the tip support: it may have some small flakes stuck in it, especially if it's made of antler. Anything hard that's trapped between the point and the tip support may-cause flaking.

The preform fluted, but the flute was too wide. Probably due to one of two things (or maybe even both): either the preform's cross-section was too flat or the platform was too stout. Find the channel flake and see if you can determine the cause.

No flute and the nipple is gone. Sounds like the nipple crushed when you applied pressure with the copper bit. It could be that the nipple was too small for that material. Or maybe you forgot to grind a flat spot on the nipple where the copper bit contacts the nipple. Re-bevel the preform's basal edge, build a new nipple and try again.

Short, shallow flute. I suspect the platform released too quickly: a clear case of premature eflutulation. If the flute just barely skimmed the median ridge, there was probably no harm done. Just build a new nipple and try again. If, however, the flute was a little deeper and really degraded the side to side contour, you can re-flake that face to get a good contour and try again. But make sure that the copper bit sits flat on the nipple's ground spot: if the copper only contacts an edge of the nipple, small flakes will be driven off, or the nipple may crush.

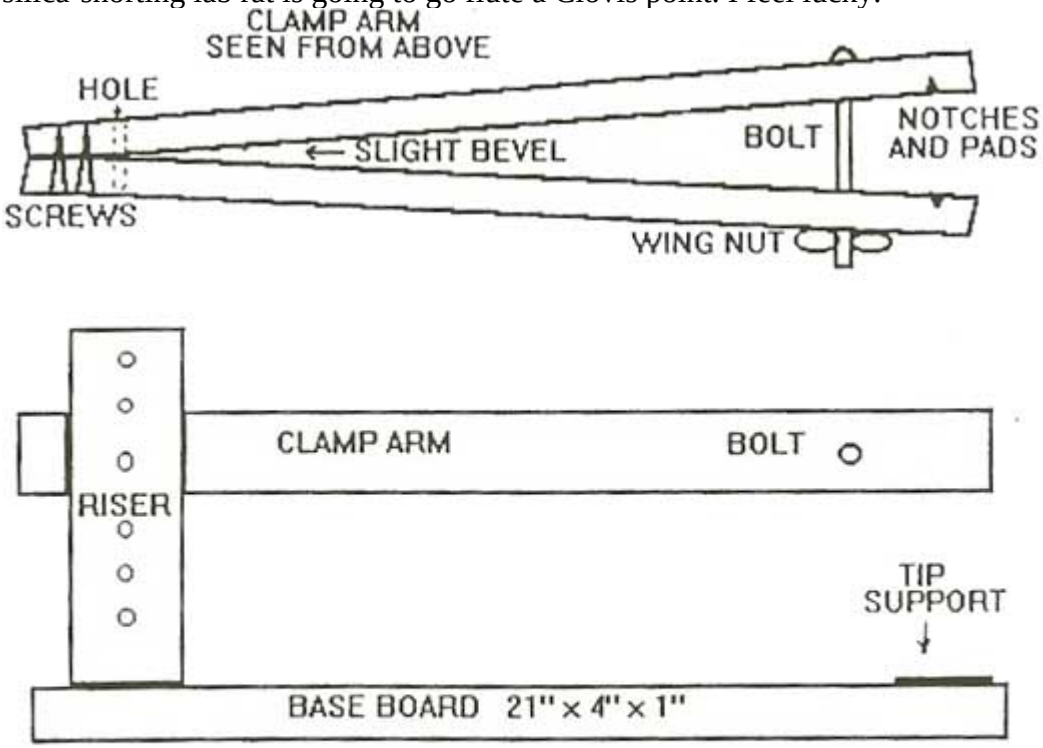
Edge of the' flute channel wanders, but deep undulations are not present. The preform may not have been very "smooth". There may have been some high or low spots along the edges. Keep trying to make the cleanest possible preforms, which will lead to straight-sided flute channels.

Long flute, but the very tip of the preform was cut off. I'm not sure if you should complain or brag. Remodel the tip, grind a flat spot on the end-;-and flute the other side. And hope like Hell it goes that far too!
You did everything right, and it broke anyway. It happens. I can't explain it and it frustrates me to no end. But -- and these are good things -- it keeps us humble, preserves the mystery of the stone, and allows us to feel wondrous surprise when everything does go just right.

