The plans for this issue had included stake forming and inlay. Both of which will be (probably, that is) in the next issue. There were several excellent submissions that I chose to run instead. I'd like to thank Clay Spencer and Doug Hendrickson for the time they took in getting the information together for all of us.

If there is something you would like to contribute, please do. If there is something you would like to see, please say so. If you have a question, please ask it. I would very much like to get some information on colonial period motifs and related tool/process examples.

The Apprentices’ Notebook in this issue is used to review tooling that I described in previous issues. Several folks have asked questions about specifics from that section including one detailed letter that requested clarification on tooling.

This Journal is dedicated to tools and process. No gallery section, no politics, just "how to". As I have said before, the examples are usually traditional and European in style, but they are used to illustrate process that is generic in almost all cases. Take the tools, the process and your personal vision of a design vocabulary and run with it.

Italian Vise, circa 16th century.

1998 Conference Survey Postcard is in the envelope!!
The clock is ticking, the Conference seems to be the day after tomorrow for those of us working to pull together the many details and issues of the Asheville, NC event. One of the chief concerns is the amount of on-campus housing available for what is shaping up to be a well-attended conference. At present there are about 650 beds on site. Early registration will be important to have a shot at on-campus housing.

If you plan to attend and do not want to stay on campus then it is a very good idea to book your accommodations this fall. The Asheville area is one of the most popular tourist destinations on the east coast. Asheville recently received one of the "Top 10 American Cities" awards which raised its visibility even more. Due to the proximity of Smoky Mountains National Park, The Biltmore Estate as well as a wide variety of other vacation enticements, this area draws a large number of visitors in June. There are a large number of hotels, motels, bed & breakfasts as well as a lot of camping locally that is convenient to the conference site at UNCA (within 5 to 15 minutes of the site). It tends to get booked early so try to make your plans accordingly. This is one conference you will not want to miss!

The enclosed survey card is important. It is not pre-registration, it is a tool for the Conference staff to use to get a feel for your intentions and desires. We are planning tour and shuttle bus services, pre-conference events, housing and other aspects to make this a comfortable and enjoyable event as well as a dynamically educational one. If you intend to be in Asheville in 1998 please take a minute, fill out and mail the survey card as soon as you can!

Off Campus 1998 Conference Related EVENTS!

Albert Paley: The Blue Spiral, an Asheville art gallery, will host an exhibition of Contemporary Art-Metal work including the work of Albert Paley, Paige Davis, Rick Smith, Paula Gerrett and others from May 1 to July 11, 1998. There will be a "Special ABANA Reception" on June 18 that will be tied in with the 1998 Conference schedule.

The Asheville area is known for its support and appreciation of the arts and crafts.

Samuel Yellin: The Southern Highlands Craft Guild, an area crafts group, will host an exhibition of the historic work of Samuel Yellin. This exhibit will also include later work done under his son, Harvey Yellin, as well as the current forge work of Clare Yellin, granddaughter of the famous smith. It will be held in the gallery upstairs from the craft shop of the Southern Highlands Craft Guild store on the Blue Ridge Parkway near Asheville.

Next Deadline: September Out: November 1
Address all material for publication to: E-Mail: METALSMITH
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The Early Ironwork of Charleston

Alston Deas
Linder Publishing, Inc. Fresno, California
Reviewed by George Dixon

This definitive work on the ironwork of Charleston, South Carolina was first published in 1941. Alston Deas divided the book into three sections. The first deals with the origins of the style of work that graced Charleston from colonial days through the post Civil War period. The influence of British ornamental style is examined with some insight given to the question of why colonial ironwork lacks the embellishment of its European contemporaries. The impact of war, Revolution and Rebellion, had an effect on what remains to be seen in Charleston. For example the author documents the scrapping of architectural metalwork to serve, reworked, as the skin of ironclad ships of the Confederacy. This survey of the design and history serves as the introduction to the subsequent sections of the book.

Next, Deas opens a window into the shops forging the ironwork of early Charleston. This brief section includes period business notices and accounts of jobs over 200 years old. A feel for the life of an ornamental blacksmith, his work and sources of inspiration are found in these pages.

The final section of the book is a treasury of shaded and line drawings of various types of work from Charleston. There is dimensional information with many of these fine renderings. In the foreword, Deas accurately describes the illustrations as more art than architectural in nature. The line drawings that accompany many of the shaded drawings specify material sizes and sections while the shaded drawings are done to scale. In addition to the drawings themselves, there is a paragraph of description and the location of each selection of metalwork.

Fanlights, grilles, gates and rails in colonial and early American Charleston period styles are included in this profusely illustrated book. As either a historical reference or a period style book, The Early Ironwork of Charleston makes an excellent addition to your Blacksmith's Bookshelf. The Early Ironwork of Charleston can be ordered from Linden Publishing Company, Inc. at 3845 North Blackstone, Fresno, California 93726. TEL: 209-431-4736. Price: $19.95

Editor's Note:
I have received a couple of letters asking for some minor changes in the way The Hammers' Blow information is presented. They are both very reasonable requests and here to forth the concepts will be incorporated in this journal.

The first was a request that the book review section, The Blacksmith's Bookshelf, include the name of the publisher, the price, where to get the selection and the name of the reviewer. As seen above, this will be the format used.

The other letter asked for a similar identification of the source of articles in this journal. When they are submitted material I have listed the author / contributor as well as identified the source of submitted illustrations. I had left the balance unattributed with the assumption that they would be seen as being by the editor. Starting with this issue, all articles and illustrations (except clip-art) will have the source listed at the top of the page. That should clear up any confusion.

I am happy to get any submissions or illustrations as well as any sort of suggestions, concerns and criticisms the readership may wish to send in. Both of the letters referred to had the request that they not be published. Keep writing folks, this is your magazine!

Respectfully,
George Dixon, Editor
Shop Notes

Theforge, ABANA's E-Mail based informational round table generated the following inquires and responses from among its over 400 members. This growing service which is made possible by your support of ABANA's educational outreach efforts.

To join theforge send an e-mail to: listproc@wugate.wustl.edu and in the message put subscribe theforge and (your name). The parentheses around your name are important.

Question:
I'm building a new treadle hammer Some advocate using a solid anvil and others say it doesn't matter. Do you think the extra weight helps?
Matthew R Wills

Reply from Theforge:
I think treadle hammer anvils are pretty much like any other kind of anvil. More mass and more weight backing up the struck piece is better. I used a solid piece of 4" shafting.
Mike George

One of the Clay Spencer Treadle Hammering tapes discusses the matter of the ratio of hammer to anvil weight. A ratio of four or five to one seems to be a pretty good compromise between effectiveness and practical design.
Hal Holt

Question:
With regard to the push rod and its location on the foot treadle, does it matter if the push rod is located in the center of the foot treadle or placed forward just behind the anvil column? This is a matter of 3" to 4" horizontal movement along the foot treadle. What are the advantages/disadvantages regarding lower push rod location?
Ernie Dorrill III

Reply from Theforge:
The amount of movement of the rod (it is a pull rod) is proportional to the distance from where the treadle pivots. It affects how much the hammer travels. For light work it is not too important. To get the max work from a hammer stroke, the relationship on the treadle and on the link to which the upper end of the rod is attached are very important. Either one can be further or closer to the pivot point and affect the hammer force and length of arc traveled.
Clay Spencer

Question:
The following are comments and observations regarding treadle hammer safety. The treadle hammer is as close to an invaluable tool in the forge shop as there is today. But with the versatility of the treadle hammer comes the need to address safety in all respects.

Reply from Theforge:
Our shop is public, and a lot of people walk by. [To keep someone from accidentally hammering their hand..] We loosen the adjustment for the head, and let it slide down and rest on the base. Easy enough to crank back up before use.
David Hoopes

On my ABANA style treadle hammer I've got a rod that is bent in a hook that goes around the treadle and another hook on the other end that hooks on something in and or around the anvil area. If [someone accidentally] steps on the treadle, it will not go down. This is a Bob Walsh idea.
D L Mariette

My safety device is not idiot proof, but is handy and effective. I have a chunk of 4X4 that I slide under the treadle. Just takes a second to slide it out of the way with your foot when you are ready to use the hammer.
Keith Snook

My hammer is a Jere Kirkpatrick type from a kit. I used a pair of vise grips on the bar that pulls down the hammer (between the treadle and hammer mechanism) The vise grips, placed just above the anvil brace, locked up the hammer just fine. Much akin to the fabled monkey wrench thrown in to the works...
Dug Hays/Cash
Echo's of the 'Ring'

Samuel Yellin Square Knot
Originally printed in the September, 1975 issue of The Anvil's Ring (Volume 3, Number 2). It is by Larry Miller.
The Yellin examples that grace the page are from the June and September issues of The Anvil's Ring (Volume 7, Numbers 2 and 3) respectively and were originally submitted by Jack Andrews.

1) Bend the rod to a "U" shape with the parallel sides about 1" apart.

2) Using a 1" rod or pipe in the bend of the "U" squeeze the sides together (while hot) around the rod or pipe using a vise.

3) Bend the loop to the desired angle. Note: the sharper the angle and the smaller the hole in the loop - the tighter the finished knot will be.

4) Assemble the knot as illustrated and forge them to the desired tightness and width.

5) Straighten the completed section as it will make trueing up the finished product much easier.

6) Place the knot and tack weld the rods together at the ends. Note: An alternative to welding is to clamp or wire the rods together for the forge welding.

7) Heat the straight sections and twist tightly by putting the knot in vise and twisting with a pipe wrench. Note: It is desirable to protect the work by using copper in the jaws of the pipe wrench.

In addition to railing posts this might be good for table legs, pedestals, firetool stands or plant stands.
Motif:

Cold Chased Leaf

Stock: 1/8" sheet metal.
Tools: 1st and 2nd pass Butchers, Flatter, Curved and Straight chisel, elliptical section chasing tool.

Texture the 1/8" sheet metal by bringing the metal to a high forging heat in a coal forge. After a layer of scale appears, remove and brush the metal clean. Replace in the forge and take a second high heat. After a pronounced scale pattern has occurred, brush the cooling metal until it drops below scaling temperature. The last wire brushing will make the subsequent hand sanding much easier. Do not quench the metal, that both cinches the scale down and slightly hardens the plate which makes the cold chasing more difficult. This process will give the metal a marbled pattern that becomes apparent when it is hand sanded. Hand sanding comes after the processes that follow are completed.

For a more pronounced pattern, lightly forge the hot, scale covered surface with a crown-faced hammer. This drives the scale into the surface and makes for a more variegated surface when it is hand sanded, again, after all processes are completed.

