

SOFA SOUNDS

JUNE/JULY 1986



SOFA
SOUTHERN OHIO FORGE & ANVIL

Artist-Blacksmiths Association of North America

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NEWSLETTER EDITOR:

Ken Scharabok (513-252-3001)

MARK YOUR CALENDAR:

Unless otherwise indicated, all meetings will be held at the Studebaker Homestead on Rt. 202, four miles north of I-70. Guests and the public are invited. Bring items and tools you have made for display. Donation of items for the newsletter raffle are always welcome. Please don't park on the grass, there is plenty of parking around the production buildings, but please don't block driveways or interfere with plant operations.

June 14th, 1 PM

BUSINESS MEETING followed by a double program. Steve Roth will give a presentation on "Elements in Design in Everyday Blacksmithing" followed by a demonstration on making spoons by Terry Garman. **NOTE THIS IS THE SECOND SATURDAY.**

June 21st, 9 AM

Work on the homestead gate. Bring your favorite forging hammer. Lunch (hot dogs and beans) will be provided by SOFA.

July 12th, 1 PM

BUSINESS MEETING followed by a horseshoeing demonstration by Dave MacDonald. Dave will forge a shoe out of barstock and then reset the shoes using factory shoes. Note that this is the second Saturday due to the holiday.

July 19th, 9 AM

Work on the homestead gate as required. See entry for 6/14.

July 19th, 9 AM

Joint meeting between SOFA and the Northwest Ohio Blacksmiths Ass'n at the home of Ed Hulihan, 6311 TH 80, Mt. Blanchard, OH - 419-694-7941 (near Lima/Findlay). Contact Ed for directions. Bring a portable forge, project and/or potluck lunch item.

August 2nd, 1 PM

BUSINESS MEETING followed by a workshop lead by Ron Thompson on making an old-fashion beaver trap. Teams will make the parts.

August 13th - 17th

1986 ABANA National Conference at Flagstaff, AZ. Plan your family vacation around this event at it should be GREAT!

September 6th, 1 PM

BUSINESS MEETING followed by a demonstration on making tenons by Hans Peot. Hans will demonstrate several methods.

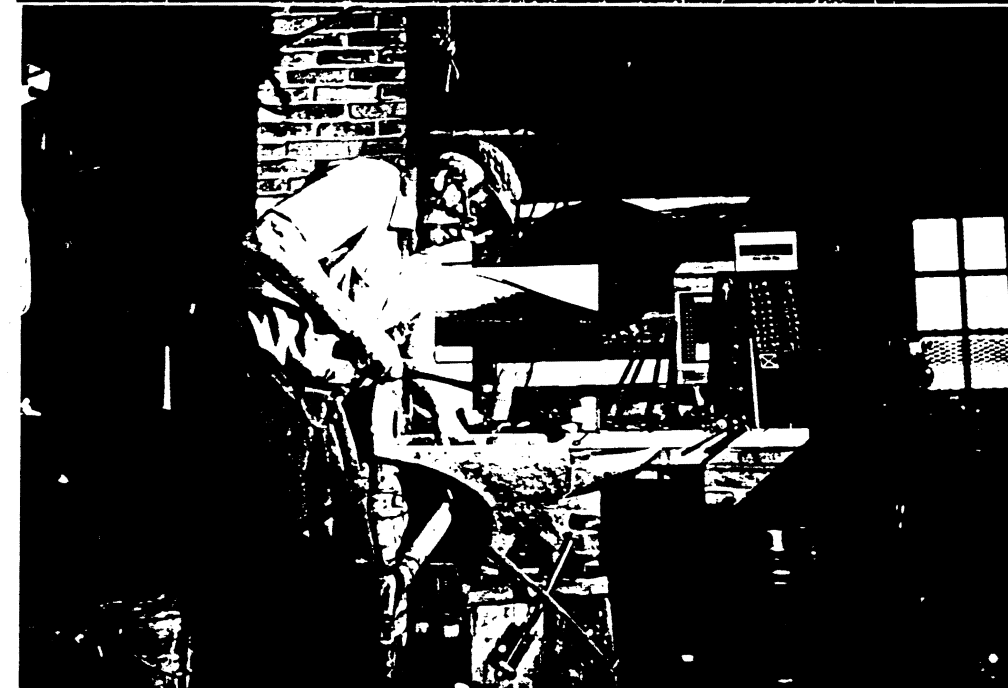
September 13th, 9 AM

Work on the homestead gate as required. See entry for 6/14.

September 27th - 28th

1986 Quad-State Blacksmithing Round-Up. See write-up elsewhere in newsletter. Should be an interesting conference.

Creative & Friendly



WHITAKER GATE WORKSHOP: Upper Left - Completed Flood Memorial Gate (see description elsewhere in newsletter), Upper Right - Center details. Dayton would be several times larger now. Lower Left - Dr. Whitaker at work. Couldn't find out who the math lesson on the board was for. Lower Right - The crew: (left to right) Steve Roth (designer), Hans Peot, Emmert Studebaker, Ham Hammond, Scott Larkton (Ann Arbor, MI), Randy Oberg (Cohasset, MN), Dr. Carl Van Arnam (Gainesville, FL) (kneeling), Francis Whitaker, Dave MacDonald, Danny O'Brien (Tipton, IN), Dave Hartman, Duane Wegleg and Dave Brenkel.

MEETING NOTES:

At the April 5th Board of Directors/business meeting, the following items were discussed:

- Don Witzler is organizing a blacksmithing group in the Toledo area. Their first event will be on May 17-18. See details elsewhere in the newsletter. A letter of support for this effort will be sent by SOFA.

- The ABANA national office is contacting the national Boy Scout headquarters to try to reactivate a merit badge in blacksmithing.

- The Treasurer gave a brief third quarter financial report. Essentially the group is breaking even with income matching expenditures, excluding funds placed in our building contingency fund.