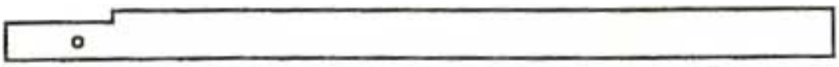
Here are a few final tips:

Save your channel flakes - Besides being nice to have, they're valuable study pieces to help determine reasons for failure and success. Before you flute a point, run a piece of Scotch tape down the median ridge to trap the flakes. And don't give up too quickly on the Sollberger jig. Expect some failures. Your success rate may be 20% or less for a while. At best, it will probably be about 80-90%. And as you get better, you may find that your success rate will take another dive when you start pushing the envelope, making paper thin Folsoms or ten inch Cumberlands.

I read somewhere that infrequent rewards are the most addictive. I guess some proof of that assertion can be seen in habitual gamblers who loose everything in search of the big pay-off. And then there are lab rats that perform complicated tasks to get a special food treat, even though they may be rewarded only once for every ten times they complete the task. On that philosophical note, this gambling-addicted, silica-snorting lab rat is going to go flute a Clovis point. I feel lucky.



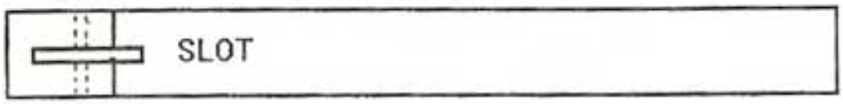
Clamp arms are 20 & 1/2".
Distance between notches is 1"
Bolt is 1 & 1/4" behind the notches.
Notches are 3/16" deep and 3/16" wide.
Holes in riser are 3/4" apart.



LEVER ARM, SEEN FROM SIDE
14" long, 1 & 5/8" wide.

HOLE

LEVER ARM, SEEN FROM ABOVE



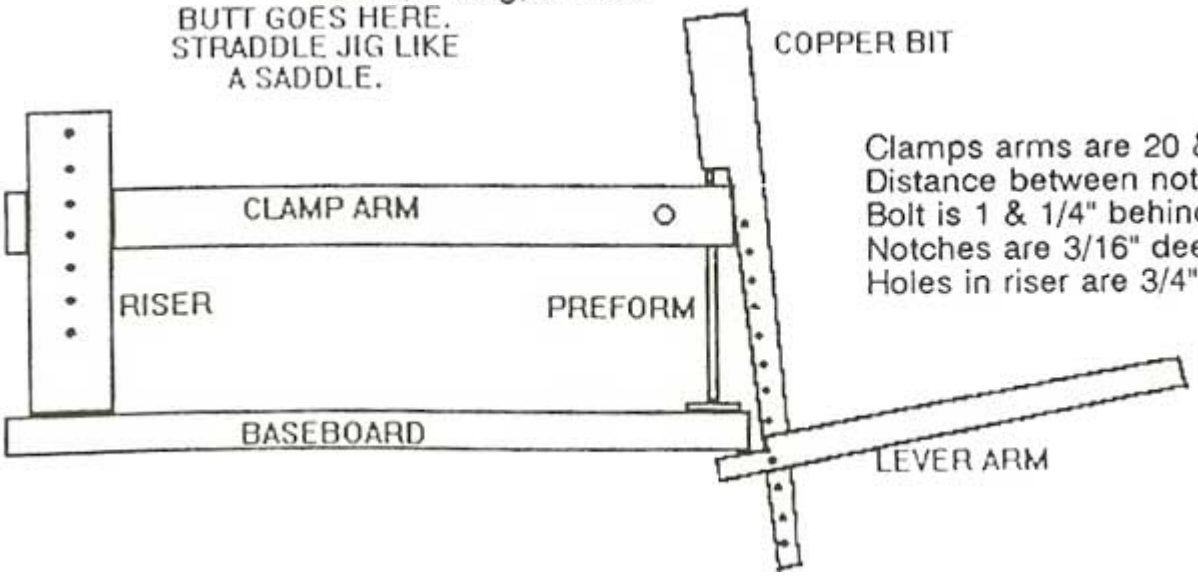
SHELF

Slot is 1 & 3/4" long, 1/4" wide.

