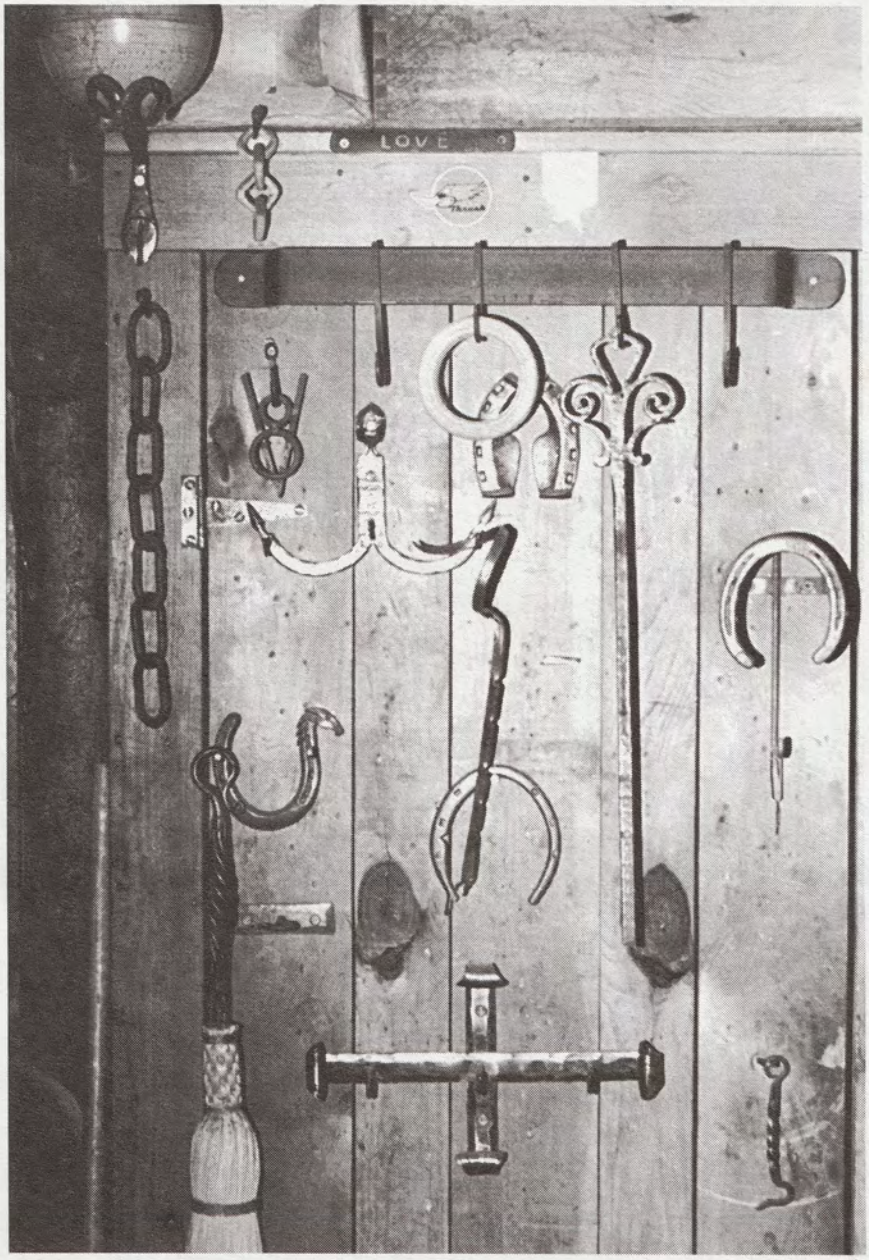
METALSMITH

"The lyf so short, the craft so long to lerne"



A Chapter of ABANA
A Quarterly Publication of the Guild of Metalsmiths
Volume 23 Number 3 Sept 1999

Presidents Message Dave Feterl

On behalf of The Guild of Metalsmiths I would like to extend my sincere thanks to the family of our late member Paul Hubler for their great generosity of donating toThe Guild his training aids, associated tools, anvil and vise. These items are and will be held in great regard by this organization to educate and train the methods and skills of metalworking that Paul shared with us.

The Program Committee is finalizing the plans for the Fall Conference. The Fall Conference agenda will include some family activities so please plan to bring the whole family to this event. We will keep this type of activity in the schedule if it is well received. Please keep in mind as this is our yearly major event, the Program Committee will appreciate all the help they can get. So please volunteer, anytime you can spare before, during or after the event will benefit The Guild. Also, keep in mind that tickets are now on sale for the raffle. The meeting at the Log House Grounds was a well attended and informative meeting. Many good suggestions on ground usage and schedule (Fall Conference) were presented. The Blacksmith shop there is functional and very interesting. (Nice spurs, Bob)

The Education Committee has quite a full schedule of classes scheduled for the coming year. The classes include both ferrous and non-ferrous classes, forge welding and "Train the Trainer" for those interested in furthering their skills by teaching classes. Teaching is quite a rewarding experience. I encourage all who can to give it a try.

The Publicity Committee is always looking for good articles for the Metalsmith, The Web Site and the Forum. Marcia McEachron is the Editor of the Metalsmith, and Gene Olsen takes care of the Web Site and the Forum. There addresses are in The Guild directory.

The repair of the forges at the Minnesota School of Horsehoeing is nearly complete at this writing. A hardy "Thank You" to all who (very many to mention) participated in this project. The benefits of your labor will be enjoyed by many. The next scheduled purchase of coal is tentatively scheduled for early October if our supply lasts that long. When it arrives, a slightly different selling procedure will be in effect.

See you at the Fall Conference (formerly known as the Madness).

Guild of Metalsmiths Metalworking Class — September 1, 1999 to May 20, 2000

Date	Class	Place	Instructor
9/11/99	Novice Blacksmithing	MN School of Horseshoeing	Jim Scott & Larry Vensel
10/9/99	Instruct the Instructors	MN School of Horseshoeing	Bob Fredell & Pete Stanaitis
10/16/99	Open Forge	MN School of Horseshoeing	Pete Stanaitis
10/16/99	Silver Chain Making	Curt Engstrom's Shop	Curt Engstrom
10/23/99	Beginning Blacksmithing Section A #1	MN School of Horseshoeing	Group A
10/23/99	Damascus Making	Marcia McEachron's Shop	John Moriarty
10/30/99	Trade Axe	MN School of Horseshoeing	Fred McClusky & Bob Johnson
11/6/99	Beginning Blacksmithing Section A #2	MN School of Horseshoeing	Group A
11/13/99	Tools from Blacksmiths Study Guide Unit #5	MN School of Horseshoeing	Pete Stanaitis & Bob Fredell
11/20/99	Beginning Blacksmithing Section A #3	MN School of Horseshoeing	Group A
12/4/99	Beginning Blacksmithing Section A #4	MN School of Horseshoeing	Group A
12/11/99	Open Forge	MN School of Horseshoeing	Pete Stanaitis
1/8/2000	Beginning Blacksmithing Section B #1	MN School of Horseshoeing	Group B
1/8/2000	Small Aluminum & Brass Casting Workshop	Gene Olson's Shop	Gene Olson & Chris Wilson
1/15/2000	Intermediate Processes	MN School of Horseshoeing	Myron Hanson, Dick Carlson John Adams, Bob Johnson
1/22/2000	Beginning Blacksmithing Section B #2	MN School of Horseshoeing	Group B
1/29/2000	Intermediate Processes	MN School of Horseshoeing	Myron Hanson, Dick Carlson, John Adams, Bob Johnson
2/5/2000	Beginning Blacksmithing Section B #3	MN School of Horseshoeing	Group B
2/12/2000	Open Forge	MN School of Horseshoeing	Pete Stanaitis
2/19/2000	Beginning Blacksmithing Section B #4	MN School of Horseshoeing	Group B
2/19/2000	Poz Tongs	Monty Bygd's Shop	Monty Bygd
2/26/2000	Beginning Blacksmithing Section C #1	MN School of Horseshoeing	Group C
3/4/2000	Colonial Flesh Fork	MN School of Horseshoeing	Bob Fredell
3/11/2000	Beginning Blacksmithing Section C #2	MN School of Horseshoeing	Group C
3/18/2000	Chisel & Chase	MN School of Horseshoeing	Tom Latane
3/25/2000	Beginning Blacksmithing Section C#3	MN School of Horseshoeing	Group C
4/1/2000	Hinge Making	MN School of Horseshoeing	Curt Engstrom & Don Welch
4/8/2000	Beginning Blacksmithing Section C#4	MN School of Horseshoeing	Group C
4/15 &16/2000	Hammer Making	Dick Carlson's Forge	Dick Carlson & Myron Hanson
5/6/2000	Forge Welding	Dave Mariette's Shop	Dave Mariette
5/20/2000	Metal Shaping & Tooling	Don Hammer's Shop	Don Hammer