Glue the paper pattern to the textured 1/8" sheet metal after it has cooled. Use chisels (or a jewelers saw) to cut the leaf blank out.

Take the first pass butcher (the steeper angled butcher of the standard two butcher set) and cut through the pattern to transfer the vein layout to the metal. The butcher should have its vertical face towards the vein.

Once the veins are incised, take the elliptical section chasing tool and stamp a scalloped border around the inside of the perimeter of the leaf blank. The first pass will establish the pattern to be followed in repeated developing passes. Be sure to pay attention to tool placement so the scallops blend seamlessly into the ends of the veins as they touch the perimeter of the leaf blank. Pay attention to where the back of the tool is to prevent marring the veins behind the tool as the scallops are developed by the front of the tool.
Alternate between the butchers, 1st and 2nd pass configurations, and the chasing tool to both set-down the metal along the veins and stamp in the scallop pattern to the same depth. That depth is about 3/32", which sounds slight but it takes a lot of force applied through repetitive passes to move cold metal with the control that an intricate pattern requires.

Once the pattern of veins and border is well established, use the same elliptical chasing tool to compress (chase) the cold metal in the 'field' bounded by veins and border down to the same depth everywhere. It takes some care to use a small tool to chase metal down to a common depth while avoiding irregular tool marks. There is a difference between tool effects that texture the surface and random, unequal marks that come from working too fast with too little attention to developing the effects. It takes some care to keep the finished surface even using a small tool. However, the smaller tool fits into the tight spaces between scallop and vein, plus a smaller tool face conducts the force of the driving blow more efficiently than a larger tool face.

After the entire surface inside the scalloped edge is chased down, take a small, square flatter and dress any rough areas as needed. In all cases of tool use be sure to keep continuous contact with the surface while moving and striking the tool. This not only minimizes the chance of setting the tool on an edge as it is struck, thus marring the effect, it also gives a smoother result than setting and striking the tool. See the Apprentices Notebook for a more detailed review of tool shape and use.

The last step in forming the leaf is to take a heat, place the leaf face down onto a block of hardwood and drive a ball tool or ball peen hammer into the back of the leaf. This forces the hot metal down into the wood which burns out under the tool pressure while the wood around the point of pressure supports the leaf. The result is a domed leaf form. One last heat is used to turn the tips of the leaf up in opposition to the down-thrust of the dome, giving the leaf some visual tension and grace. Hand sand and coat with a clear coating.

Perspective view showing the face of the tool.

Close up of the finished leaf. Curved chisel cuts are used to accent the indentations along the edge of the leaf.
A Review of tool shapes and applications.

In a recent E-mail, Ben J. Lobue asked a series of questions that made me consider revisiting these issues in an effort to clarify some concepts...

Ben began with:
"In the Hammer's Blow and watching your demonstrations at the Rocky Mountain Smiths Conference you suggest making slitting chisels, fullers, butchers etc. in incremental sizes with the same radiiuses...."

What I was trying to suggest is to make slitting chisels that have the same thickness but incremental widths. This common cutting edge thickness leaves incised lines that have the same visual line-weight. That is to say that they would all leave the same width line if struck to the same depth. For example, 3/16" wide, 3/8" wide and 1/2" wide chisels that are all similar in thickness would allow you to switch between them, as the pattern requires, and still maintain the same visual effect in incising as if a single tool was used.

Why switch between various straight chisels? The 1/2" wide chisel will cut a straight line, as will the 3/8" wide and 3/16" wide chisel. But the 3/8" wide and 3/16" wide, straight chisels will cut or incise progressively tighter curves. Having the same line-weight as they cut ever tighter curves allows one to cut a near infinite range of curves as well as various length straight lines while maintaining the visual width of the cut as a decorative constant (calligraphy with a chisel). This line weight in incising can be seen in pierced work as a constant bevel along the cut edge that you will not get if the chisels have varying thicknesses as you switch between them to accommodate the pattern. Visualize a set of chisels with a common wedge in vertical section compared to a set with varied vertical wedge sections....

Also... In cutting or incising intricate patterns one finds the need for varied length straight and curved cutting capacity. In some cases the curve is so tight that only a curved chisel will suffice, then make one appropriate to the patterns' demands. (Make all curved chisels symmetrical. Test in lead before heat treatment by rotating it as it is struck. A symmetrical curved chisel will cut a core-shaped plug, where as an asymmetrical curved chisel will ride out of its track and give a choppy cut when rotated). Otherwise, it is very handy to move from a straight cut into a range of broad curves using just the three sizes of straight chisels. This is true whether you incise into or cut completely through the metal. Intricate repousse' and pierced sheet metal patterns with areas cut out completely (negative spaces) often have various length short straight lines to cut as well.

Lastly on chisels, the cutting edge should be slightly crowned along its blade length, so the center just makes contact first with both ends of the blade rounded so the cutting edge continues up the side of the chisel for a distance. Chisels intended for deep slitting should have a cutting edge that extends up the side for about half of the thickness of the metal to be slit. The ideal cross section for a slitting or incising chisel is elliptical, like a canoe. If one was to make slices through a properly formed chisel there should be progressively narrower canoe shaped cross sections as you approach the actual blade. Why go through all of this for a chisel?..... When one cuts or incises a line, one should move the chisel forward about one half of the blade length per stroke. The cutting edge that runs from the center of the blade up the side of the chisel leads the cut cleanly. The radius on the corner makes a leading cut that is a diagonal to the plane of the metal being cut. This gives a visually clean effect (a tapered cut rising through the metal) at the end of a slit AND, since it is diagonal through the metal instead a vertical line, flexing is less likely to result in a crack. A saw cut split often cracks during flexing since it is vertical through the metal. The canoe or elliptical cross section has the effect of planishing the
lead cut mark as the thicker center is moved forward a half-chisel length per cut. (Do not get the center too thick or the wedge action will cause drag as well as wedging open the cut and tearing the metal). So, what happens is a lead cut followed by planishing action at the middle of the chisel as the lead cut is moved forward. You get cuts so clean that little or no filing is needed afterwards. Make each cutting process a series of passes, do not force the tool through the material if you want a smooth result.

