Making My First KITH Knife

On September 9th, 2011 the announcement came out on Bladeforums.com that knifemakers should start thinking about what they wanted to make for this year's "Christmas KITH". The KITH is an annual "Knife In The Hat" exchange between makers on the site, offering a way for a knifemaker to show off his skills and see what another knifemaker is doing. Since I felt my own skills had risen to the point where I could produce something worthy of exchange, I decided to enter.

About a year before I became inspired by an image on the back cover of a book about custom knives.

Figure 1 Illustration from the book cover

At that time I attempted to make something similar using a very expensive bar of Damascus steel. The result was disappointing to say the least.

Figure 2 My first attempt at a damascus dagger

Not surprisingly, the desire to make a nice Damascus dagger was unfulfilled by the first endeavor. So when the KITH challenge arose, I decided it was time to make a second attempt, using the skills I had developed in the intervening year.

One thing I'd learned in that year is that Damascus blades work better with hidden tangs than they do with full tangs covered by scales. So when I set out to design the KITH knife, I knew it had to be a hidden tang. I laid the bar of steel I had on a piece of graph paper and drew a number of patterns, but the one I kept coming back to was the same basic shape I had attempted a year before.

Figure 3 The rough drawing of the blade shape

In the months before the KITH announcement I had worked on a couple of blades that had angled plunge lines, and it occurred to me that this blade could be done with converging angled plunge lines that would result in a triangular ricasso that would be just big enough to hold my makers mark. So when I cut out the blade blank I scribed in the center line, then marked off the angled plunge lines.

Figure 4 The scribed blade blank

Because a dagger such as this requires fairly precise grinding to get the bevels to meet at the center lines (on both top and the edge), I elected to do all of my grinding with hand files. Using belt sanders would be faster but I didn't have one suited to this sort of work, and they remove material so fast it would be much harder to control. Since the bar of steel I was using was only 1/8th of an inch thick, there was simply no room for error. Some on the forums suggested that it probably wasn't wide enough under the best of circumstances, but I pressed on.

Figure 5 Primary grinding of the blade

One of the keys to a good dagger is to have even bevels on both sides that join to form a crisp center line. A blade, such as this one, that has curved edges increases the difficulty because the amount of material and angle of attack varies as the blade width varies. After a few days, however, I had the blade to a reasonable facsimile of the shape I was trying to achieve. At this point the edge was inconsistent up and down the length, but the center line was crisp on both sides.

Figure 6 The blade after being roughed out

At this point it was time to sand out the grind gouges and see what I really had. This would give me a sense for how much more grinding was really needed before I could begin to work on the finish.

Figure 7 First look at the semi-finished blade

The next step was to think about the guard. A few months before I had made a couple of guards out of some scrap 1095 steel I had laying around. It occurred to me that one of those guards might look good on this blade.

Figure 8 The guard made from scrap 1095

Originally, this guard was designed to fit on a blade made from thinner steel, so I had to widen the slot. I had originally cut the slot by drilling some small holes very close to one another and using a diamond burr wheel on the Dremel to merge the holes, following by use of a small spark plug file to flatten the inside of the slot. To widen the slot to fit over the tang, I went back to the spark plug file and spent a couple of days grinding away, until blisters appeared on my fingers. When it finally slipped over the tang I rejoiced.

Figure 9 First fitting of the guard

One thing I noticed right away is that there was a slight gap between the base of the ricasso and the top of the guard. Likewise, I expected that there would be a similar problem between the top of the handle and the guard, so I started thinking about how I was going to deal with that.

At this point the work on the blade was mostly done, so I sent it off for heat treatment, and began the three week wait before I could work on it any further.

At this time I turned my attention to the handle. Several months before I acquired a large piece of ivory at an antique expo. I still had a large chunk of the material available. I had long wanted to make a solid carved ivory handle, and this seemed an ideal project for such a handle. After spending some time looking over the remaining piece, I was concerned that there was no way to cut a single piece that would be long enough for the entire handle. I decided to cut the longest piece I could that preserved as much of the remaining material for future projects, so I cut off one of the curved edges of the tusk.

Figure 10 The raw ivory piece

Next, I had to get down to the usable portion of the material by removing the “bark” and rounding the sharp corners.

Figure 11 The handle blank

Next I had to work the handle into a usable shape that would be suitable for carving. This involved flattening the bulge on one side and moving the outside edges more to the center of the piece. This gave it something more like a regular oval shape. I then marked the center line for the handle and drilled out the tang hole. Again, the procedure was to drill multiple holes of the correct width and connect the holes. In this case, however, the holes were connected with needle files.

Once I had the raw handle blank shaped and slotted, I decided that the best way to create a seamless join with the guard was to cut a depression in the guard that the top part of the handle would slip into. By doing this, any imperfections of flatness of the handle would become a place for the epoxy to create a stronger bond without leaving un ugly glue line. I used the Dremel with diamond burrs again to cut that depression in the guard, and used the needle files to clean up the edges and flatten the base.