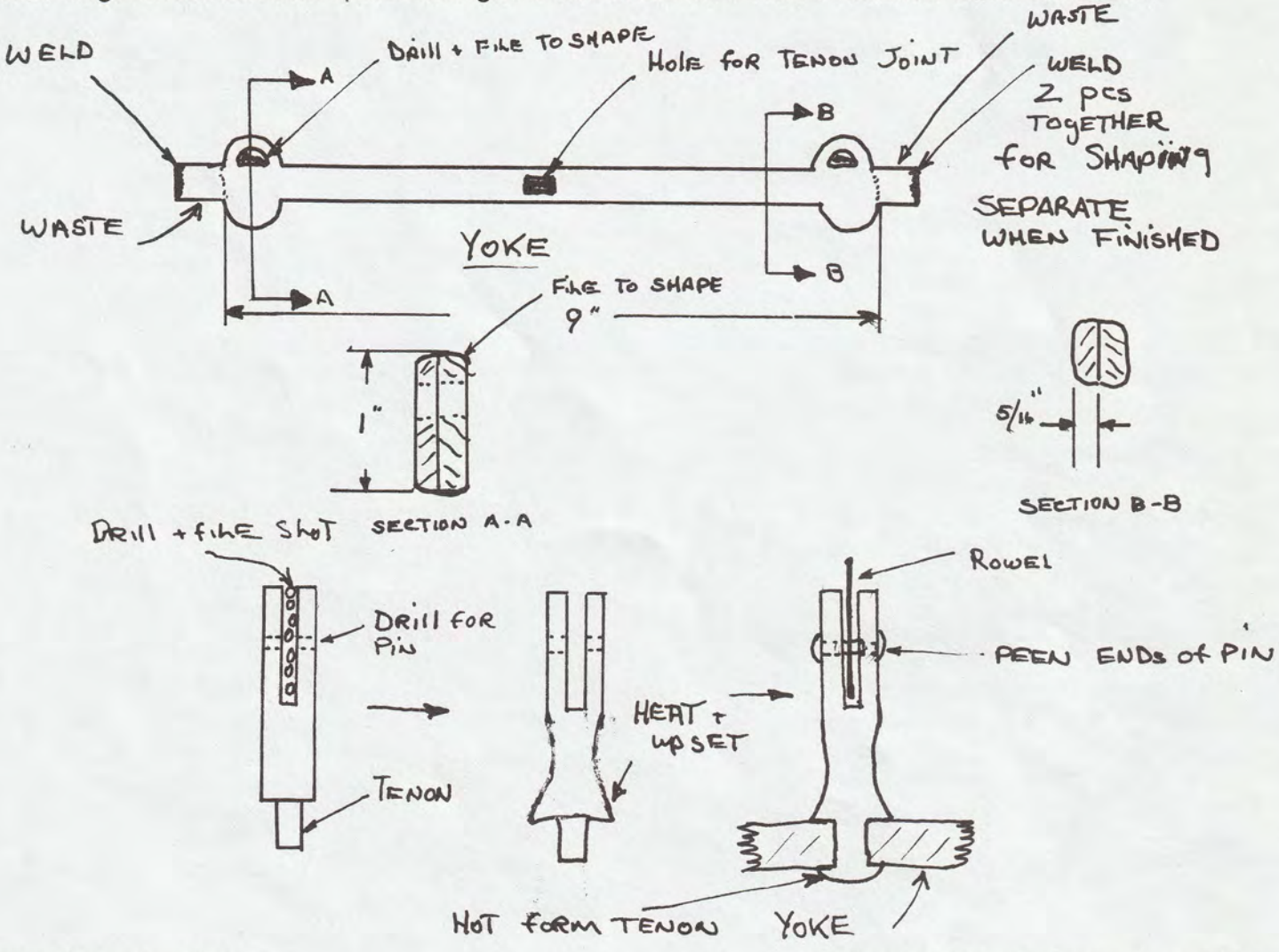
June Meeting of Guild of Metalsmiths at Little Log House

by John Moriarty

Due to the hospitality of Steve Bauer the Guild meeting of June 9th was held at the Little Log House site near Hastings. If you have not visited this location yet, be nice to yourself and do so. As I drove to what is to be the location for the 1999 fall conference the sky began to darken and it looked like rain. I arrived just in time to park and enter the "great hall" on the site. This is a very large wooden building with a beautifully vaulted roof and large cathedral style windows. Standing on the gentle rise in front of this building and looking to the east, we could see the sky darken and the clouds begin to loose the rain that they held. The dark sky and the rolling land emphasized the truly staggering scale of this building. This becomes even more striking after entering as it is immediately evident that there are no supports breaking the expansive wooden floor.

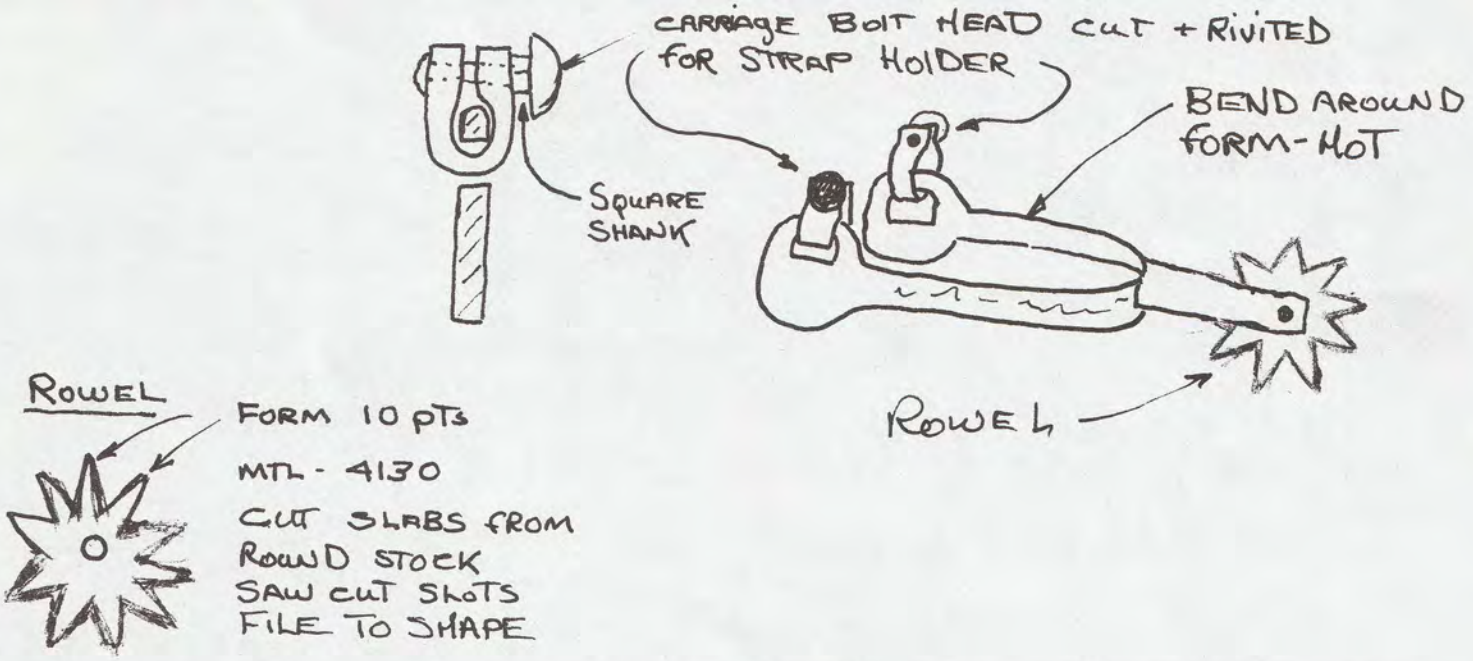
Steve was at the door welcoming arrivals and answering the many questions about this and the many other fascinating buildings, machinery and antiques on the site. I think being a collector of "things" is in the genetic makeup of everyone connected to the Guild, Steve however, is doing this on a scale that makes the rest of us look like amateurs. I think maintaining such a place is a very worthwhile endeavor to ensure future populations will be able to enjoy examples of some disappearing parts of our culture.

