JAY CLOSE ON CONTROLLED
HAND FORGING
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NOTICES

ABANA 2004 Conference Details

The 2004 ABANA Conference will take place on the beautiful campus of Eastern Kentucky University, EKU, in Richmond, Kentucky. The Conference will formally begin with the Opening Ceremony on Wednesday evening July 7. Thursday, Friday and Saturday will be jam-packed with forging demonstrations, classroom activities, galleries, family programs, vendor activities, tailgating sales, the Saturday ABANA Auction, a membership meeting and of course time to visit and plan for the future.

Dave Koenig, Conference Chairperson, and Paul Moffett, Conference Co-Chairperson, have the wheels in motion to produce an informative and exciting Conference.

Maegan Crowley and Chris Winterstein have letters out to prospective demonstrators.

Clare Yellin is already fielding questions about Conference insurance.

Tim Ryan is putting together a team of people to run the silent auction, and the ever-popular live ABANA auction.

Will Hightower is making Conference money available and setting up accounts to manage the Conference finances.

LeeAnn Mitchell, with the help of Noah Mudge, has a few 2004 Conference logos ready to consider. LeeAnn is also poised to ramp up the ABANA web site for the latest Conference information.

Dave Mudge is providing input to see what it will take to bring live Conference Internet pictures to computers around the world.

David Hufford is ABANA’s on-site resource, EKU faculty member and the person who suggested that ABANA consider the campus for the 2004 Conference.

Mark Cross, the Events Director at EKU, is continuing to work with Dave and Paul to sort out all the details yet to be resolved about the Conference.

There is a host of other people—ABANA Members who worked on past Conferences, department heads at EKU, and even service and art representatives in the city of Richmond who provided information to get the Conference to this point.

Your comments and suggestions regarding the Conference are welcome. Please address them to davekoenig@abana.org.

Dave Koenig said, “It’s remarkable how much expertise there is among the ABANA membership. The success of the 2004 Conference will depend in large part on Paul’s and my ability to tap these resources. We’ve just started and we will need more people willing to share what they know. Here’s ‘A Big Thanks’ to everyone who helped to get the Conference to where it is today.”

Keep checking the ABANA web site for new Conference developments. Things are going to start moving faster in the coming months. This will be the first place to learn who will be demonstrating, what is planned for the classes and family programs, and how to get involved as a volunteer, vendor or tailgater.

See you in Richmond!

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in Italian and English
Hardbound, 229 pages
Reviewed by Brian Gilbert

This is another more specific offering in the series of books on Italian Blacksmithing written by Giuseppe Ciscato. Like his Italian Masters of Wrought Iron, this is a large, full-color, high-quality book that effectively showcases the wide range of smithing talent currently working in Italy. The two big differences between this and his previous work are:

This book includes a full English translation. While this book would still be useful even without this information, it’s nice to be able to understand what’s being said.

By limiting the scope of his subject matter, the editor can more thoroughly examine his subject in a smaller, less expensive volume.

The book is primarily divided into three parts. The first, “Italian Wrought Iron Beds: Types and Styles,” devotes one page to each of 75 blacksmiths, showing from one to four photographs each. Part two is entitled, “From the Design to the Production.” Here we see the design drawings compared with the finished product, but no images of the work as it’s being produced in the shop. Part three is devoted to works made in 2000. It’s similar in presentation and scope to part one, and includes additional works from blacksmiths shown in the previous section, as well as some new smiths.

Overall, this is a fine book, and it’s especially useful if you’re making beds. It would be a great resource to show designers and clients. I’m curious how the money was raised to produce this book, as it surely cost a great deal of money. It is somewhat reminiscent of the Guild sourcebooks, only exclusively for blacksmiths. Guild books are paid for by the artists who are included, and has the disadvantage of including only the artist who pays, with less emphasis on artistic merit. This certainly isn’t the case here, but I wonder if more books like this (and Dona Meilach’s works) could be produced for American smiths?
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Seven volumes soft bound, 701 pages total. Catalog # 929; $59.95 plus $2.50 shipping. Reviewed by Larry Stevens Recently I had been looking for small bench model shapers. Since milling machines have become popular, I have not seen one advertised for years...even used ones are hard to find. Compared to a mill they are very slow cutting. Their value lies in the fact that the tooling for any job is quite simple to make, while for a mill, the tooling costs about the same as the mill.

In desperation I ordered Vol. 3, The Metal Shaper, just to get an idea of where to start on a design using built-up plate weldments. Was I surprised! The "scrap" consisted of mostly aluminum and pot metal castings. To make these, you need The Charcoal Foundry (Vol. 1).

Vol. 1 The Charcoal Foundry. Made from a five-gallon metal bucket utilizing an old hair dryer as an air source. The refractory lining was made with fire clay andbuilder's sand. The author describes how to make your own molding sand, flasks (copes and drags), patterns and molds.

Vol. 2 The Metal Lathe. It's made with aluminum castings and cold-rolled flats. Only simple hand tools were used, with the exception of a 3/8" power drill. Machining tolerances were held to within 0.001 inch without the aid of expensive measuring tools.

Vol. 3 The Metal Shaper. Using the lathe to machine the parts, the author was very frugal and if at all possible would figure a way to make anything costing more than $10. He claims building his machine shop was a hobby, and that hobbies are intended to be an enjoyable means to use up time.

Vol. 4 The Milling Machine. Is a unique design with all the features of a professional mill, yet simple to build.

Vol. 5 The Drill Press. A very complicated item to build. Although excellent machines are available at a very reasonable cost, the author recommends building one for the experience and when finished it will have separated the men from the boys. Vol. 6 The Dividing Head and. Deluxe Accessories. Is loaded with useful home-made tooling. The dividing head was used to cut a complete set of change gears for the lathe described in Vol. 2.

Vol. 7 Designing and Building The Sheet Metal Brake. Was made from hot-rolled angles and flats with off-the-shelf hardware. In conclusion, this set of books is invaluable to the 'tinkerer,' even if one does not produce a single machine. The way the author figured out how to do complicated tasks reflects back to the 1900's before we had all the sophisticated tools we now have. When something needed doing, someone figured out how. Speed and lower production costs came afterward.

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LETTERS

More on Jewelry

Jewelry in the Blacksmith’s Shop… unique, interesting, and thoughtful. There is a product sold at most hardware stores called “Stay-Brite.” It includes a small roll of solder and the flux in a plastic bottle. It acts like silver solder with “high” strength, melts and flows at about 430°F. “Easy” silver solder melts and flows at about 1325°F. For your project, Stay-Brite would be more than adequate. A welding torch can be used with care, but a better setup would be a Prest-O-Lite torch with a number one tip.

To keep from feeding drill bit manufacturers, solder the (necklace) bails on. The silver cabochon cup and silver base can be soldered to the finished Damascus steel in one quick operation. Turn the project over while hot and solder the bail on—done! Be sure the silver base, cup, and steel are flat on the surfaces being soldered. I cut the solder into small, flat “pillions”—snips—because the solder will flow the heat. But if there is any dirt, oil, or oxides, the solder will ball and refuse to flow.

Those scraps you have from the silver, including the filigree, can be used to make shot-balls for decoration. Pile them up on a charcoal block and melt. The silver will ball right up, flat on the bottom. The same can be done with clean copper wire cut into small pieces. Copper melts at 1700°F.

Now to the earrings. Watch the weight or your lady will have lobes to her shoulders. If they are pierced, the holes will turn into long slits. Most American Indians have them and they look like they were cut with a pen knife after a few years of heavy weight.

I do silversmithing when I can… off-and-on between everything else. You can also use a three-square triangular needle file to decorate the top edge of the bezel cup. A number of designs are used, but most common are:

Jim Bush, Colorado Springs, CO

More Thoughts on Air-Powered Treadle Hammers

In reference to Clay Spencer’s warning about the dangers of adding air power to a treadle, I would like to add my comments. Tom Lupton, in the latest issue of the Hammer’s Blow, felt compelled to somewhat diffuse the warning. However, I suggest that we heed the word of the wise, namely Clay Spencer. In Clay’s professional career as a mechanical engineer with NASA he designed sophisticated ground support equipment for the Space Shuttle. We blacksmiths come from a great variety of backgrounds (I know ‘converts’ from the professions of landscape architect, police officer, machinist, welder and medical doctor), and we have treadle hammerers of all kinds of origin, from scrap yard material home designs to commercially sold ones. So we should listen to folks like Clay.