BASE BOARD AND RISERS, SEEN FROM ABOVE

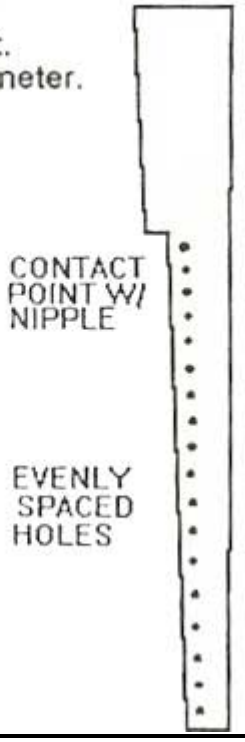
20 & 1/4" long, 3" wide.

BUTT GOES HERE.
STRADDLE JIG LIKE
A SADDLE.



Clamps arms are 20 & 1/2"
Distance between notches is 1"
Bolt is 1 & 1/4" behind the notches.
Notches are 3/16" deep and 3/16" wide.
Holes in riser are 3/4" apart.

My bit is 17" long.
Widest point is 1 & 5/8".
Hole centers are 5/16" apart.
Holes are just over 1/8" diameter.
Narrowest point is 1/2".
Holes go along one edge.
Contact point is inset 5/8".



COPPER BIT

From: http://www.pugetsoundknappers.com/how_to/sollberger_jig.html, accessed 12-16-10

Notching Arrowheads

From http://www.arrowhead-makeyourown.com/, April 6, 2010, copied with permission from "How to Make Your Own Arrowheads"

The Basics Of Punch Notching

by Mark Bracken

In the early days of flintknapping, I think we all have tried making notches in our flint points with a punch. All to often and with the greatest of ease, simply split the point in two or blow the ear off. You only have to do this two or three times to develop quite a rash.

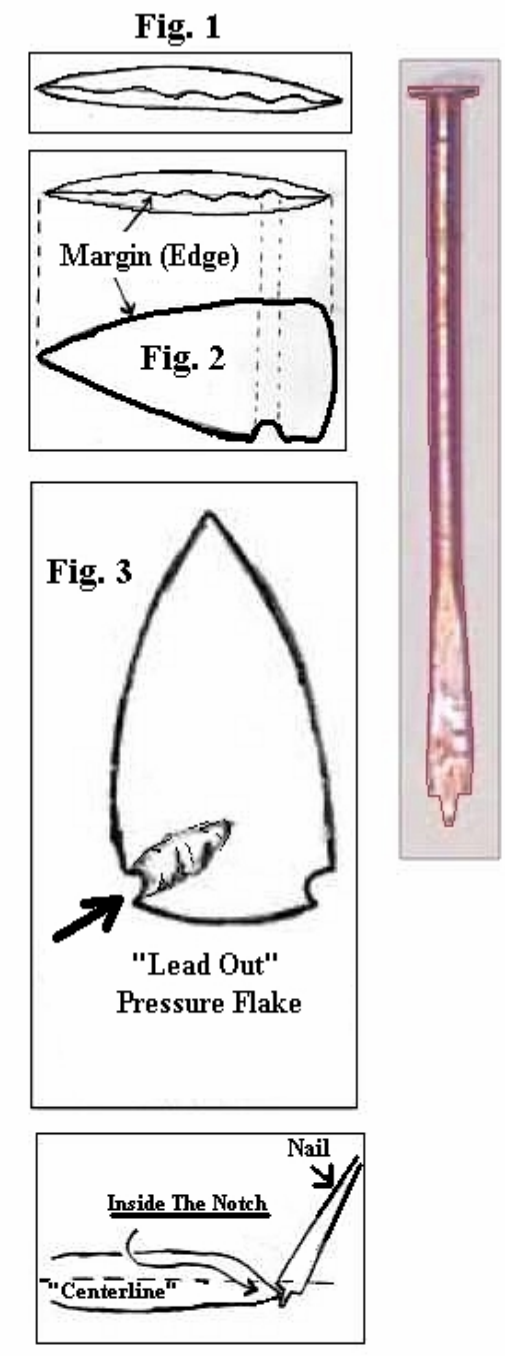
Thank goodness for good friends and flintknappers. About three years ago a knapper from Texas named Dan Theus showed me a thing or two on punch notching. Dan can notch most anything as deep as he wants or needs to with this technique.