After a short business meeting which followed the usual potluck dinner, show and tell produced 2 knives forged from railroad spikes using a Celtic cross and Thor's hammer as adornments.



The demonstration for the evening was done by Bob Beck. Holding forth in the cozy little stone blacksmith shop, Bob gave a fine demonstration of the art of building a beautiful pair of western riding spurs. Bob uses a method of construction that pairs the parts together while they are being made which ensures that they are both identical. This is the part that goes around the back of the boot. The part that holds the rowel (this is the wheel shaped part that actually touches the horse and makes a ringing sound when the wearer walks) is made by upsetting a piece of 5/8" stock and joined with a mortise and tenon joint to the part that goes around the boot. The rowel is made from 4130 stock and has ten points on the circle. 4130 is a high carbon tool steel and gives a very nice sound when in use.

Bob has had extensive experience engraving on the guns and other items in steel and this was the next thing that he demonstrated. After explaining how to make the gravers (these are the tools used in engraving)from high -carbon steel or drill rod, and how to harden & sharpen these tools, Bob showed how to cut a design into steel as well as copper and brass.

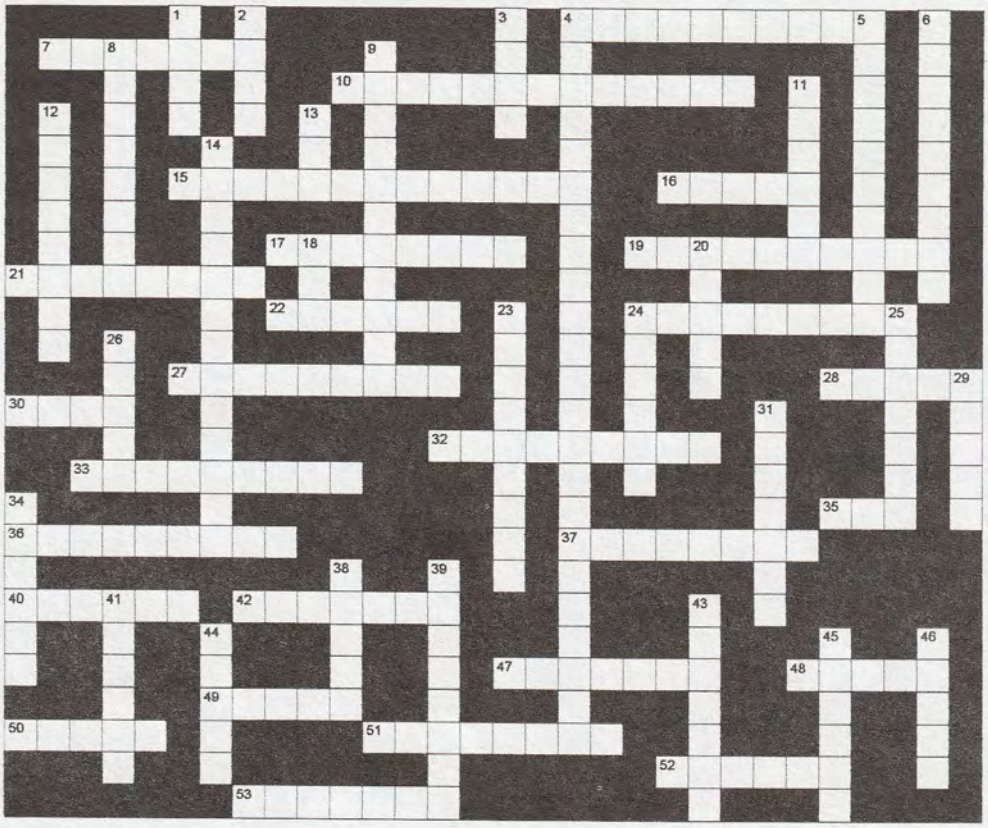


For a comprehensive text, The Art of Engraving by Meek is the book that Bob recommends as a good source for the beginner as well as the advanced student of this craft. Another recommendation is to use common "common white out" instead of the more expensive China White for the background for the design. After applying the white-out to the material and allowing it to dry, the design is drawn on the surface. For a harder materials such as steel a small chasing hammer is used to apply force to the tool. Brass and copper can be engraved by hand using a rhythmic side to side motion at the same time as applying a linear force that moves the graver through the material. If everything is being done correctly a small curl will come off the front of the tool and the tool will move smoothly along. Lubrication with a fine light oil such as odorless kerosene is desirable to help the tool to cut cleaner. A steady hand and a good eye are also important things to have at your disposal, but as with many things, practice, practice, practice.

Bob brought along photos showing many examples of his fine work in steel and in leather. Having members who are willing to share their work skills and talents such as Bob Beck is one of the basic reasons that the Guild of Metalsmiths has survived as a viable organization.

Thank you Bob!

Forging & ABANA Trivia



Across

4. 1988 ABANA conference city
7. 1999 ABANA President
10. A book on making animal heads
15. A "must" in the blacksmith shop
16. Tool steel has a narrow forging _____.
17. Holds flat steel
19. Traditional form
21. The tree over the Smithy
22. 1990 & 1996 ABANA conference city
24. Yet another traditional joinery technique
27. Holds round steel
28. Little _____
30. Heated coal becomes ____.
32. Common blacksmith hammer
33. 1986 & 2000 ABANA conference city
35. A ___ hammer works iron in a tight spot.
36. Square hole in the anvil
37. Pattern welding
40. Blacksmith shop
42. Moves the iron in one direction
47. Results of coal impurities
48. Makes a hole
49. Used to make iron round
50. Yet another Traditional joinery technique
51. Rounded peen
52. Makes nail heads
53. Makes the iron smooth

Down

1. Aid in Welding
2. Fe is the chemical symbol for it
3. Between the horn and the face
4. A great course in learning blacksmithing
5. Makes tenon shoulders square
6. 1998 ABANA conference city
8. Preserver of hearing
9. Iron and Iron silicate
11. 1984 ABANA conference city
12. Round hole in the anvil
13. Strike while the iron is ___!
14. 1992 ABANA conference city
18. Quenching medium for O1
20. Protects the smith's clothing
23. Another traditional joinery technique
24. Makes a notch
25. To make iron longer and thinner
26. Iron and Carbon
29. Blacksmithing process that was a popular dance in the late 1950's
31. 1994 ABANA conference city
34. Cuts iron
38. A wire brush removes surface _____.
39. Measures circumference of a wheel
41. Toughens hardened steel
43. Blacksmiths helper
44. To make iron shorter and thicker
45. Air intake
46. Color of burning iron

Nowthen Threshing Show
Blacksmith Shop Update

The Nowthen Historical Power Association (NHPA) has agreed to purchase from The guild all of the equipment that The Guild has supplied for the blacksmith shop at the show grounds. This means that NHPA will own all of the equipment and The Guild will not have a financial investment in the blacksmith shop. The roof and shell of the 41'x 56' shop will be built this summer and it will be completed next year.