Curved and straight chisel sizes, shown full size.

What increments or sizes would you recommend for a basic set of tools, and would the sizes be the same for each tool type? Since 1/4" stock for a 1/4" tool would not stand up to a treadle or hand hammer what size stock do you recommend?

The chisels sizes above plus:
1) Butchers in 1/8", 1/4" and 1/2" width (First and second pass as a set. First pass butchers are steeper in angle back from the vertical face, second pass about half as steep, about 45 degrees and 30 degrees respectively)

1st pass butcher.  
2nd pass butcher.  
Butcher front view.

2) Flatters in 1/8" square, 1/4" square 3/8" square, 1/2" square...all with a slightly crowned face and less than sharp edges.

End-view of flatters shown full size.
3) Ball end tools that are in sets, one half-round and one elliptical face per size in every size of tool steel stock I find. Start with 1/8" round, then 5/16", 3/8", 1/2", 5/8", 3/4" and 1".

4) Chasing tools have work faces that can range all over the map. Start with oval and rectangular faces, slightly crowned in sizes similar to those cited above. Ball end tools are also used in chasing.

5) Teardrop flatters or 'shoes'. These have a teardrop shaped perimeter to the working face that is slightly crowned in some while others with the same 'foot print' are dead flat. Both types have slightly rounded edges. These tools range in size from 3/16" from point to heel up to 1/2" in several increments and the width at the heel ranges from 1/8" to 3/8" wide.

6) Fullers; there is the fuller shape most are familiar with, the most common one is a tapered wedge that ends in various half-rounds or elliptical working faces. The sides are somewhat squared off. This configuration is intended to span the material to be fulleried. For repousse' and chasing, a fuller that has the ends tapered and rounded with a slight crown along the work face is better. This blunt version of a chisel, with less of a canoe-like section, allows conventional fullering, set and strike...but it also allows the tool to slide a half-tool length per strike so as to leave a fulleried line that has no tool marks. Conventional fuller shapes tend to dig in at the ends if they are not held perfectly vertical.
I heat treat all of my tools full length save about 1/2" at the end so they do not spall when struck. Full length heat treatment allows a 1/4" W-1 (water hardening drill rod) tool, for example, to survive treadle hammer work all day long. Although I use 1/2" round S1 for all of my chisels and butchers, due to the heat resistant properties that are needed for thin bladed tools (I use all of my tools in either hot or cold work without regard to tool steel. All work is laid out then marked cold with the tool to be used in the subsequent process, either hot or cold), many of my chasing (repoussé') tools are either 1/4", 5/16" or 3/8" round W-1. Due to the mass of their blunt working ends (small flatters, ball shapes which are half-round and elliptical faced in every size I can find, oval and rectangular faced, all with a slightly crowned work surface), W-1 is OK for chasing tools smaller than 1/2" diameter.

One point to make in this tool explanation; although I am describing tools that may seem somewhat small, my scale of work ranges from very small to large. A small tool is more versatile, it fits into more spaces and a small tool transfers more energy from the hammer (hand or treadle) to the work face due to its small footprint. This really matters in deep cold chasing. The shapes are more generic than specific in that there are very few that give a single effect. This also allows more versatility of work. My choice of work is period European motifs, which means an huge range of patterns and shapes. The generic, small tool approach allows a smaller set of tools to do a wider range of work in a wider range of sizes than any other approach I have encountered.

Do you use a few standard sizes and forge the business end to smaller sizes or do you make them both smaller and larger from the same size stock? So for instance do you use 3/8" stock for sizes 3/8 and smaller, less than 3/8, or greater than 3/8 by spreading the end?

As alluded to above, there are certain cases as well as availability of tool steel that makes it necessary to draw down some stock, 1/2" round S1 for a 3/16" wide chisel blade for example. But for the most part, tools that are blunt as opposed to chisels (straight and curved) and butchers, are made out of stock close to the size needed for the working end.

To use these tools: There is a specific action used in applying tool to metal. Although there are plenty of times that a tool is set and struck as a single operation, most application of tooling to metal (hot or cold) involves setting the tool and maintaining continuous contact (as opposed to set and strike, set and strike) while striking and dragging the working end along the layout. The crowned faces of the tools makes it easier to drag the tool, again- one half tool width per blow- without lifting and setting it per strike. This dragging or continuous contact approach gives a much smoother effect to whatever tool process one is applying. Cutting, chasing, incising etc. are all made much cleaner this way. There is also less chance of a miss-strike. When one lifts the tool and sets it anew with every strike it is easy to set it off and strike it anyway due to the rhythm that develops. So set the tool on the layout or previous pass, and with a rocking and dragging motion..drag and strike. This applies to either hand or treadle hammer driven tooling.