Figure 12 The handle blank and the guard with its depression

Note that the depression in the guard is slightly smaller than the handle blank itself. The idea here was that it would be easier to bevel the handle to fit into the depression, and this method would virtually guarantee that the depression would not be larger than the handle, thus avoiding the problem of creating an ugly gap at the join.

Next I decided to give the handle more of a barrel shape that is standard in dagger handles. In order to create a flowing line with the blade, the butt end of the handle needed to be tapered to a narrower

diameter than the guard end. I also wanted to be careful not to taper the guard end of the handle to the point where it became smaller than the depression in the guard.

I also began thinking about how I wanted to do the fluted carving along the length of the handle. I used a piece of dental floss wrapped in a spiral around the handle and used a Sharpie to mark the lines for the carving. It took a couple of attempts before I got the spacing I wanted.

Figure 13 The handle an guard are taking shape

I made the choice to turn the circles at the ends of the guard into balls, and used files to grind away the edges and to refine the shapes accordingly. At this point the guard was still uneven with one of the balls seeming more round than the other, so I continued working on them until they seemed more symmetrical.

It was time to turn my attention to carving the handle. Once I was satisfied with the spacing of the lines, I once again grabbed the Dremel with a diamond burr wheel and cut in the guide lines that would be the valleys in the fluting. At this point, the handle looked very rough and ugly, leaving me concerned that I would not be able to get it refined enough to be used. I also noticed that the resulting lines were not as even as they had seemed when drawn out in ink, due largely to difficulty controlling the Dremel as I rounded the outer edges of the handle.

Figure 14 Rough carving of the flutes on the handle

Next I used files to clean up the worst of the gouges and reshape some of the irregularities of the lines. This cleared up the worst of the problems and gave me confidence that I would be able to get this piece of material to work.

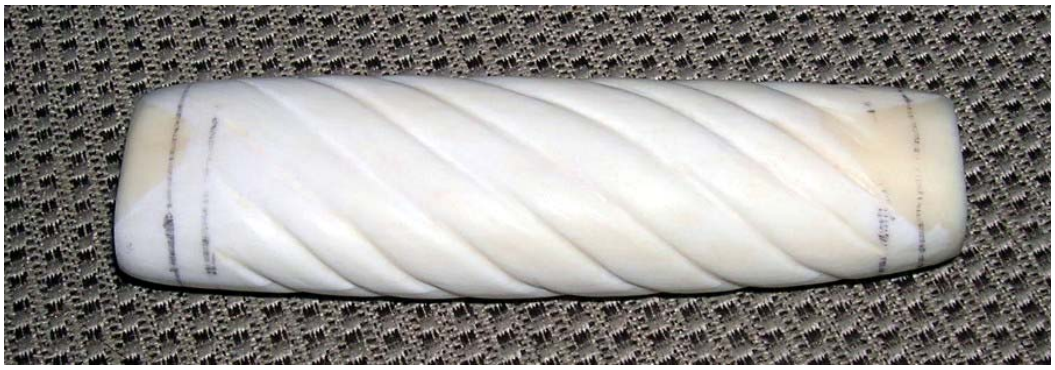

Figure 15 First level of refinement of the fluting

Next I cut in the ridge lines at the ends of the handle and went through a similar process of refining those grooves.

Figure 16 End ridges are cut into the handle

Once the main carving was done, I beveled the guard end of the handle to fit into the depression in the guard.

Figure 17 Handle fitted into the guard depression

At this point it was time to turn my attention to the pommel. I still had some small scraps of the same 1095 steel used for the guard, as well as some other pieces of steel. I cut a few pieces to shape, showed them to the forum and then decided that the best approach would be to use the same material for the guard and the pommel to insure they had the same color. So I cut the piece down to size and filed it into a rough approximation of the shape needed to fit on the end.

In order to protect it against accidentally falling off if the handle took a lateral hit, I drilled a small shallow hole in the pommel. To align this with the matching hole needed in the handle I used a leaky ink pen to pit ink around the edge of the small hole, then pressed the pommel against the handle, leaving a perfect round ink mark where the hole needed to be drilled. I then ground the head off a small brad and pounded it into the hole in the pommel, then ground off most of the tip of the brad so that what was left was a small but solid post that attached the pommel to the handle.

Figure 18 Attaching the pommel to the handle

About this time the blade came back from heat treatment. I never quite know what to expect a heat treated blade to look like, but the look of this one really concerned me. Usually the scale takes the form of a grayish cast with some rainbow hues throughout. This time, however, the grayish scale was flecked with what looked like rust spots.