Let’s revisit the concerns:

a. The energy applied by air power is a multiple of leg power and at a constant level, not a variable person energy, which is high or low, i.e., befitting a specific task. Together these factors create a drastically increased duty cycle and energy input for the treadle hammer. This is what puts the high loading on the structural members. Typical machine design has not enough safety factor to absorb a multiple of its design load.

b. Home-built treadle hammers often have inherent shortcomings. Material may be of unknown origin, e.g., having high carbon content, making it brittle and unsuitable for welding. Further, improper welding can surface its flaws by poor workmanship, like undercut or cold welds, and wrong placement of welds, like under transverse shear loading. These flaws only show up as ultimate failures, much more so with high impact loading, and not necessarily with any warning signs.

c. Last, I am really worried about the foot treadle and the handle being forced down by air motive power. It’s just too easy not to pay attention, resulting in having your foot under the treadle lever while it smashes down, or having your head in the way of the handle while concentrating on the work piece.

It’s not having different opinions that is at issue, here. A hammer retrofit with air power is not like any other machine of its type, as Tom Lupton suggests. We all have made stupid mistakes in our forging career (even Clay—ask where his thumbnail is) and we need to be proactive in avoiding failure and injuries. Let us be aware when we invite danger like this.

Dietrich Hoecht, Big Bang Forge, Loganville, GA

From The Editor

In the last issue (HB 11/1, Winter 2002) Chris Winterstien’s article was incorrectly subheaded as “Controlled Hand Forging.” This article is not part of the Controlled Hand Forging series, but was incorrectly labeled. I apologize for this mistake.

Also, there was some confusion over my drawing of the parts of the anvil, specifically, the ‘cutting’ saddle. To some, this is the historically correct name for this part of the anvil, but this label can cause problems. It probably predated the Bessemer process, when high-carbon steel was much more expensive and cold chisels were harder to come by. Some smiths used this part of the anvil to cut steel, thus marring up their anvils in the process. But now, as Mr. Nauman correctly points out in his article, you shouldn’t scar any part of an anvil with a cold chisel… it’s a simple matter to use a scrap of steel for this purpose. So just because it’s called a cutting saddle doesn’t mean it’s a good idea to cut on it.

BG

Controlled Hand Forging Series

I just received Vol.11, #1 and wanted to let you know how helpful the Controlled Hand Forging Series has been to myself and I’m sure everyone else who is struggling to learn this craft. I’m new to blacksmithing, having just taken a class last year at the John C. Campbell Folk School taught by Steve Williamson. Needless to say it flipped my switch. One thing I have learned, other than the fun and frustration, is that every smith I’ve talked with has been so enthusiastic about sharing the knowledge they’ve spent years acquiring. This is still very evident in every issue of the Hammer’s Blow and The Anvil’s Ring. My thanks to everyone who contributes the time, effort, and energy to keep us all learning. Thanks.

Frank Price, Sapelo Island, Georgia

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Spring 2003
A Foot-Operated Anvil Vise

This idea originally comes from an old issue of The Blacksmith and Wheelwright, and was reprinted in M.T. Richardson's Practical Blacksmithing. I've never seen one in operation, so I can't report on how effective it is in practical use... it appears similar in function to a farrier's rasping vise.

Tong "Springs"

Someone left a large pair of tongs from a foundry at our shop with an interesting "spring" to help hold the tongs open. A short length of rubber tube had been slipped over the ends on the reins, helping to hold the tongs open while not being too strong to make the tool tiring to use. A conventional spring at the joint would surely overheat and soften. Combine this with a rein clip, and you'd have a well-dressed pair of tongs!

The Anvil as Ruler

You can save a lot of time looking for a tape measure by carefully measuring various distances on your anvil, then using those known distances as measurements. Write the dimensions on your anvil with soapstone or silver pencil until you commit them to memory. Don't forget the sides of the anvil and the horn.
A Side-Draft Forge Hood

By Brian Gilbert

I recently received a letter from an ABANA member who was looking for measurements to a side-draft forge hood. While much has been written about forge hoods in the affiliate newsletters, I couldn't lay my hands on a specific sheet of dimensions or blueprints, when the little light bulb clicked on above my head.

We have a couple of side-draft hoods at the shop, but one stands out. It draws very well, even when cold. It's exact history is unknown, so I'm not sure who the original designer was. Lonnie Farmer measured all of the dimensions and produced a cutting layout, which he's generously agreed to share with the ABANA membership. The advantage of this hood is that while it draws very well, it can be cut from a single 4x8 sheet of steel. The steel needs to be thick enough to butt-weld together, about 11 gauge or thicker. Access to a large sheet metal shear would be helpful to make the long straight cuts, but this could be built with a number of cut-off disks chucked into a side grinder. A MIG welder would be helpful, too, though a stick welder could be used with thicker sheet.

4'x8' 10/11 GA SHEET

All joints butt welded

Pattern layout from a single sheet, measured and drawn by Lonnie Farmer
Forging S7 Tool Steel

By Brian Gilbert (with lots of help from Frank Turley)

Good fortune is often a double-edged sword... I was recently lucky enough to score a good deal on some tool steel. Two ten-foot bars of 7/8" H13, and one of S7. That was the good news. The bad news was that I didn't know how to forge it.

A look through my Anvil's Ring index showed very little about forging S7 in the blacksmith's shop... only one article, and wouldn't know it, it was an issue I didn't have (Volume 8, #2, June 1980) None of the books in my library gave much info on S7.

That's when I remembered Frank Turley. Frank has operated a blacksmithing school in Santa Fe for many years. Some of the best blacksmiths in the country have gotten their start at the Turley Forge. Frank gave two demonstrations on forging tools from S7, one at the Asheville conference (which I didn't attend, but had pre-printed notes on) and another at Madison, Georgia, (which I did attend, and took tons of notes on... and now I can't find them!) Between the two, and some helpful e-mails from Frank, I figured I had enough information to give it a try.

While S7 is an air-hardening steel, this doesn't mean we can "force it and forget it." Far from it. This is a fairly picky material, and the proper forging procedures must be followed if we are to obtain the high performance that this material offers.

I did remember one thing that Frank emphasized in his demo... Read the data sheet! I found the information about S7 on Carpenter Steel's website and downloaded seven pages of specs. Most of this information is geared towards large industrial users, but there are a few important facts that can be gleaned from them.

"Heat uniformly and forge from a temperature in the range of 1950-2050 degrees F. Do not continue forging below 1700°F." This is a fairly narrow range, and unless you happen to have a pyrometer-controlled forge, you'll have to make an educated guess of the temperature by color. Frank sent me a note that said 1950°F-2050°F is a "bright orange, approaching lemon," and the lower forging temperature, 1700°F, is a "bright red or salmon color."

Taking a piece of S7, I forged a hammer eye punch using Frank's notes as a guide. I shaped the end to be roughly rectangular, as I have a number of handles that are shaped that way. (It saves time for me to buy several handles at a time, then forge a punch to match those particular handles. You may find handles that are oval-shaped. In that case, you would want your punch shaped accordingly.)

This steel wasn't too difficult to forge at the correct temperature... harder than, say, common A36 structural steel, but not as hard as a piece of forge-welded cable. I understand that if overheated, S7 will disintegrate when struck with the hammer, becoming similar to "stiff mashed potatoes." The steel may also separate into two pieces if overheated while in the fire, so that you take out half a workpiece! I didn't intentionally test this theory, preferring instead to wait until I accidentally overheat a piece. I'm sure it will happen sooner rather than later, probably while demonstrating.

One little detail that must be done at the forging stage is to mark the tool. After the punch was tapered and correctly shaped, I clamped "S" and "7" standard letter/number punches together in a pair of ViceGrips™, took another heat, and marked the tool hot. You should get into this habit; otherwise someone else could ruin your tool by quenching it in liquid.

I skipped the normalizing stage, since according to Jorgensen Steel's Steel Aluminum Stock List and Reference Book, S7 cannot be normalized. Turley suggests that it's a good idea to make an attempt at annealing before hardening, although his anneal will not be as thorough as the manufacturer's anneal. After taking the steel to 1500°F - 1550°F, a bright cherry red bordering on salmon, S7 should be cooled at 25°F per hour down to 1000°F, and then air cooled. Turley does not have the temperature controls for this, so he cools slowly in fine wood ashes, occasionally taking a peek until the metal shows a dull red. Depending on the mass of the material this usually takes several minutes, more or less. Then it is taken out to air cool on a bed of room-temperature coke. Annealing will refine the grain structure prior to hardening, thereby making a tougher tool.