- The demonstrators have been lined up for the Quad-State Blacksmithing Round-Up on Sept. 27-28. Beau Hickory (From Arizona) will demonstrate ornamental ironwork on Saturday and on Sunday morning. Sunday afternoon he will head a scroll workshop in which participants will make a scroll under his guidance. Our own Dick Franklin will be demonstrating basic blacksmithing on Saturday. Terry Carson and Darrel Nelson (from Washington State) will be repeating their program from the 1984 ABANA National Conference in making life-like animal heads and a three hour garden-type gate. Animal heads will be on Saturday and Sunday mornings and the gate on Saturday afternoon. Al Pendray (from Florida) will be demonstrating a Damascus-pattern knife blade on Sunday while discussing his cast Damascus process (how they really use to do it). On Sunday afternoon our own Ron Thompson will demonstrate sand casting (see the last issue of the newsletter). We believe we succeeded in making your demonstration watching choice difficult again this year. We will also have a full program for spouses featuring presentations on topics such as family and small business financial planning. Except for lining up volunteer workers, the Round-Up has been pretty well finalized. However, suggestions for improvement from the membership are always welcome. Complaints are accepted from 2400-0000 (military time).

- The Sixth Annual Laura Old Fashion Weekend will be July 25-27. They will have an area set aside to demonstrate, display and sell crafts. For further info contact Lori Todd at 513-947-1031.

- Marsha Nelson is organizing a blacksmithing group in the Kentucky area (they are springing up all over). For further info contact her at 613 Third St., Silver Grove, KY 41085.

The raffle brought in an additional \$63.00 to support the newsletter. Englewood member Steve Roth won the anvil pick make at the last meeting by Hans Peot and Larry Wood. Your Editor won the scroll starter/bick made at the last meeting by Hans Peot. Kettering member Ham Hammond won a copy of Richardson's book Practical Blacksmithing donated by Spring Valley member William Flectenstein. Silver Grove, KY member Marsha Nelson won a length of 1/4" brass rod (for making brass rivets) donated by William Flectenstein. Lima member Bud Rolston won an either/or railroad spike horse-holder or door knocker make and donated by the Editor. Tipp City member Emmert Studebaker won three tomahawk handles donated by Steve Roth and Joe Abele. Rushsylvania member Ralph Van Buskirk won a shovel pan made and donated by Emmert Studebaker (matches the one his son won last meeting). Several other members also won either magnets (donated by William Flectenstein) or a comical blacksmith shop hours sign.

Following the business meeting Emmert Studebaker (with assistance from Ron Thompson and a couple others) made a Gordian Knot (also known as the Clayton Knot since the

English blacksmith who developed it lives in Clayton, England). The knot is named after the Knot solved by Alexander the Great by slicing through it with his sword. Emmert commented that, even though Alexander the Great could neither read nor write, he founded the Great Library at Alexandria, Egypt (in which most of ancient written history was lost when it burned down later).

My first inclination on this knot was to say "if you weren't there to see it done, tough!!, since it is more than a little bit complicated to describe in the newsletter. However, here's an attempt at it. I'll comment in advance that the secret of the knot is in how to interweave the sixth strand without needing three hands.

Emmert started with six pieces of 7/32" rod 12" long. He used a gig to bend them in the shape illustrated at (1) while cold. The gig and handles look like Illustrations 2 and 3. The dotted lines in Illustration 2 are marks to let Emmert know when to stop bending. The gig had a bottom plate to hold it in the leg vice. He commented that on this knot, 3/16" rod seemed too thin and 1/4" too thick, so he prefers using 7/32" welding rods. Note that the center section is not straight across but rather bent a little to help hold the pieces together. Emmert center marked the rods to know where to place them in the gig.

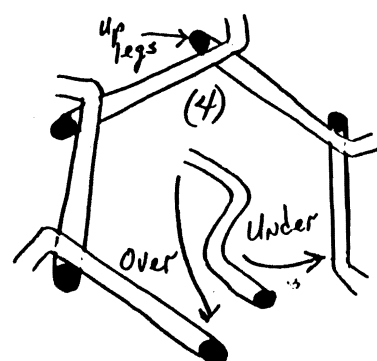
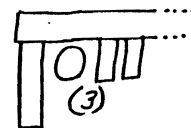
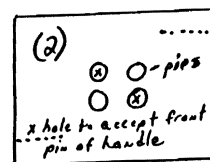
Here comes the hard part! Emmert started the knot by crossing one rod over another at the saddle, then a third over the second, fourth over the third, and fifth over the fourth. To tie the sixth rod to the first, it is inserted downward under the bend in the first rod and then raised upward to lock the sixth rod to the first, completing the basic knot (see Illustration 4). Ask Emmert to show you how to do this at any of the future meetings. Dorothy Steigler demonstrated this knot at the 1985 Indiana Blacksmith's Ass'n annual conference. For the "third hand" she drilled holes in a piece of wood and inserted the first five rods in it as she laced them, laced the sixth rod and picked up the bundle completed.

To hold the rods together until the ends can be arc welded, Emmert used two different sizes of rings, one with an outside diameter of 2 1/8" and the other 1 5/8". The rings were driven on using the leg vice. Prior to arc welding, a 1" piece of the same size rod was inserted between the rods to form six rods around one for the next step, forge welding both ends.

The ends are forge welded just like a basket handle or bulb. In this case, the forge welded area was drawn down to 3/8". Once both ends are forge welded, the entire assembly is given a consistent heat and twisted back against the curve (Illustration 5) until both ends are twisted together (Illustration 6).

The next step is to determine the better twisted end and cut off the other one with a hacksaw just above the knot. The knot is then reheated and the cut off ends driven down with a punch into the center area of the knot, with the dimensions of the knot adjusted with a hammer as required.

Robert Ream made the suggestion that the shank could be welded onto the knot at the first opportunity since it eliminates the need for a pair of tongs for future steps. This could be done after the forge welding of the first rod ends, but you would be stuck with whatever end was welded to the shaft rather than being able to choose the best twisted ends for beneath the knot. If one leg of one of the rods was left about 18" longer than the others, it would also provide a handle for the first weld.



The final knot looks something like Illustration 7. There are several examples of this knot at the homestead for you to look over. Dorothy Steigler said she sells a number of these by drilling and tapping the area under the knot and making them into automobile gear shift knobs.



Following Emmert's demonstration, Hans Peot and Dick Franklin made one with the intent of putting a basket under the knot. It got out of the shop before I saw the finished product, so either it was very good or very bad.

* * * * *

On April 12th, several members arrived at the Homestead to work on the gate project. Fair progress was made as we now have the more-or-less completed first side to use as a pattern. As I have mentioned previously, it would be educational just to come and watch the gate being made, although you would likely find a hammer in your hand before long.