For the 12th consecutive year we will be demonstrating at the Nowthen Threshing Show. Many of us consider this event to be one of The Guild's program highlights. This is a time for Guild members to come together, socialize, beat on iron and demonstrate for the hundreds of visitors who pass by our demonstration area.

Last year twenty two Guild members spent a couple of hours, or a couple of days, demonstrating. You, too, would find it enjoyable to join this demonstration crew! You don't have to be a super - duper blacksmith to demonstrate - beginners contribute just as much to the show as the old-timers.

Here is all you ever need to know about demonstrating at the Nowthen Threshing Show.

* Tell the ticket taker at the entrance that you are a blacksmith and you will be admitted free. When not demonstrating you may tour the grounds. The free entrance does not include family members.

* Come to the old blacksmith shop and check in with Ralph Amundson. Ralph will be in charge this year. You may address him as Master Smith Amundson or Illustrious Sir.

* Five workstations will be set up for our use. We take turns using them. Coal and a limited selection of stock will be provided. You probably will want to bring your personal hand tools. If you need a certain size stock for whatever you plan to make bring it with you - just to be on the safe side.

* If anyone would like to bring their own personal and portable forging station and set it up in the new, but not completed (roof only) 42'x56', building go right ahead. Be sure to check with Ralph.

* If you will be at the August 1999 Guild meeting you may put your name on the sign-up sheet. If you won't be at the meeting, don't let that hold you back. Come to the Threshing Show anyway.

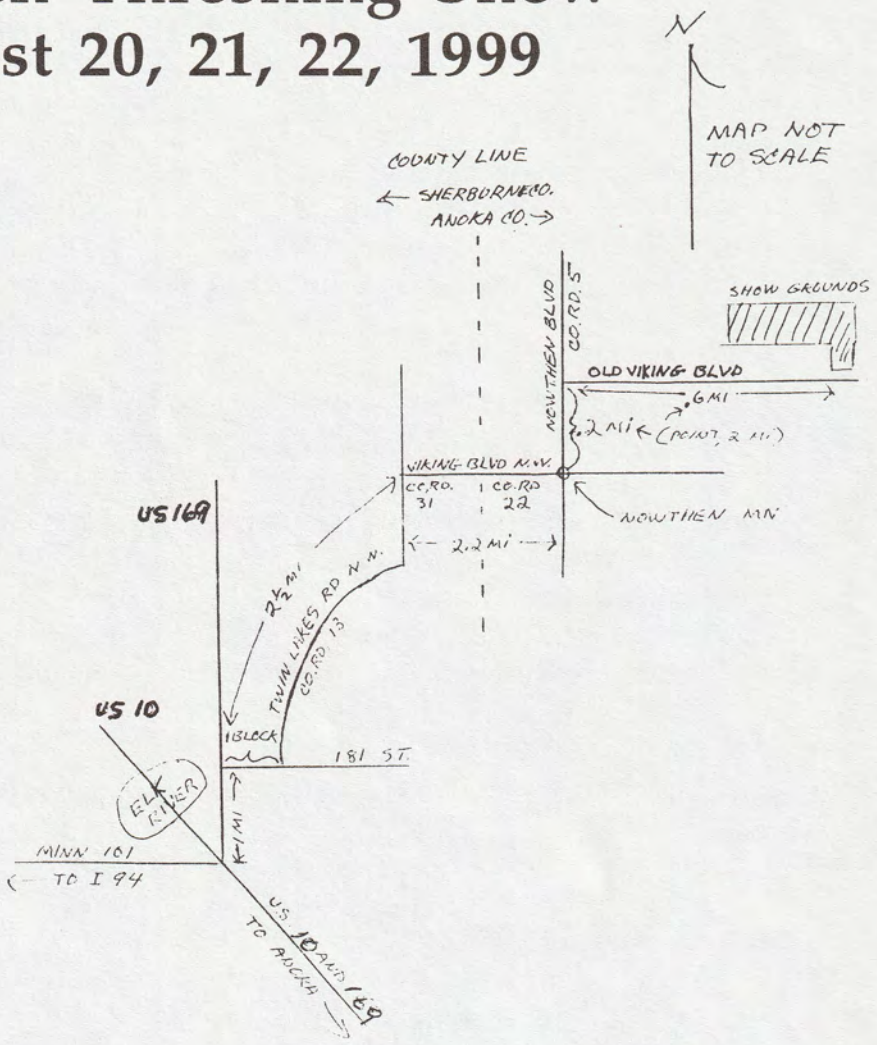
* Dates August 20, 21, 22, 1999. See the map in this issue for directions.

* Call Ralph Amundson (612) 789 6721 for answers to all of your questions.

Nowthen Threshing Show
August 20, 21, 22, 1999

From Minneapolis or St. Paul go west on 1-94 to Hwy 101. Go east on Hwy 101 to Hwy 169.

181st. St. east to Co. Rd. 13 to Viking Blvd N.W.



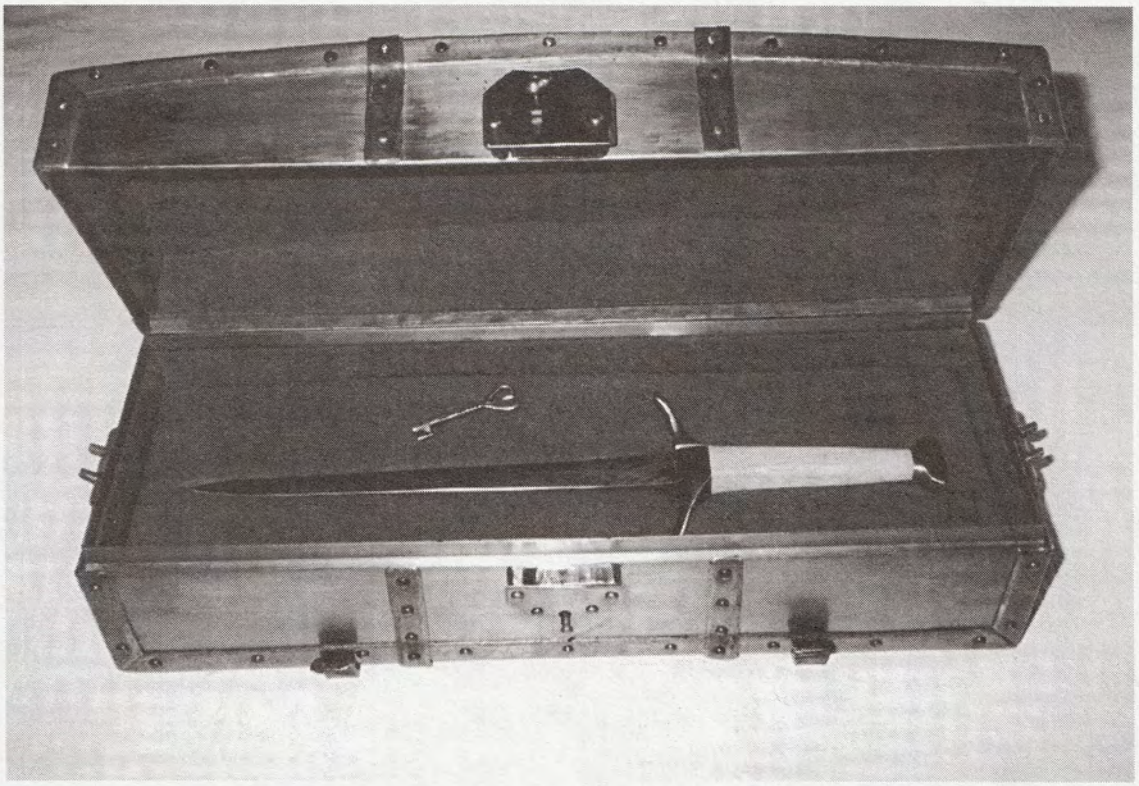
Don't forget the Annual Fall Conference
September 25 & 26, 1999

We will be meeting at the site of Little Log Home Days, a short distance south of Hastings, MN. Frank Turley, Bill Fiorini and Kirsten Skiles will demonstrate forged building hardward, Damascus knives and repousse' respectively. You have already received your brochure in the mail. Please observe the registration deadline. Better yet, register now.