Using an Ishi stick or the smaller flakers has its limitations, for example..."dog leg" notches, thick points or very deep notching. Texas style Andice points are a good example of this.
In the artifact world, it appears native American Indians preferred punching their notches. This is based on the flake scars of old points. Successful punching produces large aggressive "c" shaped flakes.

Now Lets take a look at the basic rules you must follow for risk free notching. There are four basic factors for success. These are: Platform setup, grinding, strike angle and velocity. Lets look at basic platform setup.

Fig.1 shows and view of the margin. Note that the margin is not directly located on the imaginary centerline, it is for the most part, closer to the lower face of the preform. This would make any flake removal(s) more successful and less risky. The same thing applies to the tiny margin located within the notch, in a much more critical way.

Look at fig.2. It shows the margin being closer to the top face. (It's up-side-down) The flake should be removed from the "top" of the Bi-face. Having the platform edge below the imaginary centerline is a must for punching! It is the key!



To begin a notch, I like to use my ishi stick to make a "lead out" flake. Shown in Fig 3. This thins the notching area and can be done to "lower" the platform edge, I like to do this on both faces of the preform. This is not necessary but it can be a big help. Keep in mind that the notch platform is basically the same principle as a standard thinning platform.

With your platform ready as described above you must now abrade it. This is critical, even if you are doing minor adjustments to relocate the margin (something that you will occasionally have to do after punching a flake) to favor flaking the best face.

Take a look at fig.4. It shows the shoulder on the nail resting in the notch ready to punch, note that the nail shoulder is located at or slightly below the centerline of the point. Screw this up and the ear is gone! The nail will require file retouch after a few flakes.

Make sure you're not biting too much off by having to broad of a shoulder on your nail. If you have a good low platform, whack the heck out of it. You can use you billet, a chunk of wood, frozen steak or what ever to hit the nail.

A few more tips. The "lower" the platform the more you can change the angle to drive into the preform, and vise versa. Faster hits for bigger flakes and slower for smaller flakes. You can grind with a small flake. The tricky part is readjusting the margin to favor a face.

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From http://www.flintknappingtools.com/punch.html, March 31, 2010, copied with permission

Punch Notching an Andice

by Kinley Coyan (aka elremolino)

I have had a few people ask to see the tools and angles at which I notch my Andice style points. I apologize that these are not the best angles but it is difficult to both hold the punch and the point at the correct angle and try to snap the picture.

This picture simply represents the tools I use. The antler billet is the hammer I use to strike the head of the copper rivet. The first rivet is how they look when I buy them. These are 2"x1/4" sucker rod rivets used in windmilling. The second rivet has been hammered out and filed with the "nipple" left on in the center. The contact edges are actually the two shoulders, not the "nipple". I put the black pad underneath the preform to raise it off my leg so that the flakes will travel when punched. The flat, hand held, flaker is what I use to clean up and straighten the platform within each notch, before flipping it over and punching it.

Just starting to notch. The angle of my punch is not exactly correct in this photo. It is actually facing a little too far to the left side.

In the left notch you can see the white platform in the notch. This white part is where I will set one of the shoulders of the punch, and then tap it with my antler hammer.

Another angle after punching a bit deeper.

This angle shows the black pad with the basal portion of the point hanging off so that the flake will remove without any interference. This angle of the punch is correct.

One last shot with the point hanging off the rubber pad. You can see how the shoulder of the punch rests against the platform within the notch.

Finished product! Please feel free to ask questions or make comments, and sorry about the pictures.

P.S. I would say the platform is typically about 1/2" off the pad. Sometimes, if that pad isn't far enough away, you will loose your energy and the flake won't travel. Every now and then you can see where a longer flake is going to release and adjust accordingly. Basically, as I continue to notch I just slowly move the point down the pad, or the pad moves up towards the distal portion.