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At the May 3rd business meeting the current officers were recommended without opposition to the Board of Directors. New to the Board of Directors will be Steve Roth and Ham Hammond. Ron Thompson was reelected to the Board. Following the meeting, the Board met briefly to appoint the group officers.

Other business covered:

- Emmert Studebaker and Larry Wood both spoke on the importance of ABANA to the resurgence of blacksmithing in the U.S. and encouraged all SOFA members to belong to ABANA. Emmert pointed out that if it was not for ABANA, SOFA probably would not have been started. The \$25 annual ABANA membership fee seems quite reasonable for the services provided by the national office and The Anvil's Ring. Members can join or renew to ABANA by sending \$25 to ABANA, c/o Ruth Cook, P.O. Box 303, Cedarburg, WI 53012.

- Scott Shoemaker presented Emmert with a framed photograph of him working on the Clayton Knot at the last meeting.

- We still have copies of the 1913 Sear's catalog on blacksmithing supplies for \$6.50 each. We also have a new supply of SOFA black baseball-type caps for sale. One size fits all. To have one mailed to you send \$4.00 (plus \$1.00 for shipping) to the Editor.

- Reminders about upcoming blacksmithing events in Kentucky, Northwest Ohio and the Detroit area were given. See details elsewhere in the newsletter.

- Larry Wood was presented with a trophy. It seems he was making one of the baskets for the gate and left it in the fire a bit too long, burning several of the strands. He then promptly bent the piece in two. The ruined basket was presented as a token of our appreciation for demonstrating that even experienced blacksmiths will occasionally ruin a piece. We had mounted it on a piece of wood.

The raffle brought in a record \$72.50 to support the newsletter. Perrysburg, OH member Don Witzler won an extra large meat fork made and donated by Randy Oberg, a workshop participant from Cohasset, Minn. Your Editor won a beautiful wooden mallet made and donated by Rushsylvania, OH member John Jacobs. The head was made out of a piece of ash stump and the handle was ironwood. Cleveland Heights, OH member Art Wolfe won a fireplace shovel made and donated by Findlay, OH member Dave MacDonald and a pair of adjustable pliers donated by Spring Valley, OH member Bill Fleckenstein. Kettering member Ham Hammond won a T-shirt featuring a power hammer donated by Scott Larkton from Ann Arbor, Mich., another workshop participant. Gainesville, Fla. member

Dr. Carl Van Arnam (another workshop participant) won a kitchen knife donated by Dayton member Owen Vance. Vandalia member Steve Roth won two lengths of brass wire (for rivets). Cheviot, OH member Bill Heileman won two wall brackets (for holding shovels I believe) made and donated by Rushsylvania, OH member Ralph Van Buskirk. Dave MacDonald won a pair of large tongs. Huber Heights member Dick Franklin won a can of assorted springs donated by Bill Fleckenstein and West Alexandria, OH member Henry Meyer won a pair of vice jaw blocks. Five members also won magnets donated by Bill Fleckenstein. Thanks goes out to all the member who made and/or donated items for the raffle.

Following the business meeting Steve Roth and Larry Wood took the group outside to display and explain the gate made during the Whitaker Workshop. A photo of the gate is in the newsletter. Briefly, the gate memorializes the 1913 Dayton flood. The outside frames of the gate are the borders of the water control/conservation district created after the flood, with the City of Dayton in the center of the gate. The saddle stirrup looking areas are the lakes created by the dams built as part of the flood control effort. The 3/8" rods going across the gate represent meteorological isobars with arrows representing heavy rain expected. Once mounted, the gate can be seen at the Flood Memorial Park, located at Valley and Alaska Streets near Children's Medical Center. Francis Whitaker was not able to stay for the Saturday meeting.

Prior to and after the meeting several members worked on the homestead gate. We are nearing the point where the components of the gate will be assembled, in some cases requiring the gate to be held upright for riveting on pieces. Each side of the gate will weigh about 700 pounds when assembled. Thus, we sure could use some help in manhandling the gate sections for assembly.

HEAR YE! HEAR YE! HEAR YE!



The workshop schedule for the Appalachian Center For Crafts (Rt. 3, Box 347A-1, Smithville, TN 37166 - 615-597-6801) is: Jun 30 - Jul 4, FRED CAYLOR, Beginning Blacksmithing; Jul 7-11, FRED CAYLOR, Intermediate Blacksmithing, Jul 14-18, SID BIRT, Damascus; Jul 21-24, DARRYL MEIER, Advanced Pattern-Welding; Jul 28 - Aug 1, GLEN GILMORE, Beginning Blacksmithing and Aug 4-8, GLEN GILMORE, Intermediate Blacksmithing. Other workshops of possible interest are: Jun 30 - Jul 4, CAROL HAGEN, Stonesetting; Jul 7-11, SID BIRT, Knifemaking; Jul 14-18, NANCY LINKIN, Metals; Jul 21-25, ANN GRAHAM, Aluminum, Jul 28 - Aug 1, ANN GRAHAM, Aluminum and Aug 4-8, BRUCE LePAGE, Gun Engraving/Carving. For further info. contact the Center.

TOUCHMARKS are intuitive skills retreats at the Steiner-Bell Health Promotion Institute near Gatlinburg, TN. They conduct combined blacksmithing and woodworking workshops. Woodworking projects will be primarily "greenwood" exercises and you'll make such things as hay rakes and forks, bowls, scoops, shaving horses and mauls. At the forge you'll try your hand at making hooks, spike dogs, meat forks and fireplace tools. Lodging and family style meals at the Bell Tower Inn on site. For further info. contact them at 1-800-251-2811.

The group has sold out of our supply of didydim safety glasses. However, they are available from Sheridan Safety Supply Co. (1347 E. Fourth St., Dayton, OH 45401 (near the downtown Post Office) - 222-3101). They are highly recommended if you spend any amount of time looking into a forge fire.

The Annual Mum Festival and Crafts Show is scheduled for Sept. 21 & 22 in Tipp City. They are seeking craftsmen to display and sell their products. \$30.00 entry fee.

For further information and an application form, contact Lilian Nichols (P.O. Box 294, Tipp City, OH 45371 - 667-2655). Perhaps SOFA can have a float in their parade again this year?

WANTED: Donation of blacksmithing tools and equipment to the Boy Scout summer camp at Goshen Scout Reserve in the Lexington, VA area. Donations are tax deductible. Contact Randy Smidt at 703-451-9155.

Words of Wisdom: A blacksmith is like a piece of steel, he is no good when he has lost his temper. Anonymous. (From the newsletter of the Blacksmiths' Guild of the Potomac).

Attention members in the Toledo area!!! Don Witzler (28943 White Rd., Perrysburg, OH 43551) is trying to form a blacksmithing group called "Northwest Ohio Blacksmiths". They need a minimum of five ABANA members to become an ABANA chapter. Their first weekend meeting was May 17-18 at the Seven Eagles Lodge Cultural Center in Grand Rapids, OH which featured demonstrations by blacksmiths, tinsmiths and farriers. SOFA will provide what support we can to this organizational effort.

Larry Wood is organizing a "Traveling Blacksmith" catalog for smiths to use when they tour the country which will probably contain information on museums featuring ornamental ironwork, pioneer village-type settings with active blacksmithing, blacksmith or ornamental iron shops, etc. Larry would appreciate any information or ideas on what ABANA members would like to see in this catalog. Contact him at 6945 Fishburg Rd., Dayton, OH 45424.

I receive a monthly calendar up-date from ABANA on blacksmithing-related event occurring in the U.S. and abroad. I only put the ones in the newsletter which I consider within striking distance. However, if you are planning to travel around the U.S. or Europe this summer, for a 22¢ stamp I will furnish you with a complete listing.

In the June/July 85 SOFA SOUNDS I included an article about French metalworkers who were restoring the torch on the Statue of Liberty. According to an article included with the Feb. 86 ABANA President's Message to the chapters, these workers will be staying in the U.S. to open a permanent shop for repousse work in the New Jersey area. In addition to architectural restoration work, they plan to make 100 to 200 one-seventh size models of the torch for sale at several thousand dollars each.

The March 86 newsletter of the Ontario Artist-Blacksmiths Ass'n contained an excellent two-page article on "Building a Coke Fire" by Brian Hughes. Covers how to build a pre-dominately coke fire and how to maintain it. For a copy send me a 22¢ stamp.

Mark Cusac (5410 W. Bausman Rd., Piqua, OH 45346 - 513-473-3625) has the following items for sale: hand-cranked, wall-mounted drill press - \$40; twisting forks at \$1 each; and swages, tongs and other items.

Tomahawk drifts are available from Wendell's Iron Mountain (180 Marks Ave., Lancaster, OH 43130 - 614-654-2040). The D-1 size (\$12 plus \$2.24 S&H) fits small belt axe handles and the D-2 size (\$15 plus \$2.32 S&H) fits the throwing axe or the Hand B handle. They are made from #8 ductile iron.

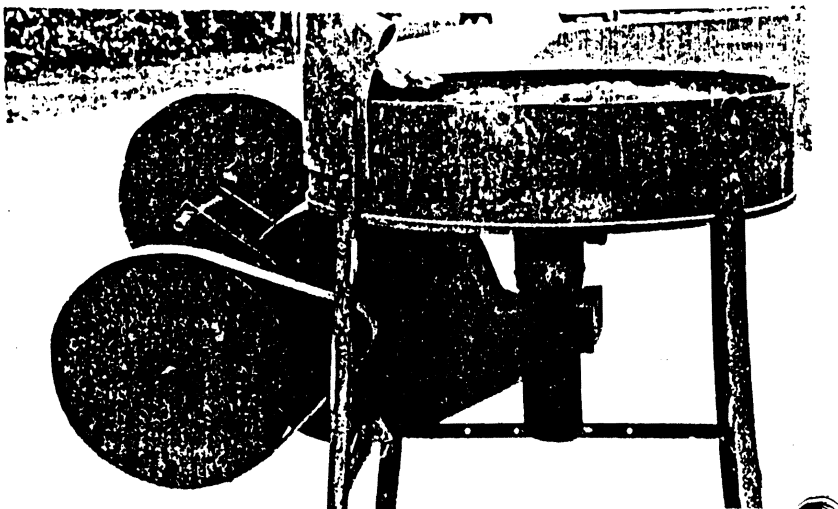
Quote: "The whole secret of forge welding is ... sometimes it works and sometimes it don't". (By Frank Nowicki as reported in the newsletter of the Arizona Artist-Blacksmith Ass'n).

The Arrowhead School for Boys is looking for a summer blacksmith from July 13 - August 22 to direct the boy's summer camp forging program in the North Carolina Mountains. Well equipped shop with hand tools. Contact Joseph Bell, P.O. Box 97, Tuxedo, NC 28784 - 704-692-8362.

The winner of the stake anvil offered during the last ABANA Board of Directors election was George Kidd from Oakridge, TN. If you missed out on this opportunity, don't dispare. A number of items from the Kenneth Lynch collection will be door prizes, with drawings every day, at the 1986 ABANA National Conference. Approximately 1,200 pounds of tools will also be auctioned off here.

A fair number of ABANA members did not renew this year. While I am sure that all SOFA members have, I would like to point out the tremendous effort Stan Strickland and a bunch of other ABANA officials are doing in promoting blacksmithing in the U.S. The Anvil's Ring is under new editorship and the first edition was excellent, serving a wide range of blacksmithing skills. The \$25 annual ABANA dues are well worth the cost in both direct and indirect benefits to SOFA members - so renew if you haven't already.

At the April 5th meeting Steve Roth brought along a homemade forge which was unusual in that the blower was made out of wood. It was powered by two wooden pulley wheels about 12" with a speed-up gear between. I forgot to check if the blower blades were wood or metal. You can get a fairly good idea of the arrangement from the photo to the right. Thanks goes to Scott Shoemaker for taking the photo for the newsletter.



The New York State Designer Blacksmiths will host a one-day demonstration by Richard Pozniak (from Chicago) on June 21st from 9 AM to 5 PM at Mitch Fitzgibbons shop in Westfield, NY (lower west corner of the state). Mr. Pozniak is a blacksmith with the City of Chicago and demonstrates and lectures on the traditional-type floral elements employed by the German smiths of the 1930's and 40's. Registration fee is \$30. For further info contact Jim Robarr, 170 Genesee St., Lockport, JY 14094.

BUILDING FOR RENT: 26' x 40' block building with private office, restroom and heat. Rent is \$260 per month. Use of a 5HP Campbell-Hausfeld air compress would be \$40 per month. Utilities are also extra. Located in Miamisburg. Call 866-3901 for additional information.