Guild Members Gallery

Knife Case

by Bob Fredell

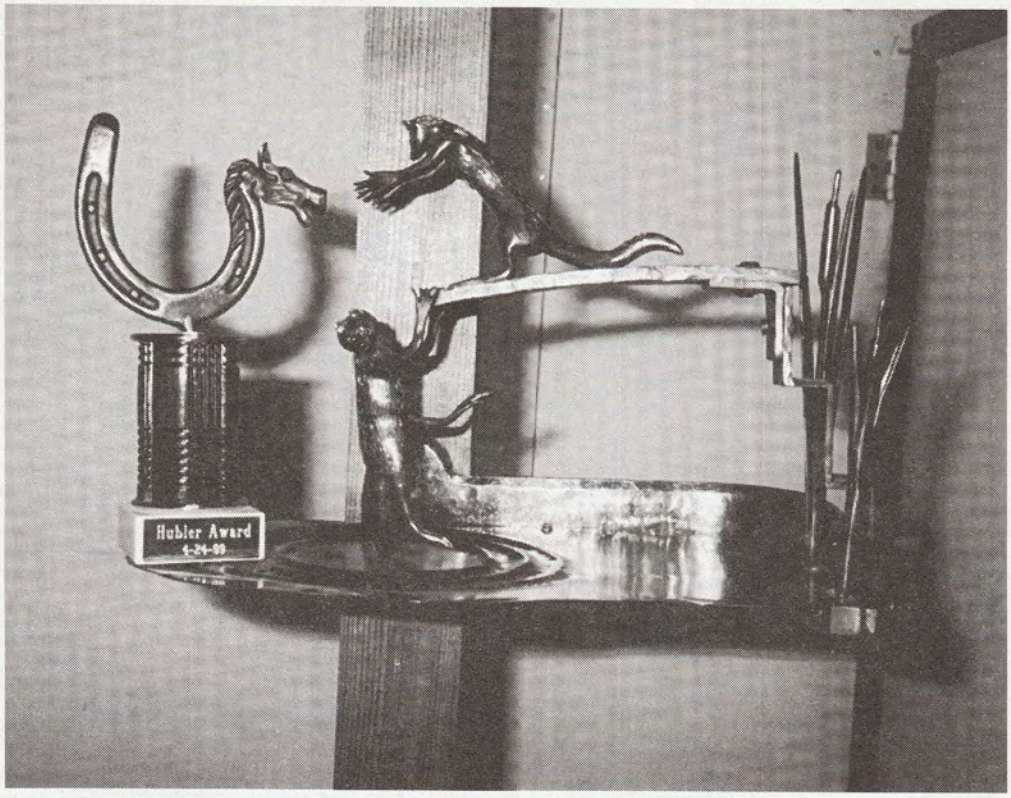


Myron Hanson bought a knife made by Sam Curry at the 1998 Northern Minnesota Metalsmith's Conference. After arriving home, Myron decided that he needed to build a proper case to hold the knife.

He started with an old S K tool box. John Yust and Tom Latane` offered some design suggestions. Myron covered the old S K tool box with 16ga sheet iron. He riveted the box, sheet iron and custom made straps together using 205 1/8" rivets. Myron made the lock and key, hinges and handles. Dick Carlson assisted with some of the riveting.

Barb, Myron's lovely wife, made the interior lining and pillow.

Guild Members Gallery



Coons Doing What Coons Do!

by Bob Fredell

It seems that Bob and Mary Fredells'shack at the lake is an attraction for the local raccoons. They (the coons) apparently feel that the deck is their own private out house. Bob traps the coons and gives them a swimming lesson, which they always fail.

Myron Hanson thinks that all this is the most hilarious thing he has ever heard. He just had to give Bob and Mary a hard time. In his fantasy, Myron imagined a couple of coons swimming in a pond of water. He got his old crony, John Yust, to design this fantasy into iron.

Myron then forged a personified female coon along with a second coon, presumably a male.(Guess who they represent?) The whole thing gives the appearance of the male coon being a bit chicken to get in the water, while the female coon about to either push him in or pull him out of the drink.

Bob and Mary bought the sculpture at the 1998 Guild of Metalsmith's Fall Conference auction. Mary, now half owner, entered it in the Hubler Award contest at the Northern Minnesota Metalsmith's Spring Conference in Myron's name.

The photo shows the sculpture and the first place trophy.

By Hammer and Hand All art doth stand

by Bob Fredell

I remember the first time I visited David Christofferson at his 19 th century home in St. Paul. On the living room wall hung a long strip of wood with old English lettering painted on the surface. That was the first time I saw the saying, "By Hammer and Hand---All art doth stand." I thought to myself, "That sounds like David, the fine craftsman he is." I then began to wonder as to the origin of the saying. David didn't know the answer to my question.

A few years later I attended an ABANA conference. I think it was the first one in Alfred NY. While watching the Williamsburg blacksmiths demonstrating I was struck by their T shirts that proclaimed the saying, "By Hammer and Hand---All art doth stand." Once again the mental process started - where did that saying come from. The Williamsburg smiths didn't know the history of the saying.

Following the ABANA conference my lovely wife, Mary, and I toured Henry Ford's huge museum. What to my wondering eyes should appear, but a sign hanging over one of the displays that said "By Hammer and Hand---All art doth stand." Who do you suppose first coined that saying?

Years passed. Not long ago I purchased the book, *Anvils In America*, by Richard Postman. I bought it directly from Mr. Postman to have an autographed copy. Much to my delight I found the answer to my question on pages 20 and 21 of this book.

Mr. Postman referred to the April 1891 issue of the magazine, *The blacksmith and Wheelwright.* This magazine reprinted an excerpt from a pamphlet published in London, England in 1747 that was designed to instruct parents on the possible trades that their children may choose to enter. The pamphlet stated that a guild by the name of Black-Smiths was incorporated in London in 1571, in the reign of Queen Elizabeth, and confirmed by King James 1. The coat of arms was described as, "Sable a chevron between the Hammers Argent, handled and crowned or motto, By Hammer and Hand---All art doth stand."

There it is. This motto goes back to at least 1571 and it pertains to blacksmithing. It seems to me that there is a lesson here for us. Learn and use the basic blacksmithing processes! By your hammer and hand you create-not by some slick gizmo. Don't focus on only the end product-but attend to the process. The age old blacksmithing methods hold an aesthetic appeal yet to be surpassed.

A Visit With Chris Poor

by Bob Fredell

The February Guild meeting was held at Arms and Armor. After the meeting I spoke to Chris Poor, owner, saying that I would like to return to his shop to interview him for an article for Metalsmith. He quickly agreed. A month later I appeared with my paper, pencil and camera in hand.

Such a pleasant time we had visiting with Chris. He is so eager to talk about medieval arms and armor. This is not only his business but his passion. As a little toddler Chris has had an interest in swords. At age six he made his first wooden sword. In junior high shop he was making primitive weapons. He accomplished a bronze pour at age thirteen.

Chris graduated from college with a BA degree in classic archaeology. More important than the degree, college saw him making his first suit of armor. Any one who knows Chris also knows that it would be impossible for him to make a suit of armor and not wear it. Off to the Renaissance Festival he went.