If you decide to make these or any kind of tools, pay very close attention to the details of form, edge, radius and finish (polish the working end like a mirror - less friction as it moves across or through the metal). This attention to the tool will help you refine it if it does not work like you think it should. The difference between a tool that works REAL WELL and one that does not is often very subtle. Those subtleties will not be apparent without trial and error and attention paid to the result of every nuance of modification.
Product Review

3M Scotch-Brite
Article by George Dixon
Illustration by 3M

Finishing and finish preparation in metal work projects not only takes a lot of time, it can make the difference in how you or your client respond to the work. Almost every coating for metal requires some surface preparation prior to application. While painting often calls for sandblasting and multiple coats of primer followed by paint, most non-ferrous finishes call for a more delicate preparation. In addition there is a similar need for a more controlled and localized surface preparation in hand-finished ironwork that is clear coated for interior settings.

One approach to bronze patination is to pickle, chemically clean, the bronze first. This leaves a matte surface which needs to be polished. The surface can be cleaned directly without the chemical process of pickling, although this is a slower approach, using mild abrasives. Scotch-Brite can be used in either approach, direct cleaning or after a pickling operation.

Scotch-Brite replaces steel wool, buffing compounds, wire wheels and brushes and, to a certain extent, sand paper with a product that is easy to use, versatile and effective. Unlike steel wool, there are none of the shredded metal fines as you work. It does not leave the residue buildup that buffing compounds can nor does it leave the striations (scratch marks) so often associated with sand paper. Used with power tools, it does not fling the wire stubs that make wire wheels dangerous.

Scotch-Brite is usually sold in some form of a pad, or disk. The hand application pad can either be backed in a holder for even pressure on a surface or used free hand to get into undulating surfaces. The Roloc Disks that fit into die grinders and even hand drills are great for surface cleaning and prep for finishes. Like sand papers and steel Wool, Scotch-Brite is available in varied grits. Some experimentation on test scraps of forged steel, bronze or copper is a good idea until you are familiar with the results of a given grit. Depending on the surface softness of a metal, various grits of Scotch-Brite will leave either some striations or none at all. There are finish effects that call for striations (fine scratches usually running in one direction only) such as a matte finish. Striations break up surface reflectivity, hence the matte result. So again, check the grit chosen out on a scrap of the project material before you start to finish, it is easy to switch grits. Scotch Brite comes in grit ranges that are color coded. Maroon and Light Gray are fairly fine, though Maroon will leave fine striations on bronze. After a patina has colored the bronze, using a Maroon or Light Gray Scotch-Brite pad to high-light the metal is a great effect. High-lighting is where an abrasive is used to buff the surface of a patinaed material to remove patina in a controlled manner to varying degrees. The low areas (incising, hammer marks) are untouched while the high areas polish up lighter. The resulting contrast is a great effect.

Hand finishes on forged steel are another place Scotch-Brite works well. In one style of finish Scotch-Brite is used in conjunction with other products. After the forgework is done and it is at the clean up stage of the job, use Roloc SE Surface Conditioning Discs to remove the scale and to expose the metal surface. Depending on how aggressively you use this approach it is possible to get a range of surface color from dark clean metal to a silver polish on steel. The hammered texture is not removed as would be the case with sanding disks. The best effect is to stop between black and silver so that a variegated pewter and dark gray surface results. This is further accented by hand rubbing with Red or Green Scotch-Brite until the desired mottled coloration is achieved. Surface conditioning pads also soften edges, giving the ironwork a 'visual warmth'.

All of this can be done with wire wheels and sand paper, but you have more control and a safer work situation with the Scotch-Brite. The range of backing pads for power applications and the range of grits for both power and hand application make Scotch-Brite one of the most versatile shop finishing tools. Scotch-Brite can also be used to apply patinas. Use a series of tests to determine what surface effect you want then use the appropriate grit (color) of Scotch-Brite to apply a patina with. The slight to severe abrasive action you select will accelerate patination as it rubs the metal surface.
Product Review

Product: Scotch-Brite Hand Pads

In shop tests the two colors, Maroon (7447) and Light Gray (7448) were tried. The literature I received covered safety aspects mostly as a point of comparative advantage over competitive types of products such as wire wheels. When using any abrasive a respirator should be used as should safety glasses.

I cut several pieces of naval bronze sheet (16g) and annealed them with a torch to oxidize the surface so that they needed to be cleaned as a prep for patinas. One was pickled in a commercial chemical cleaner using Scotch-Brite 7447 to rub the wet surface. The cleaning process went very fast. The other sample of bronze was hand cleaned dry using just the 7447 (Maroon) Scotch-Brite. The cleanup was somewhat slower as one would expect but it had the advantage that no chemicals were required. In both cases the Scotch-Brite held up well and in the case of the pickle test, it went where no steel wool could have.

Product Rating: 3

Product: Scotch-Brite Hand Pads

In shop tests the two colors, Maroon (7447) and Light Gray (7448) were tried again in a different application.

A piece of mild steel (5/8" x 5/8") about a foot long was forged through two bright yellow cycles, wire brushed hot to remove excess scale and allowed to cool. It was then hand sanded using sand paper. The test was to see how Scotch-Brite dealt with sanding striations as a final clean up tool.

After the sanding had removed the scale, leaving a striated but nice looking bar with variegated gray and silver natural coloration, the Maroon Scotch-Brite was used by hand to even out the surface effects and polish out the sand paper striations. It left a smooth surface with a soft luster, ideal for a clear coat finish.