We will need to borrow a knife quality belt sander for Al Pendray's Damascus demonstration at the Quad-State. If you have a suitable belt sander we can borrow on Sept. 28th, please call Ken Scharabok at 252-3001.

Samuel Yellin, Metalworker, an exhibition highlighting the achievements in iron of this twentieth century master metalworker in iron, is now being circulated by the National Building Museum's Traveling Exhibition Program to the following locations: June 2 - Nov. 17, 86, Minnesota Historical Society, St. Paul, MN; Jan. 19 - March 2, 87, Allen Memorial Art Museum, Oberlin College, Oberlin, OH; and July 27 - Sept. 14, 87, Leigh Yawkey Woodson Art Museum, Wausau, WI. Oberlin is about a 3 1/2 hour drive from Dayton. If any SOFA members are interested in carpooling up as a group please let Ken Scharabok know of your interest. Tentative date, the second Saturday in Feb., 87. I understand this is a fantastic exhibit of Yellin's work. The newly opened National Building Museum is in the Pension Building, Judiciary Square, NW, Washington, D.C. It apparently contains a permanent exhibit of some of Yellin's work. I suspect the museum is within easy walking distance of the Metro if you are in D.C.

Your Editor owes someone an apology. In the last newsletter I said that Darryl Painter had donated a tray of assorted rivets for the newsletter raffle. However, Darryl has informed me it wasn't him. Whoever it was - thanks.

If you are active in Boy Scouting and are interested in helping to reinstate a merit badge in blacksmithing, please contact Stan Strickland, 1147 Danfel Ct., Stone Mountain, GA 30083. He needs someone to work with the Boy Scout Headquarters on this.

The Illinois Valley Blacksmiths Ass'n will hold a weekend workshop on July 14-15. Featured demonstrator will be someone named Larry Wood - who's he? Contact Bill Kauffman, RR #2, Danvers, IL - 61732 for further information.

The Albert Paley Exhibit will be at the Virginia Museum of Fine Arts, Richmond, VA from May 24 - July 20. Ask Hans Peot or Larry Wood about his work.

On June 7th and 8th Historic Fort Wayne in Detroit, MI will be presenting its First Annual Midwest Blacksmithing Show. Local blacksmiths, displays on military blacksmiths, tools, lectures by John Hamilton from Boston on Early American Forging Techniques, wheelwright demonstration, and early military traveling and portable forges. For further info contact Dennis R. Pruss, Historic Fort Wayne, 6325 W. Jefferson, Detroit, MI 48209 - 313-297-9360.

The March 86 ABANA President's Message included a letter to ABANA from P.A. Fiebigler, Inc., the French company doing restoration work on the Statue of Liberty. In it he praised American workers also working on the statue and provided additional details on the restoration techniques. For a copy of the letter send me a 22¢ stamp.

FOR SALE: Large cone mandrel. Rick Willoughby - 317-883-7478.

WANTED: Hardies in good condition to fit 1 1/4" hardy hole. Dan O'Brien - 317-675-4807.

WANTED: Complete set of metric screwdrivers. Ken Scharabok, 252-3001.

FOR SALE: 158 lb Peter Wright anvil, 165 lb cone mandril, 165 lb swage block, rivet forge, post drill and bits, vice, and more. \$600 OBO. Phil Deefauver - 309-828-7587.

1836-ERA BLACKSMITHING PROJECTS:

I attended the Hammer, Anvil and Forge: The 19th Century Blacksmith Workshop at Conner Prairie on March 22-23. Conner Prairie is a recreated 1836 settlement about ten miles north of Indianapolis (I-465) on Allisonville Road, about a two hour drive from the Dayton area. The techniques taught at the workshop were those of the 1836-era, although mild steel was used for most of the projects rather than wrought iron. The workshop was well worth the \$35 cost and future workshops are recommended for beginning to advanced intermediate-level smiths.

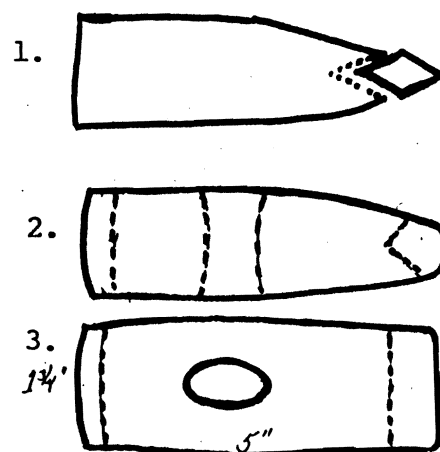
Here are three projects I found of interest at the workshop. Most of the sketches are tracings reduced so the proportions will remain consistent.

WROUGHT IRON AND STEEL FACED HAMMER HEAD:

By 1836 metal was readily available in the Indiana area with most stores carrying a range of types and sizes from nail rod to large bars. A smith could also buy direct from a wholesaler. Wrought iron cost 4 1/2¢ to 7¢ per pound, blister steel (about, what we now consider mild steel) was 12¢ per pound and cast steel (of tool quality) was 20¢ per pound.

Although tools could have been made completely out of cast steel, the cost and increased difficulty to forge resulted in tools with a wrought iron body and cast steel striking surface or cutting edge. Anvils of this period were likewise made. Most tongs and similar tools would have been made out of wrought iron. In my tongs collection I have a pair of left handed, wrought iron tongs which I hid whenever Larry Wood is around. This hammer will have a cast steel face and pein and weigh about 40-44 ounces when finished.

A bar of 2" square wrought iron was used for the body. The striker forged down the end from two opposite sides to form a pein end some 1/2" to 3/4" wide in one heat. When properly shaped with a flatter (including the sides), the pein end was cut off to remove the material which had folded over, using an angled hot cut. The bar was cut off from four sides about 3 1/2" to 4" in front of the pein edge using the same hot cut, again in one heat. The head was put face down on the anvil and a regular hot cut used to cut down 3/4" into the pein along the length. The hot cut was wider than usual resulting in a spreading of the sides. When deep enough, a piece of cold 3/4" square W2 steel was driven into the groove to final shape it (illustration 1).



To weld the W2 to the wrought iron body, the W2 was cut almost through the length of the pein width. The body and W2 were then cleaned, fluxed and brought to welding temperature. Fluxing consisted of borax followed by E-Z Weld. Most fluxing in 1836 was done with borax or a certain type of sand. Since the wrought iron takes a higher welding temperature without burning (as a result of the extremely low carbon content), it was put pein down deeper into the fire. The W2 welds at a lower temperature than mild steel so the proper temperature was eyeballed at light yellow. When both were ready for welding, the body was placed face down on the anvil, the W2 put into the groove and welded with light blows from the center out. The head was then broken off of the W2 bar stock and returned to the fire twice to weld in the sides to form a properly shaped pein, using a flatter as required. This process resulted in a flat surface for the next step, welding on a piece of W2 for the striking face.

A piece of W2 was shaped until the end matched the head face area (still close to 2" square). It was then almost cut through as was done with the pein piece. The head and W2 were cleaned, fluxed and brought to welding temperature in the same manner as the pein operation. When ready, the head was put with the pein on the anvil top and the W2 welded with light blows from the center to the outside. Two more welding heats were taken as the corners were chamfered off with a flatter. To finish the shaping, the flatter was used on all four sides. Any folded over material on the face will be removed during the grinding or filing process to shape the face slightly convex.

The final process was to put in the handle eye using a 5/8" tapered punch from both sides. Once punched through, the punch was driven in from both sides over the hardy hole to make the top and bottom of the eye larger. To form the eye from round to oval, a flatter was evenly used on both sides to return the side widths to 2". Note that the eye was put in last here - unlike a head out of all tool steel where it is often punched first. They have found wrought iron to be so soft the eye could be deformed by eyebolt tongs or the forging on of the W2 pieces. Thus, it is left to last.

The head would be annealed at least overnight in a bucket of fine wood ashes before final grinding or filing to shape. The head was tempered by holding the pein in a can of concentrated salt brine while running a stream of water on the center of the face. This results in a face which is slightly softer in the middle than the edges.

Illustrations 2 and 3 are a side and top view of the finished hammer head. The hammer took less than two hours from lighting the fire to the annealing state.

FIVE PIECE FELLING AXE:

Axe head were an important part of a frontier blacksmiths business. This one is made in five pieces.

To start the axe, a piece of $3/8"$ x $3"$ mild steel was heated and marked $1\ 1/2"$ and $4"$ from the end using an angled hot cut to cut in an angled groove (Illustration 4). A hot set was then used to flatten the area between the two grooves until the piece looked like Illustration 5 from the side. The flattened area was about halfway through the $3/8"$ thick material in the center area. A preformed drift (Illustrations 6 and 7) was used to match the sides of the flattened area with the narrow part of the drift to the top of the plate, with the groove slightly larger than the drift to allow for movement during future processes. Since the top will be narrower than the bottom less fullering was done with the hot set. The center area was left slightly raised to allow for spreading of the handle at the top, for a tight handle. The bottom area was fullered more to put ears on the bottom. The final shape is shown in Illustration 8 with the groove area noted.

The next step was to forge weld a piece of $1/2"$ x $1\ 1/2"$ mild steel to one side of the prepared plate. This will be the flat (hammer) end of the head for driving in wedges, etc. Once measured to the width of the side, it was cut almost through to remove head from the stock following welding. To form the other end of the eye, a piece of $3/8"$ x $3/4"$ mild steel was measured, cut almost through and welded to the other side of the eye.

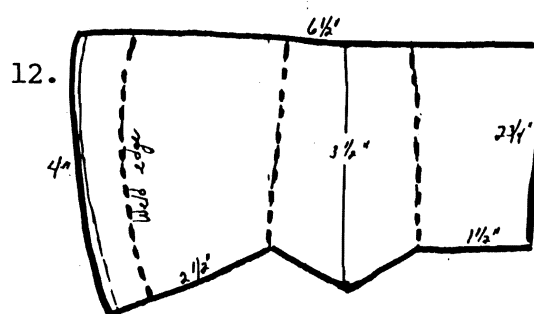
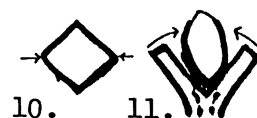
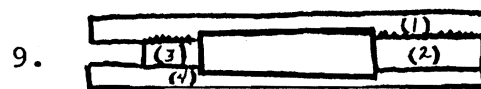
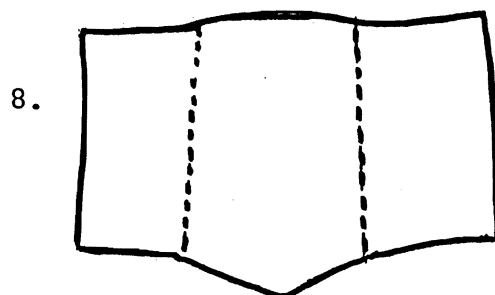
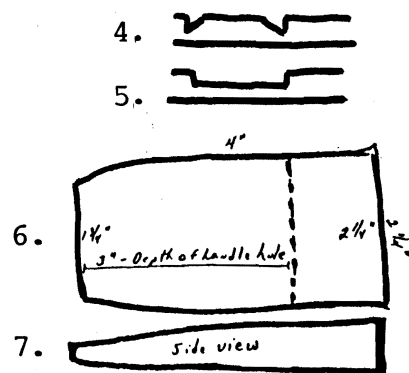
Next another side piece was made to match the original plate. At this point you have to be careful to fuller with the hot cut on the proper side so the ears match with the groove inside. The head is now a sandwich as shown in Illustration 9. Pieces (2) and (3) are called "dutchmen" and have been welded to the side marked (1). The other side (2) is now welded to the original side in two heats, starting with the larger dutchman first. This leaves forming and welding in a piece of tool steel (in this case $3/4"$ square W2) for the cutting blade.

The blade was prepared by forging the square on opposite edges to form an oval (or double teardrop shape) as shown in Illustrations 10 and 11. The head was prepared by slightly spreading the flanges and cutting a groove into the smaller dutchman to match the W2 shape. The W2 was then cut almost through and welded to the head in the same manner as the pein on the hammer.

Once the blade was welded the final shape was forged and the drift used lightly (to avoid stressing the welds) to prepare the eye. The head would be annealed, the blade edge ground and then tempered. The final shape is as illustrated in 12 and 13. In Illustration 13, the various pieces can be seen.

If desired, the back of the head could be thinner by cutting, folding over and faggot welding the end of the original side. The smaller dutchman could be eliminated by using a larger piece of tool steel (for a four piece head).

When power hammers became available, a smith with an apprentice would make this head in about an hour.



(From the newsletter of the
Mid-Atlantic Smith's Ass'n)

CREATURE HEADS
BY
DAN BOONE

As Interpreted by
Don Plummer



0

In this exercise Dan creates a dragon-like head that he claims bears a remarkable resemblance to Bill Gichner. With minor modifications you might also get it to look a lot like your Mother-in-Law.

Dan continually emphasizes using your own imagination in making your dragon heads. However, if it's your first time at it, I would encourage you to stick to these directions...more or less. Any deviation from size or process and we will not guarantee the results. However, if you follow these directions with care and detail, we also will not guarantee the results.

Dan uses a one inch square stock of mild steel. It holds the heat well for those of us who stay continually confused about what we're doing. An 18" piece will be about right. Dan prefers to tightly clamp on a pair of vice-grips for tongs.

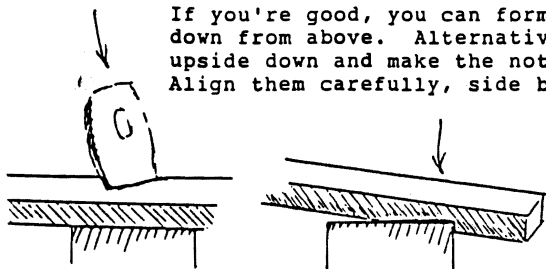
Mr. Boone can finish one of these critters in about 20 heats and about an hour and 15 minutes. That's counting time to slowly show intermediate results to a large contingent of gawking observers. By mustering great levels of technical skill and experience, however, I was able to produce an infinitely inferior and heavily fire-pitted product in only 32 heats and just under three hours.

Let's look at the process as consisting of eight basic operations:

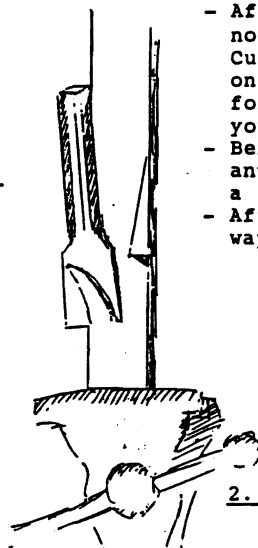
1. Notch, cut and shape the horns or ears. (Call them whatever you want).
2. Notch, punch and shape the eyes.
3. Refine the head shape.
4. Punch the nostrils.
5. Split the mouth.
6. Shape the mouth and jaw.
7. Cut the teeth.
8. Final shaping and finishing.

1. Notch, cut and shape the horns

- Notch two top edges to provide a corner to start the chisel cuts.
- Make the notches about 5" from the nose end of the bar. If you're good, you can form these notches by hammering down from above. Alternatively, you can turn the bar upside down and make the notches over the anvil's edge. Align them carefully, side by side.

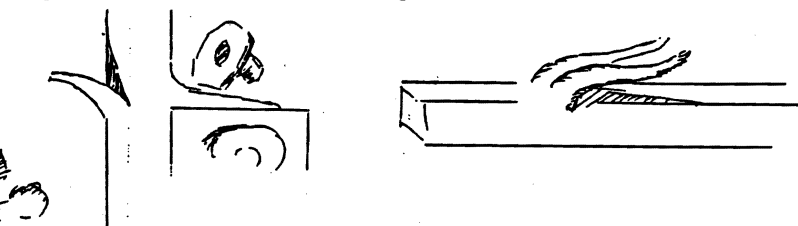


Strive for this



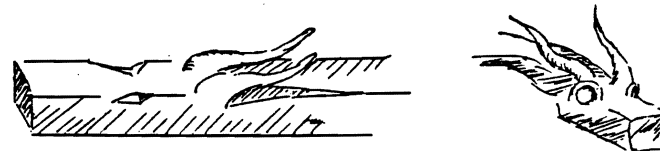
cupped
punch

- After notching, heat to a nice yellow, clamp tightly, nose down in the vise, and begin chisel cutting the horns. Cut them alternately...a little on this one and a little on the other. It will help keep them symmetrical. Don't forget to regularly cool your chisel by licking it with your tongue. Cut them about 2" long.
- Bend the horns down and draw, taper and round them on the anvil. Use a little care here because you're dealing with a triangular length of metal. It's easy to get a fold.
- After shaping, heat and bend them down and back out of the way. Kind of back where they came from.



2. Notch, punch and shape the eyes

- Notch just as previously described for the horns, either with a hammer from above or over the anvils edge. Again, be sure they are oppositely aligned. Position them about 1/4" in front of the horns.
- Use a series of increasing-sized, rounded point punches to punch the eyes. Dan works his way up from about a 1/8" for initial alignment, through about a 1/4" and then 3/8". His fourth and last punch is a cupped punch that creates a nice, large eyeball. Dan has some of the biggest eyeballs in town.
- You may want to touch up some of the areas behind or around the eyes with a small fullering or square chisel.



3. Refine the head shape

- Make sure everything is in pretty good shape at this point. You may want to just do a minor amount of touching up or get into some major shaping. You can let your imagination run amok and create great bulbous noses; long, drawn out heads, wrinkles or etc. Don't, however, just indiscriminately pound away. Think about what you're doing. You could really screw it up with a misdirected blow.
- For this particular creature, Dan knocked some of the edges off the top and bottom, rounded the end of the nose just a bit and chiseled a large groove from between the eyes to the end of the nose. This is just to add a bit of design effect. Curiously, this is the feature that made it look most like my mother-in-law.

4. Punch the nostrils

- Like the eyes, use a series of smaller to larger punches and punch at the very end of the nose. Work alternately between the two nostrils so that a symmetrical, bilateral balance may be maintained. Starting with the small punch in the right spot is very important.
- Again, you may want to touch up around and behind the nostrils with a small fuller chisel. This is just to help accentuate a few spots or punch a bit of unwanted iron back into place, etc.