S7 is air-hardening in small sizes (up to 2 1/2" thick). To harden, bring the temperature up to 1700°F-1750°F: and cool in still air. I heated my forged punch up to a "bright red or salmon into an orange" and laid it on a bed of coke to cool. Make sure to lay the tool on room-temperature coke... not hot coke. Besides coke, another inert material might do, such as a fire brick or graphite block.

S7 can be tempered to give a range of finished hardness given by the following table:
### Toolmaking

#### Effect of Tempering Temperature on Hardness - S7

<table>
<thead>
<tr>
<th>Tempering Temperature °F</th>
<th>Rockwell C Hardness</th>
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<tbody>
<tr>
<td>Untempered</td>
<td>59/61</td>
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<tr>
<td>300</td>
<td>57/59</td>
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</tr>
<tr>
<td>1,100</td>
<td>43/48</td>
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<tr>
<td>1,200</td>
<td>37/40</td>
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</tbody>
</table>

*Source: Carpenter Steel 57 Alloy Tool Steel*

The data sheet tells us that “The best combination of hardness and toughness is obtained by tempering at about 400°F. This tempering temperature is therefore suggested for cold-work applications. Tempering at 900-1000°F is usually desirable for hot-work applications.” Consequently, between 900 and 1000°F is a dark red that’s barely visible in daylight. I slowly warmed my punch until it just barely started to glow, then set it aside in still air.

I dressed the punch on the grinder, taking short, quick grinds to avoid overheating the steel, and cooled the piece frequently in water. Crown and bevel the back end, where the tool is struck, and keep the cutting edges of the punch sharp and square. The final dressing was done with a fine flap wheel, and gave the edges a smooth, finished appearance.

In Frank’s demo, he went on to punch the tool for a traditional handle. I didn’t do that with mine, for several reasons. The tool steel I bought wasn’t exactly ideal for this purpose, 7/8” round bar. 1” square would be much better for punching. I also wanted to try a wrap-around tool handle design with interchangeable punches and cutters. And also, to be brutally honest, I’m terrible at punching eyes and having them out centered and square. One of my goals is to teach myself how to do this correctly and consistently, but I’ll need to practice on some less expensive mild steel first.

To give my work the acid test, I tried punching through another bar of S7. It worked... I got through the bar, though I did scar up the cutting edge of the punch somewhat. It will need another dressing before it’s used again. I don’t think my hardening/tempering was at fault, though I may have overtempered slightly. More likely I tried to drive too far through the bar when I should have pulled the punch and taken another heat.

With S7, heating of the tool during use becomes a consideration. With punches made from, say, W1 (which is a water-hardening steel) you can give the tool a quick dip in the slack tub to cool it off between heats. This is not a good idea with an air-hardening steel like S7 (or H13... Frank said once during a demo, “If you even wave a H13 punch over the slack tub, it’ll crack!”) A much better solution to this problem is to use two identical punches, alternating each tool between heats.

S7 does have the peculiar quality called red hardness, so that it will hold its shape and keep cutting, even though the tool tip turns dark red. However, if the tool becomes hotter than that, it may become distorted. Also, when back-punching, care should be taken to keep the tool from hitting the edge of the bolster, pritchel hole, or hardie hole. If the tool tip turns dark red in use, let it cool to a black heat or below before putting it to work again.

Be careful when using this tool, especially for the first time, until you get some experience with it. If incorrectly hardened, a piece might break off with dangerous results. Keep those safety glasses on, and wear your gloves and leathers.

So that’s what I learned about S7. For deep punching in tough steel, it’s about the best performing steel you can get. You can try obtaining it locally... if you can find drops and outfits, then it shouldn’t cost too much. Alternatively, you can buy small quantities direct from Carpenter Steel at www.carpenterdirect.com. I was able to get a quote for three feet of .625” round S7 for $6.60 plus shipping, which is pretty inexpensive considering the performance this steel gives. So buy yourself a bar, download the specs, and give it a try!

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Forging and tempering colors, as corrected by Ken Zastrow, from Jack Andrews’ New Edge of the Anvil

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**SPRING 2003**
Drawing a Round Taper

By Jay Close
Illustrations by Tom Latané

Lesson Number Three—Drawing a Round Taper

Definition: “Drawing,” “drawing out,” or “drawing down” means to reduce the cross-sectional area of a bar.

Drawing a round straight taper to a point 3 inches long on the end of a square sectioned bar.

1. The final forged shape.

Intent:
The student will learn to forge a round taper of a specified length on the end of a square bar and to control for the material stretch that results from converting square to round sections.

Tools Needed:
Basic tools only, these to include a rule, straightedge, dividers and outside calipers.

Materials:
24 inches of 1/2 inch square mild steel.

Method:
When forging a round sectioned taper, first create an accurate square sectioned taper. The square taper is hammered to an accurate octagonal taper and sometimes to a 16-sided or 32-sided taper before final rounding.

As the square taper is forged progressively toward round, the length of the taper will grow about 20%.

Knowing this, the square taper you begin with should be 5/6 the desired length of the round taper you need.

Step One:
Review the previous lesson on drawing a straight square sectioned taper on the end of a square bar.

Starting at a yellow or light welding heat, forge a square taper on the end of the 1/2 inch square bar. This taper should be 2 1/2 inches long and hammered to a sharp point.

Review also the Targets section of the previous lesson on drawing out a straight taper. (Lesson One; Drawing Out, The Hammer’s Blow, Vol. 11, #1, Winter 2003)

Make sure the sides of your taper are straight and the point on center. It is hard to make a round taper significantly better than the straight taper you start with.

Step Two:
Place a chalk or soap stone mark 3 inches in from the front edge of the anvil. This will be a reference for drawing your taper to finished length. Alternatively, set the points of dividers 3 inches apart and keep them handy for comparison to your work.

Note in the technical sketch shown above the “fingernail” transition between the square and round, and where on the bar we measure to judge the needed length.

Carefully reheat the bar with the point pushed through to the far side of the fire so that it does not burn before heavier sections of the bar are at a working temperature.

3. Corner up position.

At a yellow or light welding heat, bring the bar to the anvil and place it “corner up.”

Raise the hand holding the workpiece until you can feel good contact along the downside corner of the square taper.

Starting where the bar is thickest, match your hammer blows to the slope of the upper corner and forge a neat flat or facet all the way down the corner.

As the taper narrows, so too must the facet. Lighten your hammer blows progressively as you approach the point. You want to create a clean facet. This facet will end up with an elongated, asymmetrical diamond shape.

The diamond will be widest at the base of the original square taper. It will taper gradually toward the point. Above the base of the square taper, the diamond will come to a quicker point cen-
4. Forge a neat flat all the way down to the point.

5. The forging should look like this.

6. The goal is to create an even-sided octagon.

Troubleshooting and Corrections

Shape And Dimension Problems:
Check that the sides of the taper are straight and that the point is centered. Review the lesson on making a straight taper with a square section for hints on correcting these problems. If you have approached the work in the organized fashion described, and if you have managed to keep the taper well supported on the anvil as you work, there should be little correction needed.

If the taper is too short, and you began with a proper square-section taper, the material must be "hiding" somewhere. Are the sides of the taper straight? Check against a straightedge. Any bulge is material that could be forged into length.

Perhaps you did not forge an accurate or complete even-sided octagonal taper before rounding. The result is a taper that is still "square-ish" in section with rounded corners.

7. Cross sections of a "square-ish octagonal" bar and desired round.

Go back and hammer down these rounded corners as facets once more. Then forge down the new corners before rolling and rounding.

Sometimes the taper will be a bit short simply because the hammered texture isn’t refined enough. Make sure there are no obvious flats or facets left on the work that are more than about 1/16 inch wide.

If your taper is too long, determine why. For example, you may have worked into the square-sectioned bar beyond the start of the initial square taper. You must do this on the corners but not on the flats of the square. Using your hot cut hardie, trim the tip back to prepare for drawing and rounding the taper once more.
Important: you must trim back more than the needed shape change. If the taper is 1/2 inch too long, trim off 1/2 plus a bit more. You still must draw out the now-blunt tip. How much to trim is a matter of experiment and experience, but you’ve lost the element of control that working from a specific square taper gave you. As a “guessimate” to get you started, try trimming back an extra 50% of your original error. For example, if the taper is 1/2 inch too long, cut back 3/4 inch.