It was fun jousting at the Ren Fet, battered and bruised as he was. Then an interesting thing happened. People began asking him to make suits of armor for them. Not wanting to pass up an opportunity like that, he said, "Sure." Before long he was making medieval knives for more customers. The business began in earnest in 1980 in a garage in South Minneapolis.

One day a buyer appeared to order hundreds of weapons every three months. The business was off and running. Chris hired more help and got organized. Two of the original men are with him to this day. No wonder he produces such quality work.

Today, the Arms and Armor catalog contains many items-- but not all that Chris and his skilled craftsman make. They now make about two hundred items. One will not find a production

line at Arms and Armor. Everything is made to order in a hand crafted way using 1900 era methods. Understandably, a few minor exceptions exist. For example, when a large amount of stock removal is necessary an angle grinder may be used. Most stock removal is by filing.

Chris enjoys an international reputation. It all started a number of years ago when he was touring a museum in England. Chris felt compelled to apologize for a pushy American tourist. That appology developed into an invitation to view and handle artifacts not on public display. One thing led to another. Now Chris has an open invitation from twelve museums in England, Scotland and Scandinavia to research artifacts of his choosing. His reputation makes it possible to gain this same entree into many more museums. A brief list of the museums where he has conducted research includes the Royal Scottish Museum, The Metropolitan Museum of Art and the Museum of London and the Wallace Collection.

A Visit With Chris Poor

by Bob Fredell

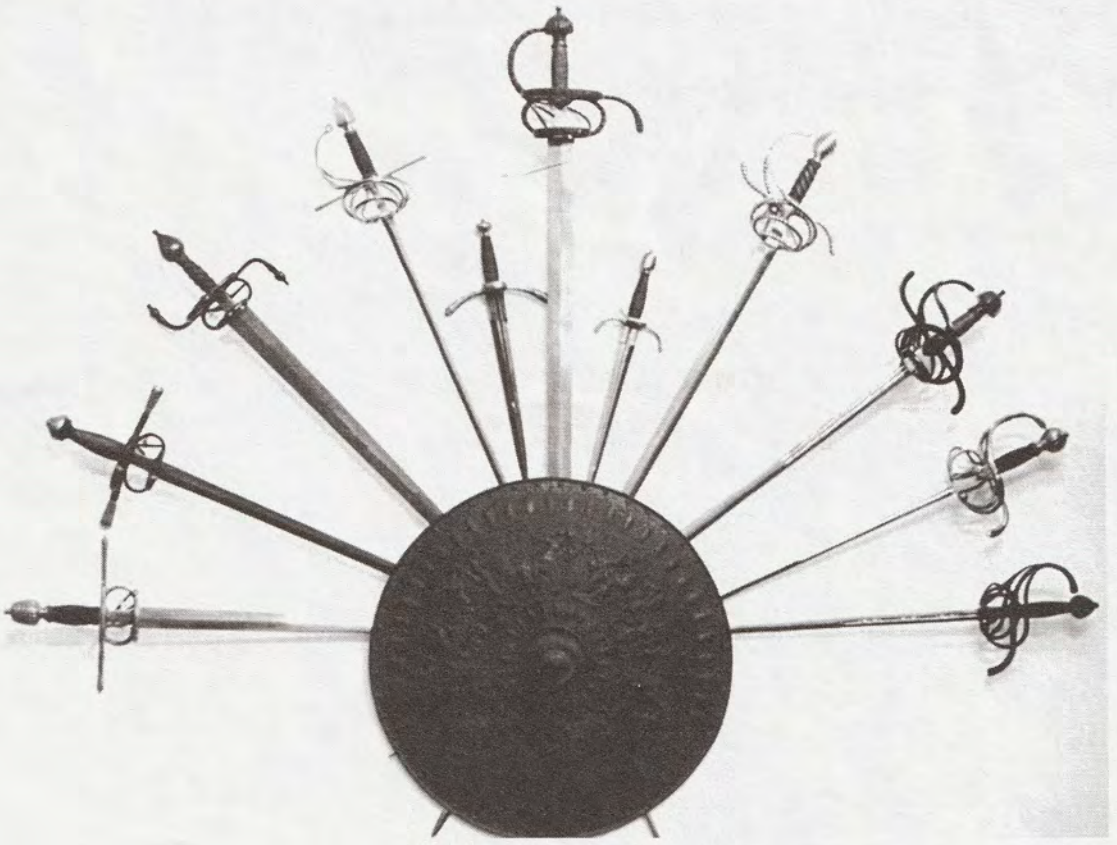
At the Wallace Collection Chris has photographed, drawn and made rubber molds of artifacts. This privilege enables him to make nearly perfect reproductions of medieval arms and armor, as well as other items. For example, he has molds of some of Marie Antoinettes' jewelry and a mold of a Donatello sword. Donatello was one of the Italian Renaissance masters.

Originally, Chris designed the items he made. Now he specializes in making exact reporductions of items from antiquity. He and his craftsmen do this so well that they receive orders from European museums for his reproductions of European arms and armor! He recently received an order from The Tower of London. Now doesn't that deserve a tip of the hat.

Chris stamps everything--one stamp for company made and another stamp for items made personally by Chris. The stamping is important because his reproductions are of the degree of exactness that would enable someone to artifically age the item and sell it as an original.

I found it to be interesting to learn that medieval suits of armor were made of steel, not wrought iron. Chris uses cold rolled sheet steel. his finished suit of armor weighs 65 to 70 pounds. They are all hand forged and have no welded seams. It takes 250 hours to make a suit of full plate armor. I remember hearing stories of knights in armor being thrown from their horse and being unable to get up because of the weight. Don't believe it. Full plate armor is flexible and light enough to allow the wearer to walk and move around.

At Arms and Armor it takes 20 to 40 hours to make a sword. The hilt alone takes 8 to 20 hours. The only reason they can be made that quickly is that they will make 10 swords at a time and they have had much practice. Chris uses 1075 (close to the original) for the blade.



A Visit With Chris Poor

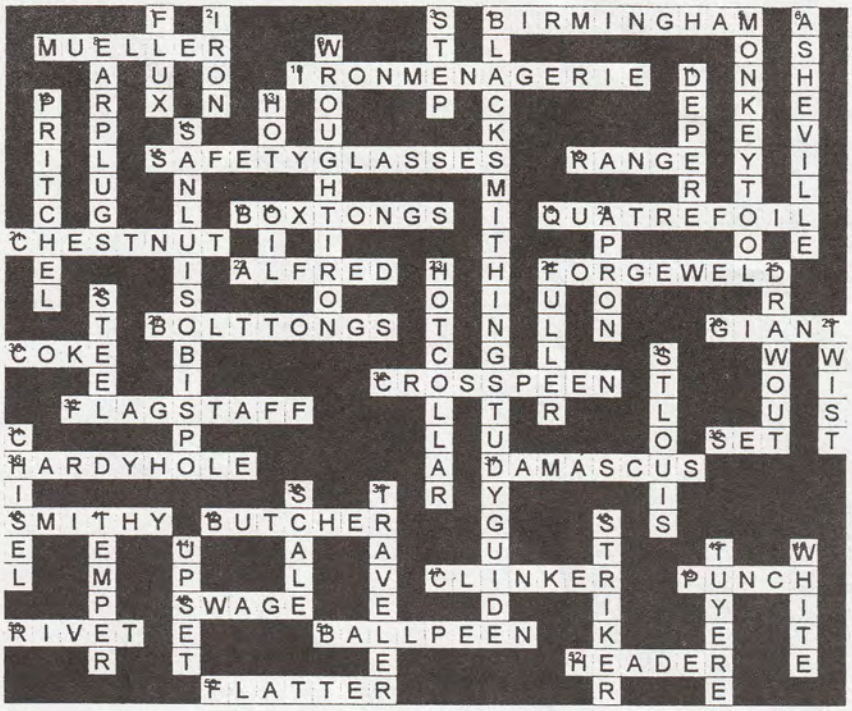
by Bob Fredell

When I first walked into the shop I almost felt as if I had entered a medieval shop. I don't know what the old medieval shops looked like, but I would like to think that this is the way they were. For the most part, the shop is of two fairly good size rooms, full of hand equipment and partly completed projects.