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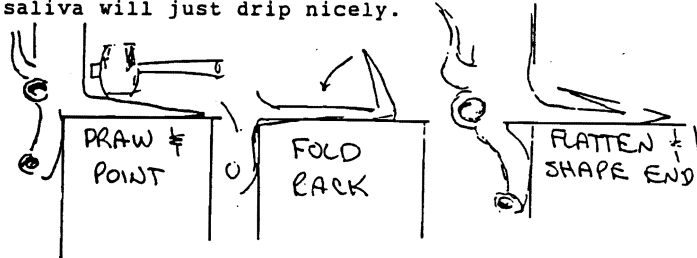
5. Split the mouth

- Split the mouth such that it will leave a larger portion of metal on the bottom jaw than on the top. Something along the lines of $\frac{2}{5}$ on the top and $\frac{3}{5}$ for the bottom.
- Keep your metal hot and your chisel sharp and cool. Whenever you put the thing in for a heat, be mindful of the horns. Pulling out the head to find one horn missing and the other sparking can cause you to say bad words.
- Anchor solidly in the vise and split down to within about $\frac{1}{4}$ to $\frac{1}{2}$ " of the eyes.
- When fully split, spread the jaws so they are at a 90° angle to each other.



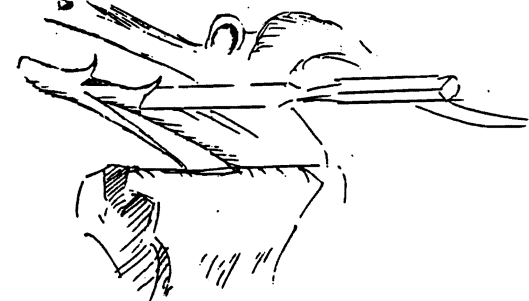
6. Shape the mouth and jaw

- Lengthen, taper and point the lower jaw. This is the reason we left a greater mass here when we cut the mouth.
- Fold back the now pointed end of the lower jaw, and shape the new end to approximate that of the upper jaw.
- If you are going to insert a tongue, this is a good time to punch a hole in the back of the gullet for a subsequent $\frac{1}{8}$ " hole. As soon as convenient drill the $\frac{1}{8}$ " hole all the way through the back of the neck, ...beginning in the mouth and coming out somewhere behind the horns.
- Bring the two jaws into a decent, gaping position so the saliva will just drip nicely.



7. Cut the Teeth

- As much as possible, heat just the lower jaw, anchor in the vise and, cutting from the back forward, cut a nice fang-like tooth on each side. As you cut it, lever it up slightly to a more tooth-like position. If you are fast enough, you may be able to cut two on each side. If you re-heat to cut more teeth be careful not to burn up what you have already cut.
- Alternatively, you may want to spot heat with a torch and cut the teeth that-a-way.
- Use a small, quite sharp chisel and, as always, keep things symmetrical and bilateral.



8. Final shaping and finishing

- If you are fortunate enough to still have something worthwhile at this stage there's just minor finishing required.
- Main thing is to now heat and shape the horns into a graceful curve, circle, natural sweep, etc.
- If you want a tongue, flatten and shape as desired, a $\frac{1}{4}$ " rod. Push through the previously drilled $\frac{1}{8}$ " hole and weld from the back.

You now have to decide what to do with this thing. Here you are with a nice dragon head on the end of a 6 pound bar of iron. Should you make it into an ear ring? a cane head? a knife handle, a door knocker? You could just cut it off, point the end and stick it into a pre-drilled block of walnut or oak. This makes a nice standard for a desk ornament or paper weight.

Dan sometimes tapers and curls a bit of stainless steel-welding rod. This is inserted in the tongue hole and...voila...a corkscrew.

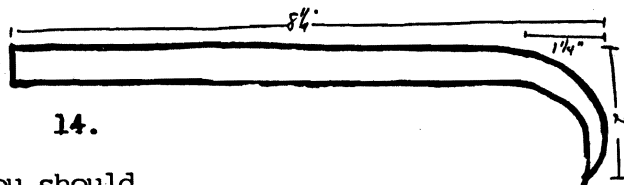
You can finish the head rapidly and nicely by buffing it with a wire wheel and spraying with two light coats of an acrylic clear lacquer.



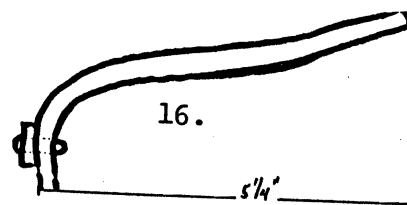
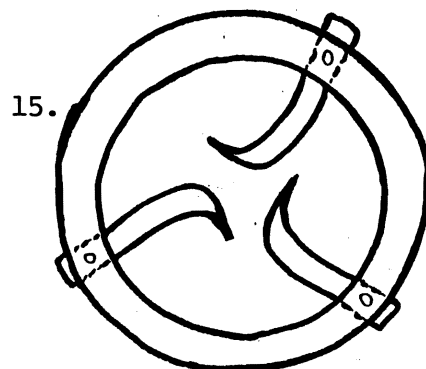
SIMPLE TRIVIT:

A trivitt is a kitchen utencil which were also a major part of a pioneer black-smiths business. This one can be made in under an hour.

Start with a piece of 1/8" x 1" or 3/16" x 3/4" stock, 24" long. Scraf the two ends on opposite sides. Use a bending fork in the vice to bend the stock into a circle, flattening it as required. When a full circle, prepare, flux and weld the two ends. You should end up with a circle with an outside diameter of 8 1/2" or so. True up the circle on a cone if available.



The combination center holders' and legs are made out of 1/4" x 1/2" stock drawn out and shaped as shown in Illustration 14. You will need a matching set of three of these. Measure the circle into thirds, center punch mark and punch for a rivet. Lay the legs over the ring to form an attractive shape (see Illustration 15), bad side of the weld up. Mark the legs through the ring and punch them. Hole should be the same distance from the end on all three pieces. Rivet the legs to the ring, again bad side of the weld up so it won't be seen from the top of the trivit. Cut off 16 penny nails would work well for rivets.



The final step is to fold down the leg slightly behind the ring using the leg vice. Put a curve to the legs using the hardy hole, some curved surface, spread vice jaws, etc. (see Illustration 16). Adjust shape as required. A handle could be added if desired. This trivit will sit about 5 1/2" high. For a lower or higher one, adjust the length of the legs as desired.

To obtain information on the summer programs at Conner Prairie, contact them at 13400 Allisonville Road, Noblesville, IN 46060-4499 - 317-776-6000. They are an Earlham Museum accredited by the American Association of Museums.

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