Product rating: 3

Product: Scotch-Brite Pads and Roloc Discs

Manufacturer: 3M

Contact: Eric Beck (Sales Representative) 800-905-5639

Product: Scotch-Brite Roloc SE Surface Conditioning Discs

These are strictly a power tool abrasive. The Roloc system is a fast change, twist and seat, way to use Scotch-Brite in clean up applications. The two colors used were Maroon and Brown. The system requires a backing pad that stems into your drill or die grinder. Do not exceed the RPM maximums stated in the literature that you should request when you first purchase this product.

The "SE" line of the Roloc system is for more aggressive applications. What I wanted was to remove forged scale from A36 mild steel as a preparatory step for applying a clear coat for interior architectural use. This does the trick. The Brown (Grade A CRS) is aggressive enough to take forged iron, cool but otherwise direct from the coal or gas, down to pewter colored variegated natural steel without knocking off the hammered textures. A sanding disk does the cleaning but it also removes the character of the forged metal, the Brown Roloc disc did an excellent job. I used it on a Metabo variable speed die grinder. The work was clamped so the surface being conditioned was above the vise jaws and ran the tool at '6' out of a setting range of 1 to 9.

I followed this with a pass using the Maroon disc (2" diameter discs) at the same speed...I have never been a fan of 10,000+ rpm and the variable speed die grinder is the solution to TOO FAST! The Maroon second pass softened the look, gave the surface a slightly more polished luster. The Brown alone was sufficient, the Brown followed by Maroon was excellent. Then it was ready to wipe down and clear coat.

Product rating: 3+

Summary: For both preparation of surfaces to be patinaed and for surface cleaning as a step prior to clear coating, Scotch-Brite by 3M worked very well. There was consistency of quality throughout the range of samples tested. I also compared the samples to some Scotch-Brite I had in stock since 1992 and found it to be consistent in manufacture. Scotch-Brite is available at most hardware or industrial supply outlets. It can also be ordered direct as shown above.
Forge a Ring

Article: Doug Hendickson
Illustrations: George Dixon

Francis Whitaker will again do a "Ring Project" for the educational benefit of those attending the 1998 ABANA Conference and the financial benefit of ABANA as the finished grille will be auctioned off at the conference. The design of the project dictates that the rings must be made from 1/4" X 1" steel flat bar stock, edge bent (bend it the hard way) to form a 10" outside diameter (OD) ring. As in past projects, the design of the interior space is up to the individuals making the ring, it can be either contemporary or traditional in motif. {Editors Note: To reiterate the joinery specifications for this project; all rings must be joined using traditional blacksmith processes. The only joinery that would exclude a ring would be either electric or fuel-gas joinery}.

This article addresses the problem of calculating and forming a ring to specs. This example will use the specs of the "Ring Project".

In the Spring of 1997 two mighty smiths met in western New York state to discuss and ultimately forge 10" rings. The only bone of contention between the two was how to calculate how much stock was needed to get the job done.

Smith A's formula was to multiply 3.14 (Pi) times the diameter of the ring at the centerline. Smith B used the same formula but also added two times the thickness. Smith B's stock was 1/2" longer than the stock of Smith A.

\[
\begin{align*}
A's & \quad 3.14 \times 9'' = 28.26'' (28 \ 1/4'') \\
B's & \quad 3.14 \times 9'' = 28.26'' (28 \ 1/4'') \text{ then add thickness times two...} \\
& \quad 28.26 + .5 = 28.76'' (28 \ 3/4'')
\end{align*}
\]

After each smith had formed, forge welded and trued up his ring on a cone mandrill the resultant rings were measured. Smith A's ring was 9 15/16" outside diameter, Smith B's ring was 10" exactly. Smith A could have stretched the ring slightly, cold, on the mandrill and achieved the 10" outside diameter and Smith B's ring, though 10" was more than 1/4" thick at the lap. You have the results, now you decide which approach works best for you.
With soapstone, draw a 10" circle to use as a guide. Cut the stock to the proper length, upset and scarf.

Turn the ring using a rounding hammer on the inside.

Turn the ends first, check the radius with the soapstone drawing.

Editors Note: The content of the ring, that which you design to fill the empty space inside of the ring, can be either traditional or contemporary in motif. Use your imagination. All rings will be displayed during the opening ceremony at the 1998 Conference in Asheville, NC.

Close the ring. Forsgeweld and true up on a cone.

Wear Your Safety Glasses
Treadle Hammer Perspectives

Article & Illustrations: Clay Spencer

The treadle hammer is a useful and versatile helper for the blacksmith. It replaces the striker of old when labor costs were low and blacksmith's sons were more available to help in the shop. It has its capabilities and limitations—it strikes straight blows, but only straight blows and you have to furnish all the energy. It is an extension of the smith to give him more hands and allows him to use other larger muscles besides his arm.

We are the result of our experiences. I came into blacksmithing from years of a more or less machining background. I love tools and making tools. When I saw the original ABANA plans for the treadle hammer, as a design engineer, I immediately started redesigning and came up with my revision. I built my first hammer in December of 1986 and then took my first blacksmithing class in early 1987. So, when any blacksmithing task is before me, my first thought is how can I use a treadle hammer or make a tool for this job to use in the treadle hammer.