Having trimmed the tip, re-draw the point starting again with facets down the length of the taper that are then blended into a smooth round. When changing the dimensions of a round, always work from facets first.

If the taper is too long, maybe you have over-forged some portion of the round, creating concave sides. On a thin point like this do not attempt to upset the bar to shorten it and fill out the concavity. Rather, trim as recommended above and redraw the point, square first, then round.

Surface Texture Problems:

Small concavities or dimples are a common problem with the surface, especially near the thicker part of the taper where the corners of the bar are first forged. These dimples result from not having the bar hot enough or from not hitting hard enough or a combination. If not severe, they can be forged out and blended into the surrounding surface.

Remember to keep your anvil surface clean and work the bar down to a black-red finishing heat. Hit hard to make the shape change, but lighten up with finish work. Hit light, sharp, smoothing blows. Keep the taper well supported on the anvil. Create an uneven-textured surface where no individual hammer mark predominates.

Targets

Time Targets: See the earlier lesson on drawing a square sectioned taper for goals for the first step of this lesson.

Once the square section taper is established, try to convert it into an even sided octagonal taper in one heat.

Take a second heat to make the upper part of the taper 16 sided and round the whole length. (A larger diameter taper may require the whole length worked 16 sided or even 32 sided. A smaller diameter taper may be able to skip the 16 sided step.)

A third heat working down to a dull red may be used to refine and smooth the surface.

Dimension Targets: Strive to create a taper that is 3 inches long plus or minus 1/16 inch.

Draw the point as fine as you can, but no more than 1/16 flat on the end.

No section of the taper is to be greater than 1/2 inch diameter.

Except on the corners above the taper the original 1/2 inch square bar should remain unchanged.

Shape Targets: The point must be on center, and the sides of the taper must be straight. (The previous lesson on the square section taper will give guidance on judging this.) The section of the taper must be round, not “rounded square-ish.”

Except for the corners, the dimensions of the parent bar must remain unchanged above the taper.

Strive for a clearly defined “fingernail” transition between the square and round sections.

Forging Dynamics

(1) There are three reasons to work the round-sectioned taper as a square, then a series of progressively smaller facets before achieving a round:

a. When using wrought iron, the traditional and historical material of the blacksmith, this was the way to retain the fibrous integrity of the material. Premature rounding causes the individual iron strands to shear past one another and create internal cracks and other flaws in the bar.

b. With any material, this method allows the greatest control of dimension and repeatability of results.

c. A hammer blow that travels across a surface in motion or a hammer blow that makes a sweeping motion itself is less effective. Working the bar as opposed stationary facets for as long as possible makes most effective use of the hammer blow.

(2) Comparing the cross-sectional area of bars helps predict material requirements for different forging operations. For example, a one-inch square bar has a cross-sectional area of one square inch. On the other hand, the cross-sectional area of a round bar one inch in diameter is only about 80% of the square:

area of a circle equals \( \pi \) times the radius squared, OR
area of a 1-inch circle equals \( 3.14 \times 0.5 \times 0.5 \), OR
\( 0.785 \) inches

When the square becomes round, the material in the corners of the square gets forged in, causing the bar to stretch.

It is actually quite easy to make a round greater than one inch in diameter from a one-inch square bar. Do this by not retaining the one-inch dimension as the corners are first forged to create an octagon. The bar will swell to greater than one inch across the flats.

If you want a one-inch diameter round from a one-inch square, first hammer the square slightly under size, then octagon and then round. This anticipates the swelling that results from forging in the corners of the square.

3) When you forge the first facet on the top corner of the square taper, the anvil is beginning a facet directly underneath on the bottom corner. The hotter (softer) the bar and the harder you hit, the more closely will the bottom facet made by the anvil approximate the dimensions of the top one made by the hammer.

However, even with the hardest blow on the hottest metal, the iron itself absorbs some of the impact of the hammer so the bottom shape change will never exactly equal that of the top. This is why we work all surfaces of a bar if a uniform product is desired.

(4) If the hammer blows are light and/or the bar is cool, the shape change brought about by the hammer is increasingly concentrated on the surface directly beneath the hammer. If you don’t forge the corners of your taper forcefully enough or hot enough the corner alone will spread. As the adjacent corners spread you create a small pocket or concavity in the surface. Look for these as they are an indication of working the bar too cold or not hitting hard enough to force the shape change into the middle of the bar.
Bending Bar Stock

By Jay Close
Illustrations by Tom Latané
Lesson Number Four—Bending

Definition: For bar stock, bending creates a change in the longitudinal axis of the bar. This change can occur in a single plane as in bending a classic scroll, or the change can occur in multiple planes as in a corkscrew.

Straightening is a special form of bending, as are sinking and raising when dealing with sheet stock.

Bending a semicircular curve with a three-inch inside radius on the end of a flat bar.

Intent: The student will practice calculating the bar stock needed to produce a bend of specified radius and learn to use the horn of the anvil to create a controlled semicircular bend of required dimensions.

Tools Needed: Basic tools only, these to include a rule and a square.

Material: 24 to 30 inches as convenient of 1/4 inch by 1 inch mild steel bar.

Method: After calculating the needed material to make the bend, the curve is produced by using the horn as a bending point or fulcrum. Shifting the location of the bar on the horn and changing where and how hard the bar is struck controls the needed curve.

Step One:

In the technical sketch, above, the radius of the bend is constant, i.e., you are asked to make a semicircle or a half circle with a radius of 3 inches measured to the inside of the bend.

However, the actual needed bar stock is determined by an imaginary line down the middle of the bar thickness. Therefore, as the bar is 1/4 inch thick, calculate the material needed for a 3 1/8 inch radius bend.

There are many ways to determine the needed material. These methods vary in accuracy and convenience. If you lack a full-sized drawing and are working from a scaled drawing or just a set of dimensions, simple geometry yields an accurate result.

In the same way that pi times the diameter of a circle equals its circumference, pi times the radius will give the linear dimension of a semicircle or half circle.

bar length needed = pi times radius

bar length needed = 3.14 times 3.125 inches or 3 and 1/8 inches
bar length needed = 9.8125 inches or 9 and 13/16 inches

Measure 9 and 13/16 inches from the end of the bar and center punch a distinct mark on the edge of the bar (not on the face). This arithmetical method of determining the needed length of bar will only work with curves that have an even, unchanging radius, but it is very accurate.

Many smiths feel it necessary to work from a full-sized drawing.


If this is not available, other methods for determining the needed bar stock are possible. Some smiths lay a piece of string or wire on the drawing along the needed curve and then straighten the string or wire to take a measurement. Others will step off the needed material using a set of dividers or a compass. A useful tool called a "traveler" can also be employed and yields a very accurate result. These methods, while of varying degrees of accuracy, have the advantage of being useful for scrolls and irregular curves as well as semicircles and full circles. Where appropriate, we will cover these other methods in subsequent lessons.

Whatever method you choose, remember to take your measurement down the middle of the bar thickness.
You may feel it useful to make a full-sized sketch of the needed shape, not just to determine stock requirements, but as a guide to the desired final form. If so, use the drawing (fig.#1) as a guide. For such simple shapes as this, ultimately you will come to find this drawing unnecessary and you will learn to hold an image in your mind of the completed form to guide you.

**Step Two:**

Take an even, light orange to yellow heat on the end of the bar. Try to heat at least 4 or 5 inches, but evenness of the heat is important.

When hot, place the bar across the horn of the anvil at a slight angle to the axis of the horn, approaching perpendicular to the taper of the horn. This helps avoid the curve taking on a corkscrew spiral as it is forged. The exact angle to hold the bar depends on the geometry of the horn and is a matter of experimentation, observation and correction as you work.

With the bar held horizontally, the point of contact with the horn is directly on top. Extend the end of the bar no more than a half an inch beyond that point of support so that the end is unsupported and free to bend.

Hit the end of the bar straight down and the work will deflect. Most of the deflection will be on the end of the bar you hit, but the metal will “kick up” a little on the near side of the point of support too. The hotter the bar and the harder the blow the less it kicks up.

The amount the bar moves depends on (1) how hot/soft it is, (2) how hard you hit it, (3) where you hit it, and (4) how much of the bar is unsupported by the anvil. These are also areas for experimentation.