Chris is in Europe from one to three times a year and will probably continue this pace. What about the future? Perhaps the Poors will be making arms and armor for years to come. Chris's fourteen year old son Galen, who started at the forge at age two and his ten year old daughter, who started at the forge at age five have developed interest in making arms and armor. They are currently doing some pretty nice work.

The Guild meeting at Arms and Armor was one of my favorite Meetings. We need to have a replay next year. Program Committee: hint, hint.

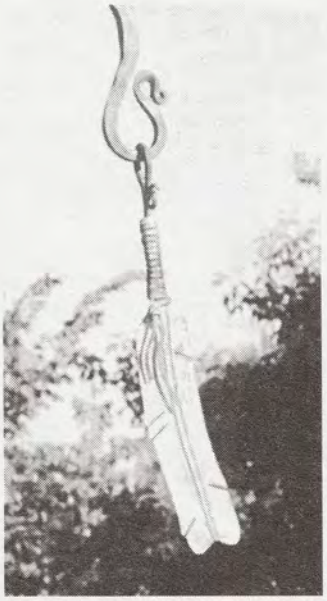
Crossword puzzle answers:

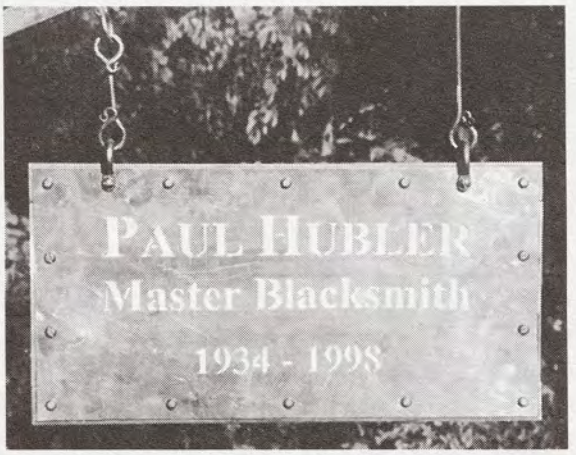


Forging & ABANA Trivia

The Making of a Grave marker

by Myron Hanson





The Paul Hubler family asked John Yust if a member of The Guild of Metalsmiths could make a plant holder and a name plate for Paul's grave site. He volunteered his services and enlisted the services of Don Welch and me. Once again I found there is no small job that John can't make larger, more complicated and more elegant.

John designed the plant holder and made the prints. We quickly went to work because we wanted the hanger to be in place by the soon approaching Memorial Day. Don thought it would be a good time to go get an operation, but he did work with us in spirit. The main upright is made of 1 1/4 inch square mild steel, ten feet long. The top is upset to hold the yet to be made eagle. I formed the remainder of the upright according to John's print. Extending diagonally from the main upright is an arm made from 1 inch square mild steel. After making the flower pot holder, John and I riveted the components together.

While I was forging the iron work, John was cutting sheet copper to form Paul's name, date of birth and date of death. John and I riveted together the sheets of copper and white glass to form the identification plate. A feather swings in the breeze from the end of the arm. It is made of 1 inch by 1/4 inch copper plate.

The day came to put the plant holder in place at Paul's grave. John and I picked up Don Welsh and met Edie Dronek, Paul's sister, at the cemetery. We managed to complete the installation before Memorial Day. We will make and install the eagle late this fall.

By the way, Don's operation went well.

Editors Note: Mike Boone will be demonstrating at the Bemidji Conference in Spring, 2000.

Mike Boone

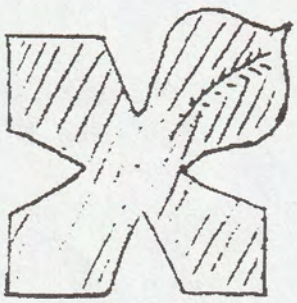
Flower Form

by Mike Boone

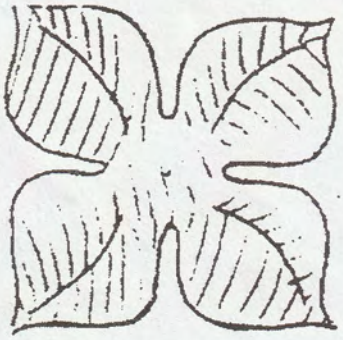
Drawings by Robin Boone

3" x 3" x 3/16"
Cut-out blackened areas.
Make two.

Petal cross-section

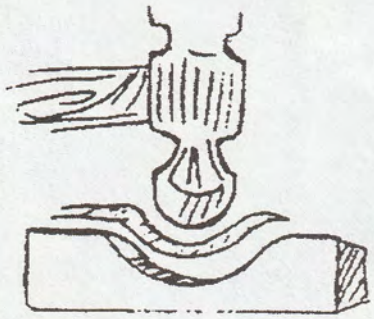


Spread each petal away from center, leaving a raised vein.

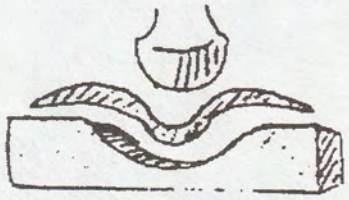


Forge all four petals.

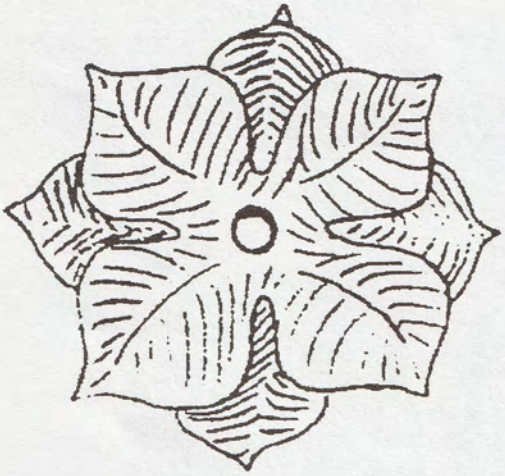
Described here is a very simple forged flower. It is two overlaying square petal elements that combine to make a circular geometric form. I first learned this form from Samuel Yellin flowers in the Washington Cathedral. Yellin's gates are very geometrical in design and the "square/round" flowers compliment the design perfectly. This design concept has infinite possibilities, I am just suggesting one. The center element here is a forged ball that has a 3/8" threaded tenon for attachment. Using a threaded tenon for a center element allows one infinite possibilities for forging and creates a nice fastener that can be used for structural and artistic joinery. The end result is a stylized organic flower that has considerable design potential.



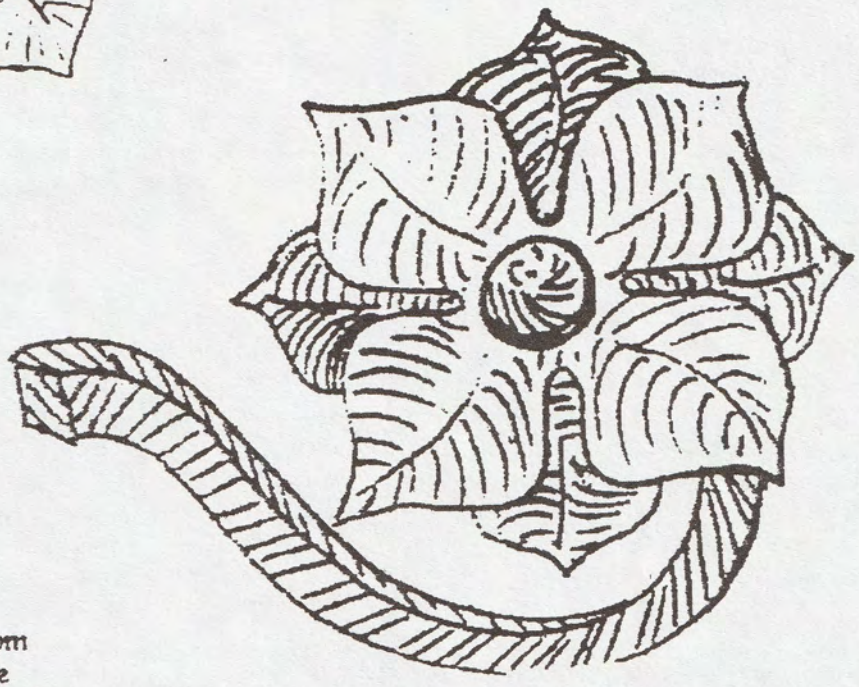
Cup each petal with a ball peen hammer.