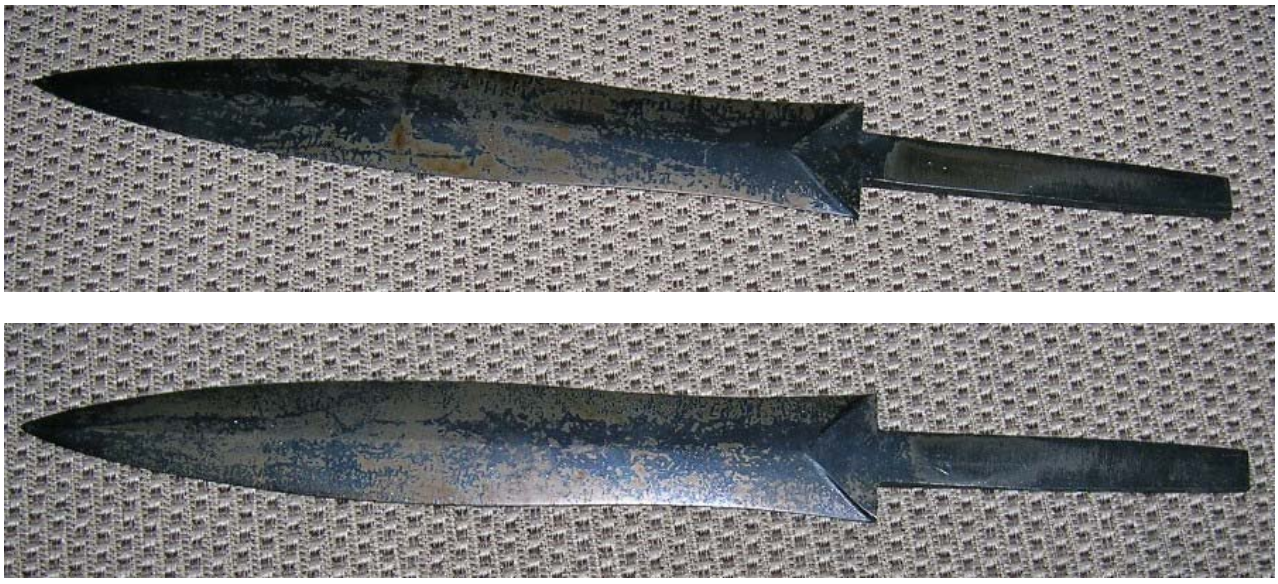

Figure 19 The blade returned from heat treatment

Obviously, the next step was to sand off the scale and get the blade back to the appearance it had before going off to heat treatment. Unfortunately, doing so softened the center line, especially at the widest point of the blade. I also took this opportunity to polish the ricasso and apply my makers mark.

Figure 20 First trial fitting of all the parts

Now that all of the parts were available and in the same place at the same time, I performed the first of the trial fittings. It was still apparent that something needed to be done to get a better fit at the join between the blade and the guard. Because the approach of slotting the guard for the handle worked so well, I decided to use the same approach of cutting the slot in the guard for the blade.

Figure 21 The guard with its blade slot and the pommel with the pin

Now that all the pieces were approaching a final state, it was time to do the final sanding on the blade. The first priority was to work the thicker parts of the blade to something near a zero edge, so that the blade would be able to be sharpened after etching. To accomplish this I used a large piece of petrified wood as a sanding base and when through a LOT of sandpaper and sanding cloth removing the extra material from the thick spots.

Following that I had to etch the blade to reveal the damascus pattern. The first attempt yielded a very light etch, but also revealed the softness of the center line.

Figure 22 First light etching of the blade

While using the Apex Edge Pro to apply the real edge to the blade I scratched the etch pattern at a couple of places. Rather than try to fix the problem, I chose to sand the blade down to smooth mirror polish again, and start over. This time I used a different method of sanding using a technique demonstrated by Nick Wheeler in a video. The result was a sharper center line and even sharper edges. The second pass through the etching process resulted in a darker etch that was more dramatic. Afterwards, I sanded it with 2000 grit paper to better reveal the etch.

Figure 23 Second etching of the blade

This brought the project to the point where final finishing needed to be done. The pommel was glued into place using Acraglas (with a bit of ivory dust mixed in). Once it was solidly attached, it was given its final shape, marrying the lines of the pommel and the guard. Next the guard was polished to 2000 grit to give it a mirror finish.

Figure 24 Pommel and handle married

When reviewing this image I noted that there were still a number of visible scratched in the ivory, so I spent a few hours with the OptiVisor on looking at every groove and curve, trying to remove all the remaining gouges and scratches. Eventually the whole handle was sanded up to 2000 grit and given a very light buffing.

The final assembly involved mixing up the AcraGlas and putting enough of it into the handle so that when the tang was inserted the glue would fill the hole, nearly to the top. To verify the amount of glue was correct I inserted the tang into the hole without the guard and saw that the glue rose a little higher than the top. I removed the tang, wiped it down with acetone, and removed the excess glue from the handle. I put a little additional glue into the hole to replace some of what was removed with the tang.

The pieces were then put together, and a little extra glue was placed at the join of the handle and the guard. The whole assembly was put into a 12 inch ratcheting bar clamp and allowed to sit overnight.

Figure 25 Clamped for final assembly

The result: