

The Green Coal Report

By Bill Roy

Mother Nature granted us the most beautiful weather on Saturday, November 14th. It was a wonderful warm sunny day with barely a breeze. A perfect day for an ODBSA event. Bobby opened the meeting at David Tucciarone's Sunrise Forge with the usual welcome and announcements, thanking David and Louise for hosting again. And while Bobby didn't take credit for the gorgeous weather, he did point out the 3 fine flesh forks he had made for the Hinshaw challenge. There was very good participation in the flesh fork challenge, but sadly one was missing. Poor Dave Hinshaw had the flu and couldn't even participate in the challenge he had suggested. This partly explains why I've written this Green Coal report. Bobby can be very persuasive at times and had hinted about it the night before to me in an email. So I brought along my camera and a notepad to try and capture a few details of the day. We learn and receive so much from ODBSA that it is truly an honor and a privilege to give back.

Before Bobby allowed David to get started, he mentioned his progress and excitement in putting together next year's schedule of events. Only two months were left to be arranged.

David's very informative demo included a split & drift technique and three different hook styles in the morning, followed by a colonial candle holder, a heart hook, a bottle opener, and two more of his own hook styles in the afternoon. Whew! It was a very full and busy day. Everyone at Sunrise Forge that day certainly went home with a new idea or two (or nine) to try out on the home forge. If you didn't take notes, left early, or couldn't make it to Rustburg, do not fret over it. I'll translate my scribbling after we get past the pleasantries.

David started off by showing us how to start the forge fire with very little smoke. He said the key was using coke from previous fire with very steady (but not too strong) an air flow.

While waiting for the forge flames to come up to temperature, Wendell asked David about the proper disposal of his coal ash. More specifically, was it an environmental concern for him? (You know everybody's thinking green these days!) Well, David hinted that his property had absorbed about all he thought it could handle now, and... it just so happens he has 8 more full buckets on the other side of the shop for anyone interested. He claimed the ash is very good for getting traction in the winter when trying to drive your car or truck up an icy driveway. David did a pretty good sell job, because at the end of the day I'm pretty sure I saw 3 or 4 of those buckets of ash getting loaded onto the back of someone's pickup truck.

At noon, David was still ready and roaring to start in on his 5th demo item of the day, but everyone else was very ready for a welcome lunch break. Bobby stepped up and gave the official ODBSA lucky coffee can a number of healthy shakes and swirls to mix 'em all up real good while we pulled out our raffle tickets we purchased earlier. John Riddle did the honors and drew Steve Ferguson's lucky number. He won three very nice nail headers (worth \$35 each) and a tutorial DVD on Nail Making. These prizes were generously donated by *Blacksmith Supply* to help support

ODBSA. Remember to support John Elliot and his Blacksmith Supply business the next time you need something new for your shop. (Thanks, John!)

Next order of business; Jerry Jones set up his camera on a tripod and used the timer to snap the obligatory ODBSA "group photo" in front of David's shop. This time the group was a little too small for Charlie to hide in the background. With the official business taken care of, some folks left for the day, some scattered to find grub and return, and a few of us hung around to take another close look at John Riddle's and Charlie Hudson's tail-gaiting items for sale. (Good stuff.)

When folks returned for the afternoon things really got fun. Tom Harrell seriously wanted to take home the items David had made for us in the morning. Let's just say he persistently and strongly suggested to Bobby (Ok, pestered is more like it) that we auction them off immediately to the group as a fund raiser. With David's agreement, Bobby started to open the bidding and Tom jumped right in with a very low first bid. Everyone knew the three hooks were worth much more, but no one was really ready to shell out the dough. However, we certainly weren't about to let Tom steal them either. John Riddle stepped up to the plate first and counter bid a few times moving Tom up to \$17.00. He really thought he had it there, but nope, I jumped into the fray with a bid of \$20.00. The look on his face was worth it. But Tom was not about to be outbid, so "\$21.00" he quickly countered. I chickened out right there, but LT Skinnell grabbed the baton from me and kept the bidding going higher and higher. Finally, after much tense back and forth bidding, Bobby hollered out the classic auctioneer's "Going once, going twice, going three times, sold!" and Tom had his hooks for a bargain price of a \$31.00 donation to ODBSA. He was happy, we were happy, and it sure was a whole lot of fun watching Tom chase the bid. As Bobby handed over to Tom his treasured hooks, Tom shouted "Val, get the checkbook out!" And with that David started up his demo again. Here is a recap of what he made and the major process steps involved.

1. Slit and drift a 1/2" round hole in 1/2" square stock



Start by figuring out how wide a chisel you should use. Francis Whitaker worked out a formula for calculating this. Use 89% of half of the circumference of the round hole.

$$\frac{1}{2}'' \text{ hole} = .89 \times ((2 \times 3.14 \times \frac{1}{4}'') / 2) = 0.7'' \text{ wide chisel}$$
 The chisel should have sharp sides slightly tapering in so that the chisel will cut a clean slot and not punch out a slug.

Mark with a center punch 2 dots to indicate each end of the slot (.7" apart) and do this on both sides of the test piece.

- Measure and mark another reference dot 3" away from the center of the first 2 dots. This will allow you to measure the eventual shrinkage of the bar that occurs due to upsetting and widening the hole. Knowing this dimension, you can then account for it when laying out the real piece you're planning to work on.
- Heat and slit about half-way through, flip over and slit from the other side. If you're lucky the two slits will meet dead on and there will not be a burr to clean out. Use a cutting plate to protect the face of your anvil and cool the chisel often.
- Use a small opener (smoothly rounded to not make marks) over a bolster block to begin widening the hole.
- Repeat with a larger sized opener to get close to the 1/2" dia.
- Take another heat and only cool just the very end beyond the hole. Holding the piece vertically, upset the hole on the face of the anvil, hot end down, by hitting down on the longer cool end. This widens the hole without thinning the sides of the hole. You may need to straighten and realign the piece along its center line if the end should shift slightly to the left or right while upsetting.

After a bit of cleaning, a check of the distance from the reference dot to the center of the hole showed that ~ 1/8" of length was lost. So, to keep the distance between two holes, an extra 1/4" should be allowed for shrinkage that will occur.

- metal at the thinnest attachment point get cold. Stop and reheat often. Only work the stem while all of it is orange.]
- Heat and flatten the pointed lump to begin the leaf shape.
- Using the peen of the hammer on the back of the leaf, spread the sides of the leaf further out to the left and right.
- Using a small peen on the front of the leaf, repeatedly hammer at a 30 to 45 degree angle to the center line on both sides of the center line. This gives the leaf its veins. Do this at a slightly cooler temp, at orange heat the metal will spread too easily.
- Heat the leaf and clamp at its base in the vise. Bend the leaf back and forth with scroll tongs to add some soft curviness and what David calls "leaf life".
- Clean up the leaf with wire brush, or belt sander or file to remove any hammer blows not to your liking. It's easier to do it at this point before curling the stem.
- Heat the stem and clamp in the vise, wiggle curve and loop the stem to your liking with an artistic eye.
- A hook must be flat on the back and perpendicular, so heat the whole hook and clamp it down to a metal table. A short piece of bar laid over the screw flat works as a jig to clamp down on. Using tongs to straighten the hook and a wooden mallet to flatten it out. Make sure that it has flow and curl with no sharp corners.

2. Leaf Hook, 9" or 10" of 1/4" round stock



- Heat and taper the end square, then octagonal, then round.
- Form a rat tail at the tip. It is important to get the first curve right to start the tail scrolling; otherwise it will always end up looking like the letter 'D'.
- Heat the end again (with the rat tail facing up so that it will not burn off) and form the hook on the horn of the anvil. True it up on the face of the anvil.
- Use a handled fuller tool to flatten an area on the back of the hook a little higher up than the rat tail. (David used his treadle hammer to do this step so he could use both hands. One to hold the hook in the tongs and the other to hold the fuller.) David made himself a special pair of tongs that can hold a hook so you can work on the other end.
- Heat and sharply taper the other end to form the leaf point. The leaf will be an "idealized" leaf shape.
- Form shoulders ~1" back from the tip by using half blows over the edge of the anvil face.