Get this first part of the curve well bent. It is often easier to straighten it later than introduce more curve.

After the first hit, advance the bar another half inch or so and hit it again.

Do this a third time and check the progress. If you have made a sketch, compare the beginning curve to that. Otherwise, look at your curve and imagine it continuing at the same rate. Does it look like it will create the desired curve?

If you need a tighter bend, return to the approximate location of your first hammer blow and hit the bar again.

If you have clearly bent too much, place the end of the bar on the horn and hit on the near side of the point of support.

**5. Forging dynamics of bending on the horn.**

Drawing #8 in the “Trouble Shooting and Corrections” section shows the idea.

**HINTS:**

Hitting on the near side of the point of support will open a bend. Hitting on the far side of the point of support will close a bend.

As much as possible, try to hit vertical blows straight down on the work. This is just good ergonomic practice.

In all cases, try to have the hammer face contact the bar squarely, even if the point of impact is at an angle. You can accomplish this by (1) swinging into the bar (that is, not hitting vertically), or (2) angling the hammer face and continuing to hit straight down. The drawing gives the idea.

As the bar bends and you need to rework an already bent section, feel free to lower the bar-holding hand in order to keep hit-
ting straight down. Do not bend at the waist, but flexing the knees can help. At a certain point this becomes awkward, so angle your hammer blow as necessary. Raising and lowering the bar-holding hand will also alter the point of contact of the bar on the anvil and the nature of the bend.

In no case bend the bar against the curve of the angle. The horn is not a forming jig. It is only a variable fulcrum point for bending.

Much of the ease of bending a smooth curve comes from even and anticipated resistance to the hammer blow.

Any blow that pinches the bar between the hammer and the anvil is a drawing blow that thins the work and makes controlling the bend more difficult.

Likewise hot and cold spots in the bar present the same challenge.

A hard blow at a high heat close to the anvil horn with a small amount of the bar unsupported will result in the tightest bend. Hit lighter and bend less.

Work colder and bend less.

Push more of the bar across the horn, hit farther away and the curve will be gentler.

Work the curve, never hitting twice in a row on the same spot. Keep the hammer blows moving and the bar advancing across the horn.

7. Lowering the bar to alter the point of contact.

Bending will develop its own cadence: Hit. Advance the work. Hit. Advance the work. Hit. Advance the work...etc.

Check your work.

Make corrections.

Check your work again.

Do not mindlessly hit the work. Observe the shape. Decide on a course of action. Then hit with confidence.

Step Three:

When satisfied with the first part of the bend, put the bar back in the fire to heat the next section.

At a light orange to yellow heat repeat the sequence of Step Two to continue the bend. Keep track of your punch mark and visualize the complete curve as you work.

Step Four:

After you are satisfied with the curve, allow the bar to cool slowly in the air and then check the needed dimensions (see the Targets section, page 18). A cold bar will allow a more accurate assessment of the required specifications. At this point small corrections in the curve and dimensions can be made cold, employing the same approaches you used while the iron was hot.

Troubleshooting and Corrections:

Identifying and correcting problems are the keys to this lesson. It will take much experience before a semicircular curve can be made with no fuss.

8. Bending sequentially by moving the bar across the horn.

Basically, problems are of two types: over bending and under bending. Both present their own challenges.

To correct a bend, you can vary (1) where the bar is supported on the horn, (2) the deviation from horizontal of the straight section of the bar, (3) whether the bar is held with the bend up or down, and (4) whether you hit on the far side or the near side of the point of bar support. How you manipulate these options to correct a problem often depends on how far along the bend is before the problem is addressed.

The earlier a problem is corrected, the easier the correction will be and the correction will have less of an effect on the subsequent work.

Here are some problems and potential solutions:

a) An over-bent end of the bar that is caught early is corrected by setting the tip of the bar on the horn and hitting on the near side of the point of support. Remember the prior hint: Hitting on the near side of the point of support will tend to open or straighten a curve; hitting on the far side of the point of support will tend to close or tighten a curve.

If, on the other hand, the over bend is not noticed until most of the curve is already completed, then the bar is best flipped so the curve reaches under the horn and the end comes on top. Support the end and hit to the far side of the point of support.

b) An under-bent end of the bar, if caught soon, can be corrected by placing the end of the bar on top of the horn, lowering the holding hand down and hitting down to tighten the bend. (See drawing #7)
If not caught soon enough, an under-bent end of the bar can be corrected by flipping the curve to run under the anvil. Support the end on the horn and hit as needed on the near side of the point of support to tighten the bend.

c) Sometimes the bend will begin to twist like a corkscrew. This results from holding the bar perpendicular to the axis of the anvil, not the curvature of the horn. Try to flatten this corkscrew on the anvil face as you work, but alter the angle of the bar on the horn to keep the twist from developing in the first place. Using the horn, you can also bring the twist into alignment by tilting the bar with one edge off the horn and striking down on that unsupported edge to swing the bar back into a single plane. You may have to do this sequentially along a broad section of the bend, depending on how extensive the spiral has become. Remember, avoid thinning the bar against the anvil. You want to hit only the unsupported edge of the bar.

Targets:
Try to get the bend done in two or three heats.
The distance between the end of the bar and the beginning of the straight section should be 6 inches plus or minus 1/16.
If you slide a square along the straight section, where it meets the punched layout, it should also hit the end of the bend.

The straight section should remain straight.
The curve should be even—no flat, straight areas or sharper bends than the needed curve.

Forging Dynamics:
The hotter the bar, the softer it is. Therefore, the more shape change that will result when a given hammer blow is applied. In bending we apply a force to change the axis of a bar. By supporting the bar at a given point on the horn we concentrate the effect of our hammer blow to a certain length of that bar axis. On the far side of the horn where the bar is unsupported and free to bend, the hammer will have the most effect. On the worker’s side or near side of the point of support the effect of the blow is “dampened” by the anvil horn and the support given the bar by the worker’s arm and body. The effects of a bending blow will, to some degree, transfer past the point of support on the anvil, but will be less than on the unsupported side. The softer/hotter the bar, the more effective the dampening effect of the horn and worker’s body.

Hitting on the end of a long, unsupported section spreads the energy of the hammer blow over a longer area so the effect on any one point is less—hence, a gentler bend.
Hitting in the middle of a long unsupported section will result in an 'S-curve'. The part supported by the horn won't bend; the free end has its own inertia and resists bending from a force placed far from it; the middle bends down and the ends tend to stay where they are.

A hotter section or a thinner section will respond to a hammer blow in the same way, by deflecting more than the cooler or thicker areas to either side.

(2) Every bent bar has an inside and an outside radius different by the bar thickness.

When calculating material needs for a bend of a specified radius, if you figure the lineal requirements using the outside radius, you will have too much material. If you use the inside radius you will end up short. The central axis of the bar will remain unchanged in a bend or twist; therefore, do your calculations from that dimension whether or not it is specified on the dimensioned drawing.

(3) As you bend a bar of iron, the bar upsets on the inside of the bend and stretches on the outside. The stresses of stretch and upsetting combined with differential resistance to the stress of bending will make a bar cup in cross section as it is bent. The upset bar inside the bend is offered the least resistance by growing sideways. The bar actually gets wider. The stretched bar on the outside of the bend is forced longer but the material for the stretch must come from somewhere. The bar grows narrow as a result. The combined widening of the inside of the bend with the narrowing of the outside makes the bar cup.

(4) When marking out for a bend, use only a round centerpunch mark, not a chisel cut or something similar. This will minimize the potential for concentration of stress in the bar that could lead to a crack or split. In no case should you mark the face of the bar either inside or outside of a bend. Both situations, by disrupting the unbroken bar surface, will result in the concentration of stresses at that point. These considerations are particularly critical when forging wrought iron and when the bend is acute.

(5) Assessing final dimensions when the bar is cold has two advantages. First, it is more convenient and safer to look closely at the work when the bar is at room temperature. Second, like most materials, iron expands when hot. When working to high levels of accuracy, final dimension should only be assessed at room temperature.

(6) Even quenching ferrous materials with low-carbon contents can leave them with internal stresses and slightly stiffer. As a general principle, allow your work to cool slowly in the air when finished forging. If there is any slight adjustment need to be done while the bar is cold, the bar will resist less.

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A Reminder — Watch for...

Selection Ballots coming in the Summer edition of The Anvils Ring Conference Registration Packet in the Winter edition of the Hammers Blow
Protecting Your Eyes

By Brian Gilbert

Recently I found myself working more in the office than at the forge, taking about a month before I could get back to some smithing. When I did, I needed to do some forge-welding. I discovered that my eyes were very fatigued the next day, and decided that I should look into some better protection for my eyes.

I had heard about didymium safety glasses many years ago when a class instructor (Jeff Mohr) had told us about them. They really did cut the glare down, but I had never been able to find a pair for less than eighty dollars. After my recent bout with eye fatigue, I did an Internet search and came up with a company called Auralens, who sold a small pair for thirty dollars, and a large for forty. I bought a pair of the large.

Compared to regular polycarbonate safety glasses, these things are great. Being glass rather than plastic, you can see much better, since the plastic glasses that I used were constantly getting scratched up. They came with an adjustable neck cord, which helps keep the glasses off of your ears and closer to your face. This is good, because they're noticeably heavier than plastic glasses.

They do a good job of reducing the glare of the fire as well... a welding heat seems much less bright now, and welding colors are easier to see. But I was curious... just how much more protection was I getting?

Not as much as I could be getting, so it turns out. I found a pair of great articles on the subject: Eyecare, by James Schell, The Anvil's Ring, Volume 22, #4, and The Open Flame and Safety Eyewear, The Anvil's Ring, Volume 23, #1. According to these articles, didymium glasses offer only slight protection from infrared wavelengths.

A forge radiates both UV and IR wavelengths. UV is emitted by any open flame, and the presence of physical heat signals IR wavelengths. It has even been suggested that fair-skinned blacksmiths wear sunscreen around a welding forge, signalling the presence of large amounts of UV.

So I hit the Internet again, this time trying to find safety glasses that filter IR wavelengths. I discovered that there aren't that many choices out there for infrared. Blocking UV wavelengths isn't a problem, but longer wavelengths are more difficult to stop. I was able to come up with a handful of safety glasses that provide varying amounts of UV and IR protection, and I managed to get my hands on a few samples to try out in the shop. Note that my "test" isn't all-inclusive or scientific, but rather a subjective report on some of the options available to blacksmiths.

The least expensive option on the list is by a company called Lexa protective eyewear, available on the Internet from a company called EHS Gear, which is a safety equipment supplier. These might be available from other suppliers as well. According to the EHS web page, these polycarbonate safety glasses are coated to block "65% infrared." I ordered a pair, but the distributor either didn't know anything about these particular glasses, or didn't care. The first try they sent me goggles, second try they sent me plain, uncoated polycarbonate safety glasses. I gave up on these folks and called the Lexa factory technical support line. From them I managed to get a specific part number for these glasses, which is #15210. They also gave me a number for Vallen Safety Supply, which sold me a pair of safety glasses with "Arc-Block DX Lens." Some suppliers called this a "3.0 welding lens." I purchased a pair online for $8.

Another low-cost option is offered by a company called "Pyramex." The have a polycarbonate lens that reduces IR, but it's only available in two models... the "Venture II," black frames, and the "Integra," model number SB460SF (3.0 shade) or SB450SF (5.0 shade). These sold for $7.25 per pair. The factory sent out a couple of pairs for us to review for this article.

The next most expensive option that I found is from a company called Oberon (www.oberoncompany.com). They are a supplier to the glassblowing industry, and they offer a pair of Cobalt II Blue PC safety glasses. These include a heat-reflective gold coating and they sell for $24.95. While they will filter IR, the problem is that they are dark to see through. I didn't order a pair of their glasses to test, but a friend had a pair that he loaned me for this article.

Several other options are available from a company called Auralens. (www.auralen.com/safety.html) This is a small company, but they were far and away the most helpful folks to deal with. They also seemed to have the widest selection of different
filters and frames. One of their available filters, AUR99, is available for $25 in small plastic frames or $35 for large, available in a welder's shade 1.7, 2.0, and 2.5. I tested (and eventually bought for myself) a pair of the shade 1.7's. These reduce a little less IR while passing a little more visible light than the darker shades, and if I were doing lots of forge welding, I might consider a darker (or possibly even a second) pair of glasses.

One of the big differences in these glasses is that they're made of real glass, not plastic. On the downside this means that they're heavier and slightly less impact resistant... they can break, and will probably do so before polycarbonate lenses would. (Safety glasses must be able to survive a 1" ball dropped from a height of 50 inches.) But the plus side is that they don't scratch nearly as easily as plastic glasses, and keep their clarity a lot longer. This is a big consideration for me, as I always seem to keep glasses around that are scratched up and foggy to see through. They can also be supplied in your prescription if you wear glasses, which is a trick that plastic can't perform.

![Glasses](image)

*The primary difference between low-cost plastic glasses and more expensive glass was the amount of visible light passed... Lexa above, Auralens AUR99 below.*

Another company called TM Technologies was listed in Dr. Kent White's article *The Open Flame and Safety Eyewear, The Anvil's Ring*, Summer 1995. I contacted the company about their glasses and this article, but their response was "we don't give out freebies." Further emails went unanswered, so I can't say much else about this company or their glasses, except that they are dark, at a welder's shade 4 to 6, and expensive at $195 a pair. They seem to be made for sheet metal workers doing open flame welding.

The most expensive lenses that I tested were the AGW186 lenses from Auralens. These were beautiful safety glasses, though quite heavy to wear. They do a good job of filtering UV and IR, while still passing plenty of visible light. The bad part is the cost... $325!

On to the Test!
I gathered together as many pairs of safety glasses as I could for a totally biased, purely subjective and non-scientific test. The procedure was simple... Dennis McAdams, Lonnie Farmer and myself lit a nice, hot fire, and took turns looking into it with different glasses on. Here's the general consensus:

If cost is your primary concern, the Lexa 15210 or Pyramex Venture II isn't a bad choice. They're very light and comfortable, and don't slip when you look down the way cheap or poorly-fitting safety glasses will. The downside is that they are dark, and might be a pain in a dim shop, though you could get used to them. Their weight is 1.0 oz. The primary difference between the Pyramex or Lexa is the color... Pyramex uses the standard welder's green, while the Lexa is more of an amber.

The Oberons, with the gold coating, probably offer the best IR protection. That's because they're so dark... one of the darkest tested. They were also the only type I could find with a gold coating. They do offer added definition when forge-welding, and really cut the glare down. But when you step away to do benchwork, you'll have to switch to a different pair.

For nearly the same price, the Auralens 99 shade 1.7 is a good compromise. They don't cut the glare as much as the Oberons, but they are much easier to see through for other forging operations. They're very affordable in the plastic frames, and are the least expensive glass lenses that I could find. As a result, they are heavier, and this takes some getting used to, but the supplied neck cord makes them very comfortable to wear. With the cord, they weigh 2.8 oz.

A pair of glass didyium glasses were checked with the others for comparison's sake, though they offer little to no IR protection. They are almost identical in darkness to the 99's but a different tint... more a pale purple. The plastic frames are not uncomfortable, though the fit isn't as good as my more expensive 99's. The neck cords help greatly though, and I've worked with them all day and never noticed them. With the cord, they weigh 2.9 oz.

TM2000 safety glasses weren't available for testing, but since these start at a welder's shade 4 it's doubtful that they're a better solution.

The Auralens 186 are really nice glasses, and offer good detail in the fire. They're very slightly darker than AUR 99's, with a purplish tint. They're also quite thick and heavy. At $325 a pair, I think they're overkill for blacksmiths, unless you plan on doing some glory hole glassblowing in the near future. These were the heaviest, at 3.4 oz.

Hopefully this article has pointed out some of the options available to blacksmiths for protecting our eyesight. I apologize if I didn't include other suppliers, as I'm sure they are out there... if you know of a good pair of IR-reducing safety glasses, pass that info along. As I said, I found the AUR 99's the best choice for myself, but any of the safety glasses here are bound to help, so take your pick. But remember, even the best safety glasses are no use if you don't wear them, so get in the habit and keep them on your face!
Working Intentionally

By Kirsten Skiles

I talk about the power of Intent when I’m teaching chasing and repoussé, to explain why my tapping hammer moves the metal so effectively. The blows don’t require a lot of strength. I always say that they require Intent, conjuring up an intriguing image of myself as a zen metal guru.