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from: http://paleoplanet69529.yuku.com/topic/40205, accessed 12-12-10, copied with permission

Expanding Type Notching Tutorial - Crump Lake Point

By Jim Winn (aka Paleoknapperjim)

I've been planning on doing a notching tutorial for a long time and finally got around to doing it today. Normally most of my notched points are on the small side, but trying to take pics of notching small points would be a challenge, so I chose a Crump Lake type point which is bigger. Crump Lake points are from the Cump lake area of Oregon and are a type of Great Basin side notch point. Many are on display at the Favell Museum in klammath Falls. Most all of them are made from black Dacite, the same material that I chose to use to make this tutorial point. Special thanks go to Chad Ring, friend and fellow knapper who took all of these pics today. This first pic shows the piece of dacite before any flakes have been removed.

Initial percussion flaking begins with Moose antler, sandstone and copper. I find the Moose antler works great in the early stages to rapidly thin the piece, many of the flakes traveling edge to edge or overshot. This picture shows the biface thinned to the desired thickness.

A little more percussion flaking has been done to shape the biface and it is now ready to pressure flake...

This pic shows the biface after the first pass of pressure flaking using an Ishi stick....

This pic shows the biface after the 2nd and final pressure flaking pass. Notice the basal thinning flakes. It is necessary to make the basal area as thin as possible in order to get narrow notches.

Here the opposite face is shown

I normally draw the starting point for my notches on the biface before notching it to be sure to get proper alignment. I use a straight edge at right angles to the long axes of the biface and place a mark on both edges on both faces. Because this point is black, I used white out instead.

The biface is now marked on both edges of both faces...

This is the edge view, showing the thinness near the basal area. This thinness is critical to successful narrow notches...

This pic shows how I support the biface on a small pad. It is very important to have very rigid control and no wiggle room anywhere. The Optivisors help a lot. If your young you may not need them, but in any case you need to be able to see real close up.

I am using a horseshoe nail for notching. This shows the placement of the tip of the notcher for the first flake removal. This first flake it taken by pressing the tip straight down, NOT IN. The idea is to take a very small flake that will set up your platform for the next flake removal on the other face.

This pic shows the first flake removed. As you can see, it is not much of a flake, but it is a starting point and we can now remove a longer flake from the opposite face...

OK, this is the oposite face flake removal, and now we are striving to push a longer flake to thin the area ahead as we go. It is absolutely essential the the tool tip be narrower than the notch. I cant stress this enough. If it is not it will rub the sides of the notch and blow it out. OK, this time I push straight in.

Here is what the 2nd flake removal looks like. It has traveled perhaps 3/16" and thinned the area ahead, looks good...

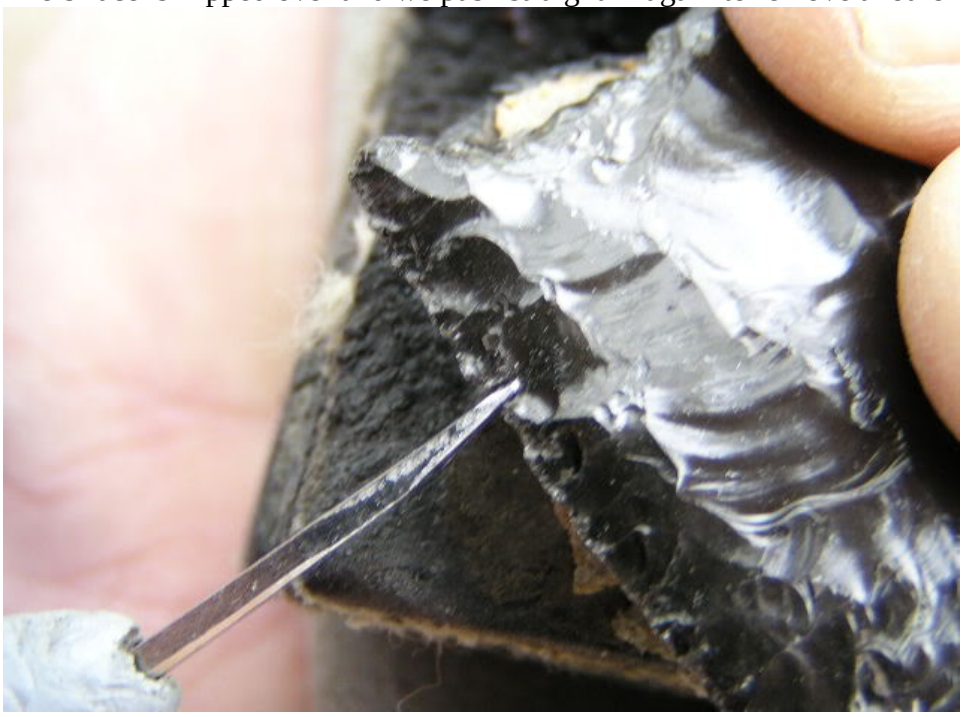
OK, this pic may look confusing, but here is what is happening. The opposite face (not shown) is where I just removed the last flake. Before removing another long flake it is necessary to get the edge of the platform as close to the face you are flaking as possible. To do this I push straight in very gently at 90 degrees to the face, just removing tiny flakes to bring the edge up. This will allow the next flake to release with less force and travel further. I NEVER grind my notches. Grinding them will stall them out and so much force will be required to remove the next flake that it will likely blow out the notch.