Draw out (thin) the stem on the horn of the anvil starting at the shouldered area and allow the stem to very gradually taper back to the 1/4" original size. (David stressed that leaves do not look good with fat stems.) [Warning: The leaf will snap off if you let the

3. Herb Hook, 7" of 1/4" square stock



- Start by slightly breaking all the sharp edges.
- Taper the end and round to a point. If you plan to make multiple herb hooks, repeat the steps up to this point to get consistent tapers and lengths.
- Add a rat tail to the tapered end.
- Bend the bar 3" back from the tip in the vise. David used a jig in his vise to get a consistent dimension.
- Fold the bend back on itself 180 degrees like you were going to make a faggot weld, but don't actually weld it.
- On the next heat clamp upright part in the vise and bend the hook part down, then back up, and then down again. Finish shaping the curve of the hook on the horn of the anvil and true it up (flatten) on the face of the anvil.
- David usually doesn't put a twist in the upright or back part of the hook, but says you could add one if you wanted that look to your hook.

Make a finial on the upper end with 1/2 blows on the near edge of the anvil face, then edge blows to flatten out a rounded area for drilling a screw hole later. Try to make this flattened out area as round as you can.

4. Lollipop Hook, 15" of 1/4" round stock



This hook was named by Louise for its appearance.

- Instead of the usual rat tail tip, make a small ball head on the end and scroll it around tight.
- Heat, quench just the tip, and form and shape the hook over the horn of the anvil.
- Fuller in a flat spot above the hook for the 1st screw hole.
- Taper and round the other end. Scroll it like a rat tail tip but not as tight because the opening will serve as the hole for the second screw. This heavy hook needs 2 screws.
- Reheat the end and begin the roll up from the rat tail using the hammer and the face of the anvil. Heat again and roll some more until the roll gets to be about 1 1/2" in diameter.
- The remainder of the rolling can be done in the vise. Be sure to keep the scroll tight against itself as you roll it up. Loosen vise, move, tighten vise, bend a little, and repeat.
- On the last heat, quench the outside of the scroll (away from the hook), clamp in the vise and make the final bend to align the two screw holes with the hook.

5. Candle Holder, 12" of 3/4"x 1/4" flat bar stock

- Start by forging the holder end. Shoulder 1 1/2" down from the end over the far edge of the anvil. (looks like a small flag)
- Thin the long part along the 3/4" dimension to 1/2" or slightly less making it longer.
- Heat the flag and clamp the long part in the vise just below the flag. Knock the flag over 90 degrees, clean and square it up. (will look like a hockey stick).



- Fuller the flag over the horn to make it 2 3/4" long. Keep the shape rectangular using the face and side of the anvil.
- Place a 7/8" round rod in the vise to be used as a form to shape the candle holder. Start bending the curve on the step of the anvil and finish it on the rod form. Heat the holder evenly so that everywhere is consistently bending.

Heat the center of the long part and clamp it in vise. Bend it over 90 degrees at about 7" down from the holder part. You will have to work out some of the

- Draw out the remainder of the long part to about 12" putting a long gentle taper on it. Start this closest to the bend and work out towards the tip. Look often to see where it is still fat and try to draw it out there to make it all even. Add a rat tail to the tip.
- Place a bending fork in the vise or in the hardie hole. Starting close to the 90 degree bend, scroll the long tapered end in the bending fork with a scrolling wrench. Work close together taking little bites (bends) in the beginning and larger bites later as you complete the scroll. Slide – bend – slide – bend, etc.
- The scroll may not be flat and the candle holder may lean. Heat the whole scroll base and use 2 C-clamps to flatten the scroll and hold it down to a metal table. While still clamped, use a wooden mallet to straighten the upright part of the candle holder into a vertical position.

6. Heart Hook, 7 1/2" of 1/8" x 1/2" flat bar stock



- Cut a slot 2 3/4" long down the center of one end of the bar to begin making the two sides of the heart. This can be done on the band saw quicker and more accurately than hot slitting with a chisel, but that's your choice.
- Draw out the other end keeping it flat and taper to a point 5 1/4" in length (good hook size). Make a little rat tail tip.
- Heat, quench the tip, and form the curve of the hook over the horn. This shaping can be a little tricky because the stock is flat and the curve of the horn tapers to the point.
- Using special tongs to hold the hook, heat and pull the two heart sides out so you can work them separately.
- Draw out and taper each side to 3 1/2" in length. Break the edges. Fix each side to be the same size because even a 1/8" difference can make the heart look "Off" center.
- Shape one side of the heart on the horn with little side-swiping blows. Then flatten out on the anvil face. Repeat this for the other half of the heart.
- Carefully tap the halves together so the points just meet.
- Visually inspect at arms length and correct if necessary.