The hammer should move in a succession of short, powerful tapping blows, pushing the chasing tool and the metal toward an Intentional target. Maybe this is more about the quality of the blow. When I tell students not to hit so hard, then they hit too lightly, pulling back on the hammer’s fall. They lose the rhythm. I can see this same problem with my own hot forging—having to think too much about where the metal should be going—so that I can’t put the intent into my blow. How can the hammer blow do its job if I’m not sure what its job is? Maybe I’m not as thrilled about the final design as I thought I would be. Perhaps another project is calling to me. I find that my overall studio intent is just as important as my intent on a single project. If the two don’t mesh, then my focus fades.

If the magic of Intent works on my chaseings, then will it work with daily life? Could I move toward my goals more quickly if I knew exactly where I wanted to go?

Intent means knowing where you want to be and making every step move toward that goal, lots of small consistent steps. The problem with Intent is knowing what I want, bringing all of these different directions into a few concrete goals, sort of like a mission statement.

With the same spirit that I bring to my chaseings, I hammered out a Statement of Intent for 2003:

* home—love my kids and husband. Focus on getting this new home built and settled.
* metalwork—complete trades and projects for our own house.

Any paid projects must be figurative/narrative repoussé and must have a high profit margin.

* other—work on writing skills toward the goal of creating meaningful essays about creativity and craft.

I wrote the statement down, drew some pictures, stuck it on the refrigerator next to my son’s drawings. I need to see it every day so that I can stay focused. When I am focusing on a piece of metal, I carefully consider every tap of the hammer—how I place the chasing tool, how hard I hit, how fast, how the metal sounds, how the surface feels under my fingers. Experience has transformed to intuition, so that these choices seem to come “naturally” when they have truly developed through years of trial and error.

It would seem logical that in focusing Intent, I would need to ask the same questions of all of my actions. Does this activity or purchase move me toward any of my home goals? Does this Internet surfing further my creative writing? Could I spend this hour in the studio? This doesn’t leave me a lot of room for playing around with all of my tempting hobbies, but when I consider my Intent, I feel quite content with my choices.

When I play the role of instructor, one of the most challenging things is getting students to find their own vision. They are doing the technique wonderfully but don’t understand what to do next, or why their piece doesn’t look like my example. What they really want is that final stamp of personality that makes or breaks a piece.

They think it’s technical, but it’s not. I can’t tell a student how to make a leaf look like mine. You have to love flowers, read books by women authors, nurse babies, doodle when bored, agonize over ridiculous imagined scenarios and then put it all in your sketchbook if you want to make a leaf like mine. You and I both would prefer that you find your own vision.

So how do you focus your creative ideas into an Intentional Path? Collect your inspiration and look for the patterns. I looked at what other artists are doing, artists whose beautiful (and ugly) forms seem to emerge out of their material like magic. A woman whose name I can’t even remember had this incredible sketchbook, filled with drawings, colors, magazine clippings, quotes, notes, and other bits off the street. She had a visual journal where she brewed her Intent, something that she carried around with her like lip balm. You fill up your visual journal with anything that moves you. Sometimes, when nothing can move you, you simply force yourself to spend 15 minutes doodling in ink or crumpling paper. Put it in your journal. Your sketches can be drawings, photos, wire models, paper or clay. Maybe your journal is a long shelf that you periodically photograph, rather than a book. The writing can be simple one-word notes or eloquent philosophizing. Creating the vision means trusting your instincts, making really bad drawings or models, doing them over and over again, re-reading the bad stuff until you start seeing the pattern and developing it until you love it, or until you

Sketchbooks can be as important a tool as your anvil.
Kirsten's repoussé work

simply must express it. These patterns become your Intent.

Make up a six-month studio goal that reflects the pattern developing in your sketches. The goal might be a specific project, a specific technique, or something related to design. Some examples are: explore six different kinds of scrolls, connect only with rivets for six months, follow through on a sequence of projects laid out in a book, make faces for six months, etc. Yes, I think you need at least a six-month goal. I believe in mastery, or at least serious exploration. I've never seen anything mastered in a two-hour session, or even after a few weeks. Remember, serious exploration is often much more interesting (for maker and for viewer) than mastery. When you start teaching the rest of us, we need to know where you started and how much you screwed up. So keep your notes and samples as you move along.

Consistency is so important now. Decide how much time per day, week, or month that you will spend in the studio working toward your vision. An Intentional hour a day makes steady progress. Even if your sketching happens at the forge, think of the two times as being separate. Sketch at the forge 15 minutes a day. Work at the forge one hour a day, or whatever your particular plan is. Make mistakes. Take it too far, so you know when to stop. Enjoy where you are at the moment. No comparisons, unless a little competition drives you. Work slower, finish faster. On my latest learning endeavor, repoussé'd leaves, I realized that I was getting very fast at making ugly leaves. (This is where you learn to laugh at yourself.) I had to remind myself to slow down and do the same leaf for the fifth time, now the umpteenth time. I'm working slower, getting better, but still not where I want to be. The leaves are still stiff. I haven't yet mastered the compound curves that will take my skill level well above ordinary. Yes, I need a little competition, but no criticism. The edges look thin and sharp, not the eloquent line that a good edge should be. I keep my actions focused on my Intent. Drag the kids with me. Ignore the housework. Love the husband. Sketch and write steadily. Work consistently.

The exquisite visions will emerge.

SPRING 2003
Gichner Hammer-In XXIII

By Ruth Cook
Cedarburg, Wisconsin

"What's going on?" asks the stranger sitting across the table from me. "I'm usually the only one having breakfast this early."

"There's a blacksmithing workshop going on this weekend," I replied.

Leaning forward with his hands gripping the edge of the table, he whispers loudly, "My daddy was a blacksmith. He ran The Antique Forge in Riverton, New Jersey. I used to help him."

If I had a quarter for each time someone told me their grandpa or their daddy was a blacksmith, I'd forget about my 401k and retire on my quarter account. Traveling to the 23rd Annual Mid-Atlantic Smiths' "Bill Gichner" Hammer-In, I would add more coins to my collection.

This year's January workshop was held at Dave Hutchison's family farm in Cordova, Maryland. Dave and his two brothers manage 3800 acres and raise between 1000-1500 specially bred, lean pork hogs each year. They have converted a large pole building into a conference site with bleachers, long luncheon tables, power hammer, anvil, and forge. The walls are hung with farm tools and a John Deere sign.

"Preserving the Past, Creating the Future" was emblazoned on a banner over the demonstration area. The motto testified to the thoughtful legacy the Mid-Atlantic Smiths Association (MASA) wishes to nurture and promote. At workshops and special events, such as the Gichner Hammer-In, Dan and Judy Boone's 'Pasture Party Weekend,' or the wrought iron workshop at the Delaware Agricultural Museum, there is a desire to foster interest in the art of metalworking.

Last year MASA donated $2,000 to the National Ornamental Metal Museum's Matching Grant Program in honor of Bill Gichner.

"We have about 130 members and growing," says MASA president and emcee, Nick Vincent. "There are nearly 200 in attendance this weekend."

Peter Happny from Portsmouth, New Hampshire, opens the workshop with a tribute in memory of Bud Oggier, a dedicated blacksmith and special friend.

"I remember the year 1992 when Bud Oggier was roasted by his friends and fellow blacksmiths at a party given in his honor. He was taken completely by surprise, not an easy thing to do. Bud had a quick wit and subtle sense of humor."

"On one of Bud and Bill Gichner's famous road trips, they met a man who owned an anvil. Bill wanted to buy it. Try as he might, he could not get the man to sell. Undaunted, Bill persuaded Peter to try his hand at bargaining. Again, the man would not sell. Frustrated, Bill asked Bud what he could do to get that anvil. Without batting an eye, Bud shot back, 'You'd have to get rid of him and buy it from his kids.'"

"Bud was a master mechanic with an encyclopedic memory, who gave freely of his knowledge. It pleased him to give information away. For many years, he shared tips and advice to beginning blacksmiths in his letters to Jean published in The Anvil's Ring. He set an example. He encouraged Peter and others to excel just by being around him."

"Practice! Practice! Practice! Bud would say, 'Go home and practice!'

Seventy-year old Tom Clark, Potosi, MO, demonstrated his specially designed line of tooling. Displaying an amazing amount of energy promoting his product, he has traveled to 45 of the 50 states, two or more times, in the past two and a half years. He is founder of the Ozark School of Blacksmithing where he teaches the ABC's of forging. Demonstrating the soft touch of his SAYHA-SSM50, 110# power hammer, he lauds its beauty. "I think it's the best piece on the market," he said.