OK, we flip the biface over and push off another long flake on the opposite face. Again, I am pushing straight in to remove a long flake and thin the area ahead...

Here is the flake removed, not as long as I wanted but good enough...

This becomes repititous, but here I am pushing at 90 degrees to the face again to bring the platform up to the face so that i can remove another long flake...

The biface is flipped over and we push straight in again to remove another long flake...



Here is the flake removed. This one traveled nice and far and really thinned the area ahead very well. This will make it much easier to continue. It is much easier and less risky to remove a short flake, but short flakes make it much harder to remove a flake from the opposite face. You pay the price when you go to remove the next flake. It is better to be aggressive and remove a big flake or things are sure to go wrong in a hurry..

Now we switch techniques. As the notch gets further in from the edge, it is too risky to push straight in. If the tool tip even touches the edges it will blow them off. So now we come up from underneath. Place the tool tip up on the platform and apply the force straight in as before. If the tool tip is too sharp it may bend, so you may need to file the tip a bit duller at this point. However, it still must be narrower than the notch.

Here is the flake removed. Again it travelled far and the area ahead is nice and thin and will be easy to notch...

OK, now it is time to begin expanding the notch. So now I take 2 flakes side by side on each face. Here is the first flake removal, again coming up from beneath with the tool tip...

Here is the 2nd flake removal. Notice I have moved the tool tip to the other side of the notch end.

Here are the 2 flakes just removed...

We flip the biface over and remove 2 more side by side flakes. here is the first flake removal.

Here is the 2nd flake removal...

We flip the biface over and continue. From hear on, I may remove 1, 2, 3 or more flakes on each face, whatever is needed to open the notch up to the desired thickness. This part is relatively easy.

Here is the first notch completed. Now I will follow the same procedure for the 2nd notch. Note: Normally I do both notches at the same time. It is much easier to maintain symmetry by having them travel along at the same pace, rather than trying to make the 2nd notch match the first. Also, if you stall the notch out but are in far enough you can stop and call it good enough...

Here the 2nd notch is completed. Notice that I did manage to blow off a tiny pice of the 2nd opening. This happened when the tool tip accidentally touched the opening, it does not take much to blow them off!

Opposite face shown here...

Here are all the tools used to make the point from start to finish

This is another view of the notching tool unassembled. I shaped and cut a plastic bolt to a bullet shape and then heated up a horseshoe nail repeatedly over the stove and inserted it into the bolt tip until it penetrated all the way through. This fits the nail like a mold and nails are easily replaced. The handle is steel pipe with the same diameter as the bolt and makes a snug fit. A wooden dowell is glued inside the pipe to act as a stop for the bolt and nail

One final word, this is not necessarily the best way to notch a point, it is just one way of many possible ways. I tried many different techniques, most ended in failure, and after many attempts this is what is working best for me at this time...

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