David reheated and took the heart apart so he could reform it again on a special jig he had made. The jig is held in the vise and allows the 1/2 heart curves to be made quickly and accurately. This would be very useful if you were making many hearts and needed them to be consistent.

7. Bottle Opener, 1" x 1/4" flat bar stock (cut to length later)



- Measure and mark 1/2" in from the end and the sides with a center punch.
- Holding a 1/8" x 5/8" slot punch with tongs, make a hole in the bar at the mark. Knock out the slug over a bolster block to protect the edges from deforming. Cool punch.
- Use a small opener (like a drift) over a bolster block to make the slot larger.
- Repeat with a larger opener to increase the size of the hole until it can be worked on the tip of the anvil horn. Try to keep the mass the same all around the hole. Flip it around to get it even and break all the edges.
- On the next heat, vertically squash down the hole on the face of the anvil to make the classic bottle opener shape.
- Next use a small round flat ended punch to form a small tab on the inside edge of the squashed hole. This is what catches on the underside of the bottle cap to pry it off.
- Use the cut off hardy to trim off the bottle opener from the long bar about 3 inches up from the hole. Taper it down slightly to make the handle.
- Shoulder the last 1/2" using half blows on the near edge of the anvil. Taper this out to a point and add a rat tail.
- Heat again, quench cool the rat tail, and shape a small loop hook on the horn for hanging the bottle opener.

8. Zig Zag Hook, 25" of 1/4" round stock



- Taper the first end to a point and form a rat tail at the tip.
- Cool the tip in the slacktub and form a hook over the horn.
- Fuller in a flat spot above the hook for the screw hole.
- Cool the hook and heat the opposite end.
- Taper second end to slightly longer point than the first. Add another rat tail, but be sure to not close it up too tight, and leave enough of a hole for a second screw.

- Heat the area above the flat and clamp the hook in the vise with the hot part just above the vise jaws
- Bend slightly perpendicular to the hook with scroll tongs.
- Heat a little higher up on the rod and bend it in the other direction until a loop forms and the metal touches itself.
- Heat again and make another loop in the other direction being sure to keep the loops tight. (think ribbon candy)
- Repeat making loops out to the end with an artistic eye.
- Heat the whole thing and clamp down to hammer flat.
- Since it is round stock, the angle of the loops to the hook is not that important while making the loops as twisting the hook back to 90 degrees will not show.
- This hook takes 2 screws because it is so heavy.

9. Dimple Hook, 3 1/2" of 1/2" square stock



David had a custom made tool that looks like a handled punch, but with a 3/4" stainless steel ball bearing welded on to the end. He called this his special dimpling tool. (This tool is beyond anything I could make, but I might try using a small ball peen hammer.) David also had a pair of custom made tongs with a ball on one jaw to clamp into the dimple.

- Using the dimpling fuller and the treadle hammer, make the round depression into the stock about 1/2" from the end. It took several heats and multiple blows to make the dimple deep enough.
- Cool the dimple end and grip it with the special tongs. Heat and taper the other end. Draw it out 5 1/2" from the closest edge of the dimple.
- Leave the hook square at the top, but round it off towards the end. Then make a rat tail on the tip.
- On the next heat, cool the rat tail and form the hook on the horn of the anvil. Square it up on the face of the anvil.
- The screw hole can be drilled at the bottom of the dimple.

If you've read through all of this, I think you'll agree that it was indeed a very full day of blacksmithing. Much thanks to David for organizing so many presentations for us. I only hope I did justice to his excellent instruction. If I did miss any major points, then I apologize and claim the newbie excuse.

The theme to this past year's events has been focused on the new blacksmith, and the demos have been terrific learning experiences. If you check out our website, Bobby has now completely arranged next year's schedule of events. It looks like 2010 is going to be an awesome year for blacksmithing.

Happy Holidays and we'll see you all in January.
Happy Forging,
Bill