According to Tom, his quality tools are user-friendly and sold under the trademark "Tom's Tongs." His line of hand hammers, patterned after those originally used by Fred Habermann, formerly of Czechoslovakia, have a balanced center of gravity that reduces the propensity of the hammer to twist while striking.

Stepping up to the anvil, Leigh Morrell shared in the day's tribute to Bud Oggier, his friend and mentor. After his tribute, he continued: "Who is here for the first time? Raise your hands. How many are beginners? I'd like to talk about the workspace in your shop and give a cross section of rules for safety."

"An efficient workspace will improve both your safety and your designs. The area you work in should be about ten feet in diameter, or one or two steps away from the equipment you are using. The forge should be located so you are never reaching for materials or tools."
raised a wrinkled, multi-colored T-shirt above his head. Flexing the muscles of his bare arm, he slipped the gaily colored Gichner workshop T-shirt over his head and shoulders. With a twinkle of humor sparkling in his eyes, he bowed formally to applause. Tony demonstrated his techniques of forging stainless steel. Slowly, under the onslaught of rigorous pounding, the metal moves and spreads. A new shape takes form.

"I’ve been forging for fifty years," Tony says, "I began at seventeen in a technical college. At that time, I didn’t feel that I was good enough to be an artist or a sculptor.

"In 1964, I wanted to work in wrought iron. I asked a blacksmith if I could work for him. He asked, ‘What can you do?’

"I had no welding or forging experience. He took me on and I stayed for six years. He was a good teacher. He allowed me to learn by not always teaching me.

"In 1970, I went into business on my own. It’s a brave thing to do, this journey of discovery to make a living. At this time, I was making gates. They were all the same. I wanted to do something different.

"The ultimate challenge came in completing the gates for the great hall of Winchester Castle, commemorating the wedding of Lady Diana Spencer to H.R.H. Prince Charles. The project took almost two years. It was more than I had anticipated at times; I almost gave up.

"One can begin forging in wrought iron, which moves easily, then move on to mild steel, which works a bit harder. Stainless steel, however, is a whole new dimension. It’s a big jump and very different than working wrought iron.

"It is very pretty material and very warm in character. Beating the material is truly an intimate experience. If worked too hot or hammered too aggressively, it is like taking the skin off of the bones. The metal lets you know when to quit. It loses its spontaneity. Your hammer is an extension of your hand, so one must learn to be kind and understanding to the metal, your partner. It is necessary, therefore, to be humble and to know when enough is enough."

Tom Boone, a working blacksmith, remembers when he was just a youngster in the crowd and came to gatherings such as this along with his blacksmith dad, Daniel Boone.

Upon analyzing this current trend in blacksmithing, I’ve decided to change my retirement strategy. Instead of collecting quarters in my pocket, I plan to cast my coins like sunshine on the water, and invest in this and future generations. I look forward to hearing people say, "My son" or "My daughter is a blacksmith."

"The horn of the anvil should be at your right so you can walk around it while scrolling. Mount the anvil approximately 30” to 32” from the floor. Mine is mounted on a sand column to reduce the level of noise. This also gives me the option to either raise or lower its height by adding more or less sand. A magnet under the heel of the anvil reduces its resonance.

"Maintain a proper balance at the anvil by standing as straight as possible. Adjust your height by changing the spread of your feet. Assume a tai chi stance. Using your left hand as the director of operations, move your material under the hammer. Practice to bring both hands into a working partnership. Practice makes perfect.

"Keep your floor space clean and free of clutter, allowing you to move freely. Set up your project so you don’t have to use tongs. Keep as much of the parent stock as possible to allow for better handling control of your project. Check for hot metal with the back of your hand. It’s more sensitive than your palm. If the heat travels toward your hand, quench it down. Use Kevlar gloves if you need to. They can take up to 800 degrees of heat and can be pulled off quickly. Don’t use leather gloves. Leather has moisture in it and can heat shrink tight to your hands.

"Albert Paley attributes his life to the fact that he was wearing safety clothing at the time of a flash-fire accident from a propane torch leak. His safety precautions reduced his chance of serious injury.

"Wear hearing protection, side-shield safety glasses, a cap, safety shoes, any clothing that will protect your body. It’s well worth the effort."

The recipient of this year’s "Random Blacksmith Spouse Award" was Jeanette Hutchison, wife of the host of this event, Dave. It was presented by board member Nancy Zastrow.

Honored guests Antony and Marie Robinson hail from Schrewsby, England. Tony, whose grandfather was a blacksmith for the railroad, is primarily self-taught. He works with his son, Simon, forging almost entirely in stainless steel.

Antony Robinson, the United Kingdom’s stainless steel wizard,
June

14 Pennsylvania Artist Blacksmiths Association Hammer In with demonstrator Jerry Durnell. Kinzer, PA. Mark Zagursky 717/657-5795 or Keith Eckman 717/291-0214. E-mail: redd1@ptd.net

23-27 Rocky Mountain Smiths announces the third Francis Whitaker Memorial Master Class in Carbondale, Colorado. Instructor: Dorothy Stiegler. Contact Eric Harmon 303/989-2694 or eharmo@hrswater.com for details.

July

10-13 CANIRON IV at Hamilton, Ontario. Our website is www.caniron.com. We have demonstrators from across Canada, the U.S., and Great Britain. A warm welcome is extended to all to come "share our fire." For further information, contact Murray Lowe, 905/772-2474, fax 905/772-2475. Email: valleytownforge@aol.com. Website: www.caniron.com

18-20 4th Biennial Upper Midwest Regional Blacksmithing Conference with demonstrators Chuck Patrick, Clay Spencer and Kirk Sullens. Pontiac, IL. Contact Paul Sperbeck 262/544-0784 or e-mail: registrar@wi.rr.com. For conference information contact John or Lee Anne Biewer 847/746-2470, e-mail: leebiewer@sprintmail.com. See web site: www.umrbc.org.

August

6-10 Rocky Mountain Smiths Blacksmithing Conference at Francis Whitaker's forge on the CRMS campus in Carbondale, Colorado. Demonstrations will be given by Clay Spencer, Daryl Nelson, Mark Aspery, and Jay Burnham-Kidwell. Limited space is available. Contact the RSMS registrar for more information: Carl Pehaty, 12675 Kenosha Road, Erie, CO 303/828-0118. E-mail: cplehaty@ball.com

Aug 18-Sept 5 Blacksmithing class at the Turley Forge in Santa Fe NM. E-mail: teeweld@msn.com

September

5-7 Early American Wrought Iron Conference, Dover, DE. Mid-Atlantic Smiths Assn. Nick Vincent 410/848-7903 or e-mail: nickv adelphia.net.

5-7 Alabama Forge Council Fall Conference, at Tannehill State Park, McCalla, AL. Info from Allan Kress 256/775-1575 or E-mail: akress@bellsouth.net.

5-8 Dan Nauman's 7th Annual Bighorn Forge Conference. The featured smith will be Dorothy Stiegler. $50.00 (payable to Bighorn Forge) for the weekend. Mail check or for more info to Bighorn Forge Conference, 4190 Badger Rd., Kewaskum, WI 53040, or e-mail bighorn@alexsa.net

13-14 NTBA Hammerfest 2003 with Corrina Mensoff. Bridgeport, Texas. More information at the NTBA home page, http://www.flash.net/~dwwilson/ntba/. Registrations: Verl Underwood, 613 N. Bailey, Ft. Worth, TX 76107-1005; 817/626-5909, E-mail vaundre@aol.com


27 SIMS Conference with Tom Joyce. At SIU, Carbondale, IL. Registration 8 am, demo at 9, evening auction and lecture follow (auction donations appreciated). $25 pre-registration to SIMS: Allyn Bldg., Room 113, Carbondale, IL 62901. Amy Winkel 618/549-1746 or Angela Bubash 618/549-1672 for more information.

October

11-12 Blacksmithing workshop with Frank Turley, Saltfork Craftsmen, Guthrie, Oklahoma. Contact Mike George, E-mail: thegeorges@pldi.net

18-19 Appalachian Blacksmiths Association Fall Conference, Cedar Lakes Park, Ripley, West Virginia. This year's featured demonstrator will be Tal Harris of Waxah, North Carolina (Traditional Joinery). For more information visit the ABA website www.appaltree.net or contact Dave Allen, Editor, 304/624-7248 or E-mail: anvilwork@aol.com
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