The treadle hammer is useful for light taps such as you could make with a small hammer if you had enough hands to hold the work and the tool and then hit it with the hammer. It can also hit with blows much mightier than you can with the largest sledge you can handle. One advantage over a striker is the better communication, you only have to tell your leg when and how hard to hit.

With tools installed in the treadle hammer hammer and anvil, it is capable of drawing and forging large, tough alloys or making many delicate, decorative effects. You can quickly change top and bottom tools, sometimes in the same heat, to go from one shape to the next.

The primary mounted top and bottom tools are round fullers, butchers to isolate tenons or step down stock, flat dies as flatters, flat stakes which act same as flat dies in a power hammer, sloped, flat dies for tapered shapes such chisel points or blade shapes, texturing dies to give a bark effect or other special textures. In many instances, the top and bottom mounted tools will be complimentary shapes, different shapes or different diameters. Less frequently used are top and bottom mounted swages. When you have mounted tools, you must have a way to line up the top and bottom tools. This requires the hammers have heads to be adjusted vertically so the tools will be aligned.
Treadle Hammer Perspectives

Many of the bottom tools are used with hand held top tools. Examples are bending in a V-block or over two rounds, bending flower shapes, dishing, cupping or shaping over a tool and lead or wood block. Most of the tools used in this fashion require or allow multiple blows at different locations on top of the work. Shovel blanks may be made in a few blows with mating dies.

Tools which are used at the anvil with a striker are very adaptable to the treadle hammer. Guillotine tools (smithing magician), swing fullers and special tools such as one with multiple stations for making straight or angled tenons in one heat are better used in a treadle hammer vs. power hammer, by hand or with a striker.

Most all the standard blacksmith handled tools, top or bottom tools, spring swages or fullers and power hammer tools will work with the treadle hammer.

The control you have with a treadle hammer (after you learn to dance on one foot) allows you to do better work carving, cutting, punching, stamping and forging decorative effects. The straight blows only is an advantage and disadvantage. You always know where it is coming from and where it will hit but sometimes you want the tool to be at an angle to the work. If you try to hold the tool at an angle, it will kick out from the hammer—be careful, it could hurt you or damage the work. Many times you can tilt or angle the work in a swage or V-block or you can make a jig to hold the piece at the desired angle. Or you can make a tool with a wide head and it may be angled somewhat.

"As with any mechanical equipment, there is potential for injury to humans who do not take proper cautions."

As with any mechanical equipment, there is potential for injury to humans who do not take proper cautions. My own broken fingers were the result of using material too thin for the load applied to it on one of the first hammers I made. I use top tools with a wood or steel handle. Ball peen hammers are a favorite as they are readily available at a reasonable cost, are made of excellent steel, are about the same size and have a handle hole already in. After forging any tool you should normalize or anneal it before quenching and tempering. I have good result by quenching in (warm) water and tempering to blue.

A treadle hammer can be used in your shop to make you more efficient and increase your capabilities but first you must build one and make the tools to use with it.
Wrapped Joint

Article & Illustrations: George Dixon

Stock: 1/2" X 1/2" mild steel.

Take a heat on the end of the bar. Set it onto the anvil as shown so that about 3/4" protrudes onto the surface. Holding down hard, drive the stock down, with the hammer face over anvil and space so that a shoulder is established. The edge of the anvil should be somewhat sharp where you chose to do this effect.

The shoulder should be about 3/8" deep. Draw out the offset stock in a long taper. Maintain the 1/2" width of the parent bar as the taper is forged.

The jig shown makes the next bends far easier and if there are more than a few to do, more similar in result.

Use a piece of 2"x 2" or 3" x 3" angle iron. The opposite leg from the surface the jig occupies will set into a vise for clamping during use. Cut a 2" long piece of bar stock the size that is to be wrapped by the taper. in this example that is 1/2" square bar. Drill the bar as shown. Use that drilled bar as the template to drill the angle iron. Once both are drilled as shown, use two rivets, 3/16" diameter, and seat the bar on the angle iron. Scribe a line into the face of the angle iron at a right angle from the riveted bar to serve as a visual guide for orienting the tapered bars as they are bent.

Clamp the riveted jig in the vise. Take a heat on the tapered end of the 1/2" bar, set the shoulder against the riveted bar, taper up and aligned by the scribe mark. Hold down hard and hammer the two bends as shown.

The resulting cupped recess will now take a bar the size of the one chosen for the riveted bar in the jig. Take a heat on the recessed end of the tapered bar, set such bar stock as the effect calls for into the recess and forge the remaining taper over, thus closing around (wrapping) that bar firmly.
KA-75 Hammers: New KA-75 air powered striking hammers. 75lb ram, 12" stroke, 2 1/2" X 5" Dies. $3850 Video available, contact: Bob Bergman 608-527-2494

Kayne & Son Custom Hardware: Air hammer: "Old Blue" Air Hammer. 75lb ram, rugged frame, large tool steel dies - $3395.00 Also... hammers, tongs, fullers, flatters, cutters, chisels, punches, swages & blocks, cones, firepots, hand vises, pliers, coal, fluxes and more. The finest 'smithing tools in the world. Tool list available on request. We ship and accept Visa & Mastercard. Steve Kayne, 100 Daniel Ridge Road, Candler, NC 28715. (704) 667-8868 or 665-1988 or fax 704-665-8303. Email: kaynehdwe@ioa.com

Heavy duty frying pan blanks: steel, approximately 9" in diameter with 2" sides. 12 gauge thickness. Available with or without two 3/16" diameter holes for handles. $7.75 each; $7.00 for 5 to 9; $6.00 for 10 or more. Shipping $2.50 plus $.50 for each pan. Contact: Bob Tuftee, 3855 Aspen Hills drive, Bettendorf, IA 52722.

Fold-Forming: Papers and video now available. Fold-forming was recently demonstrated at the 1996 ABANA Conference. This new process, invented by Charles Lewton-Brain, is a series of techniques which allow rapid development of three dimensional surfaces in thick sheet using simple tools.

Introduction to Fold-forming $15.50, Fold-forming Introduction video $23.50. Add $3.00 for shipping. Brian Press  Box 1624, Ste M, Calgary, Alberta, T2P 2L7, Canada 403-263-3955 Email brainet@cadvision.com

Life-time Collection of Blacksmith Tools: October 4&5, 9:00 AM.
All proceeds go to complete the Ozark School of Blacksmithing. Contact Tom Clark 573-438-4725

3 Little Giant Power Hammers, 200 hammers and top tools, 10 anvils, 325 blacksmith tongs, Treadle Hammers, 10 blacksmith post vices, Swage blocks, Drill press, 2 #10 Edwards shears, 2 Gas forges, Fire brick, Oxy-Acet torch set, Lincoln welder, Champion forge, Champion blowers, Tire benders, Line shaft drives, Machinist vice, 5hp Air compressor, Welding table, Forge side hammer, Tong racks, Portable forges, 3 Tons of steel to be sold in 300lb lots, Angle head grinder, 3ph Shop air cleaner, 3ph Double head grinder on cast iron stand. Bar stock bench shears, electric motors, Pedal powered grind stone, Tandem axle portable blacksmith shop with forge, anvil and tools, Bearings and pillow blocks, plus cast iron kettles, copper candy kettles and lots more.

Reward: $250.00 finders fee for information, location etc. of a Nazel 2B or 3B that leads to the purchase of that power hammer. Contact: Robert Triplett 704-488-3883

The ABANA Internet Address is: http://wuarchive.wustl.edu/edu/arts/blacksmithing/ABANA/
or http://sunsite.unc.edu/abana/

The ABANA Traveling Teaching Station is now available. It contains 10 forges, 5 anvils several post vices as well as fire tending and hand tools.

Any ABANA Chapter may schedule this trailer for their Chapter hammer-in or workshop. For details contact: Lou Mueller, 314-225-3252
Conferences & Events

**National Ornamental Metal Museum**
Heikki Seppa: A Retrospective
September 21 - November 16, 1997
Seppa is best known for a process called anticlastic raising, a variant of traditional raising in which an upward curve is created on one axis, countered by an opposite curve in another. A large selection of his work will be exhibited during this time.

**Guild of Metalsmiths Fall Conference.**
September 26th, 27th, 28th.
See the Guild Website:  [www.metalismith.org](http://www.metalismith.org)
Washington County Fairgrounds, Stillwater, Minn.
Ivan Bailey and Robb Gunter.
Camping on site available.
Three open forging stations overseen and instruction by Tom Latane.

**Southern Ohio Forge & Anvil**
Quad State 97
September 26 - 28, 1997
Miami County Fair Grounds, Troy, Ohio
Mike Bendele, Bill Fiorini, Dereck Glaser, Dorothy Stiegler, Brad Weber

**Louisiana Metalmiths Association**
Banging on the Bayou IV
October 4 - 5, 1997
Covington, LA
Peter Ross

**Northeast Blacksmiths Association (New York)**
1997 Fall Hammer-In at Ashokan
October 4 - 5, 1997
Ashokan Field Campus, Olivebridge, NY 12461
Clay Spencer

**Ocmulgee Blacksmith Guild**
Annual Bladesmith Meeting
October 4-5, 1997
Ed Halligan's Shop, Sharpsburg, GA
Bill Moore, Donnie Fulwood and Ed Halligan

**Wear Your Safety Glasses**

**Conner Prairie's Eighth Annual Arms Making Workshop**
October 10-12, 1997
Hershel House, Bruce LePage, Don Getz, Jim Chambers and many others. 1-800-966-1836

**Appalachian Blacksmiths Association Fall Conference**
October 11 - 12, 1997
Cedar Lakes State Park, Ripley, WV
Fred Crist

**First Biennial Upper Midwest Blacksmith Conference**
October 11 - 12, 1997
Thresherman Reunion Grounds, Pontiac, IL
George Dixon, Peter Renzetti, David Stasiak

**Florida Artist Blacksmith Association Annual Conference**
October 11 - 12, 1997
Pioneer Art Settlement, Barberville, FL
Elmer Roush and Clay Spencer
Conference Coordinator Gilbert Knapp, gilknapp@worldnet.att.net,

**National Ornamental Metal Museum**
Repair Days Weekend - "We fix anything but cats, cars and broken hearts."
October 17-19 in the smithy and on the grounds at 374 Metal Museum Drive, Memphis, TN.
Contact: Judy Wallace 901-774-6380

**Prairie Blacksmith's (Nebraska) Fall Meeting**
November 8, 1997
Joe Pehoske
Stuhr Museum, Grand Island Nebraska.
Contact: Dick Nietfeld 229 East Ashton Ave, Grand Island, Nebraska 68801

To join The Artist-Blacksmith's Association of North America, and get The Anvil's Ring and The Hammers' Blow, call 314-390-2133.