Cup center of form as shown.

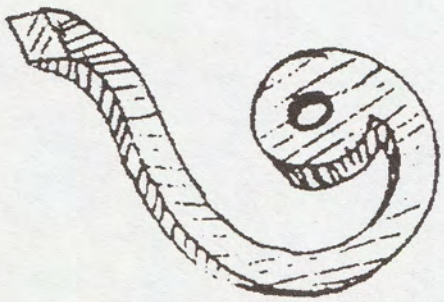


Drill holes in forged elements and overlay as shown.



Assembled Flower

Forge ball from 3/4" square stock with a 3/8" threaded tenon.



Drill and tap stem detail.

By Mike and Robin Boone
Reprinted from LAMAGRAM, newsletter of Louisiana Metalsmiths Association.

From a demo at Bill Gichner's Hammer-In, 1998

Beau Hickory talked of blacksmithing techniques that he uses. Beau is a third generation blacksmith. He learned from his father. He really wanted to be a saddlemaker but was more or less pushed into blacksmithing.

Beau teaches a three step process to successful blacksmithing:
Orient the anvil
Orient the hammer
Orient the material.

1. Orient the anvil

The anvil should be at a height that allows the hammer to contact it at a flat plane. The flat of the hammer should naturally strike flat on the anvil face. You should be upright while hammering. If you are bending over it restricts your breathing and limits the time you can forge in a session. You will tire more quickly. He suggests thinking of the body as a piece of machinery that is going to do repetitive motion. That implies there should be consistent motion in the same place. A way to help achieve that is to always approach the anvil in the same position. He suggest standing at the heel of the anvil with the right thigh touching the left center of the heel. Always go to the same position.

He prefers that his anvils and stands be movable for the job at hand. He also suggests using only wood as a base as it provides for a level of shock absorption that will decrease potential damage to the anvil.
For the same reasons he does not believe an anvil should be anchored down. He also does not favor a shiny, smooth anvil surface. He believes the work is too likely to slip. He recommends never polishing an anvil face.

He also suggested that an anvil could be successfully repaired with hardfacing by following the technique of only doing very small section at a time. Weld a bead and stop. Test it by putting your hand on it. Never let the surface get any hotter than you can touch. This may take you hours to (get done but it will maintain the temper of your anvil and the welded spots will eventually work harden.

2. Orient the hammer

Hammer handles should be long. One guide suggests the entire handle should be from your finger tips to the inside bend of your arm. Perhaps 17-18". They should also be octagonal in shape rather than round and they should be tapered along the full length. This will allow you to immediately achieve the angle you want by knowing the flats on your handle. You can more quickly achieve any angle you want. Between the octagons and the differing tapers you will be able to quickly and accurately know your positioning as soon as you grab the handle.

He also recommends splitting or sawing your hammer handles to add a level of flexibility and shock absorption. This will go a long way to saving your arm and preventing blisters. He also drills a hole in the hammer end, fills it with linseed oil and plugs it with a lag bolt. You change the weight of your hammer by changing your positioning on the handle. The handle is a fulcrum. The farther back you are the heavier your hammer is.

3. Orient the material

Hold the stock to be forged at 90 degrees to the anvil. The left hand (for ri ght handed smiths) becomes the brains of the outfit. The anvil, hammer and arm keep the machine working in a repetitive position and the left hand positions the stock as necessary. This approach provides the ability to do long term, sustained hammering in a production-like environment.

Beau also speaks to three different levels of hammer blows or strokes:
Master - Which is a full body, shoulder and arm blow
Intermediate - Which is shoulder and arm
Minor - Just the arm.

Read your hammer marks as you work. They tell you how you are hitting. Study them and make the necessary changes to be most effective in your work. Develop a cadence, a rhythm that will keep the work moving. This may involve occasionally striking the anvil surface while you reposition or think.

By Don Plummer Reprinted from Hammer Notes, MidAtlantic Smiths Association, Judy Boone

Super Quench Update

by Albin Drzewianowski and Robb Gunter

Rob Gunter was the demonstrator at the Joint Meeting hosted by Furnace Town Blacksmith Guild on March 20. As part of the demonstration he gave us the history behind Super Quench.
He explained that the Super Quench was a replacement for a lye or sodium hydroxide quench which he had been using at the Sandia National Laboratories. OSHA or its Government Agency inspected his workplace at the lab and unequivocally insisted that he "cease and desist" using the lye quench. The lye quench was a very important part of his operation. (Lye is extremely caustic, and therefore dangerous. There is no reason to use the hydroxide solution now that we have a non-hazardous, biodegradable replacement.) Rob experimented until he found a combination which gave the same results as the lye quench. Through extensive testing with incredibly high tech equipment that he had available to him at Sandia National Lab he was able to determine that the Shaklee Basic I (for industrial) with the other ingredients gave the same results as the lye.

Shaklee Basic "I" is a home marketed cleaning product and in this instance a surfacant or wetting agent. A Shaklee distributor can be found almost anywhere you would find an Amway distributor. Try the Yellow Pages. Amway probably has an equivalent but Robb didn't test this. At this point he stopped the testing as he had found the solution to his problem. There was no need to continue to spend the time and money on testing other products.
By the way, for those who wonder why does this work, Rob so dumbfounded the metallurgists at the lab that they were determined to prove him wrong. A considerable amount of testing was done at Sandia National Labs on what was then called the "Soap Solution Quench". The results verified that technically, even without enough carbon in 1018 (mild steel) to harden, he consistently got 43 to 45 Rockwell C all the way through a 1 inch round sample after cutting with a wet saw. Other low to medium carbon and alloy steels were found to harden anywhere from 43 to 62 Rockwell C. 55 points of carbon seems to be the limit for practical use. The Super Quench is too severe above 55 points of carbon and you'll see lots of cracks and part failure. In any case, this quench offers tremendous possibilities in the blacksmith's shop to harden (and toughen) many less expensive steels to make great tools easily.

The formula, now adjusted for the more concentrated Dawn dish soap, is:

5 gallons water
24 oz Dawn dish soap (formerly 32 oz)
5 pounds table salt
8 ounces Shaklee Basic I

Quench at 1,550 degrees F. (Cherry red but below orange)

The Super Quench must be stirred each time before use as it tends to stratify but freezing doesn't seem to be a problem. Alternative wetting agents such as Jet Dry sure don't work as well as the Shaklee Basic I and I'm not familiar with Simple Green. Kodak's Photo Flo is not biodegradable and may be somewhat hazardous in addition to perhaps presenting some disposal problems. The test chemists often use to test the surfacant or wetting agent in a solution such as this is a 3-inch wire loop (lollipop style) dipped into the solution and then suspended vertically above the solution in still air. If the bubble lasts a full 30 seconds on the loop you have an adequate amount of wetting agent in the solution.

The Super Quench allows the smith to quickly make many great tools out of cheap, readily available steels. Robb uses it to toughen hot rolled A-36 to make springs, especially for slap or swedging dies, treadle hammer dies and tooling, bending forks, vise dogs, drifts and pattern top tools to name a few.

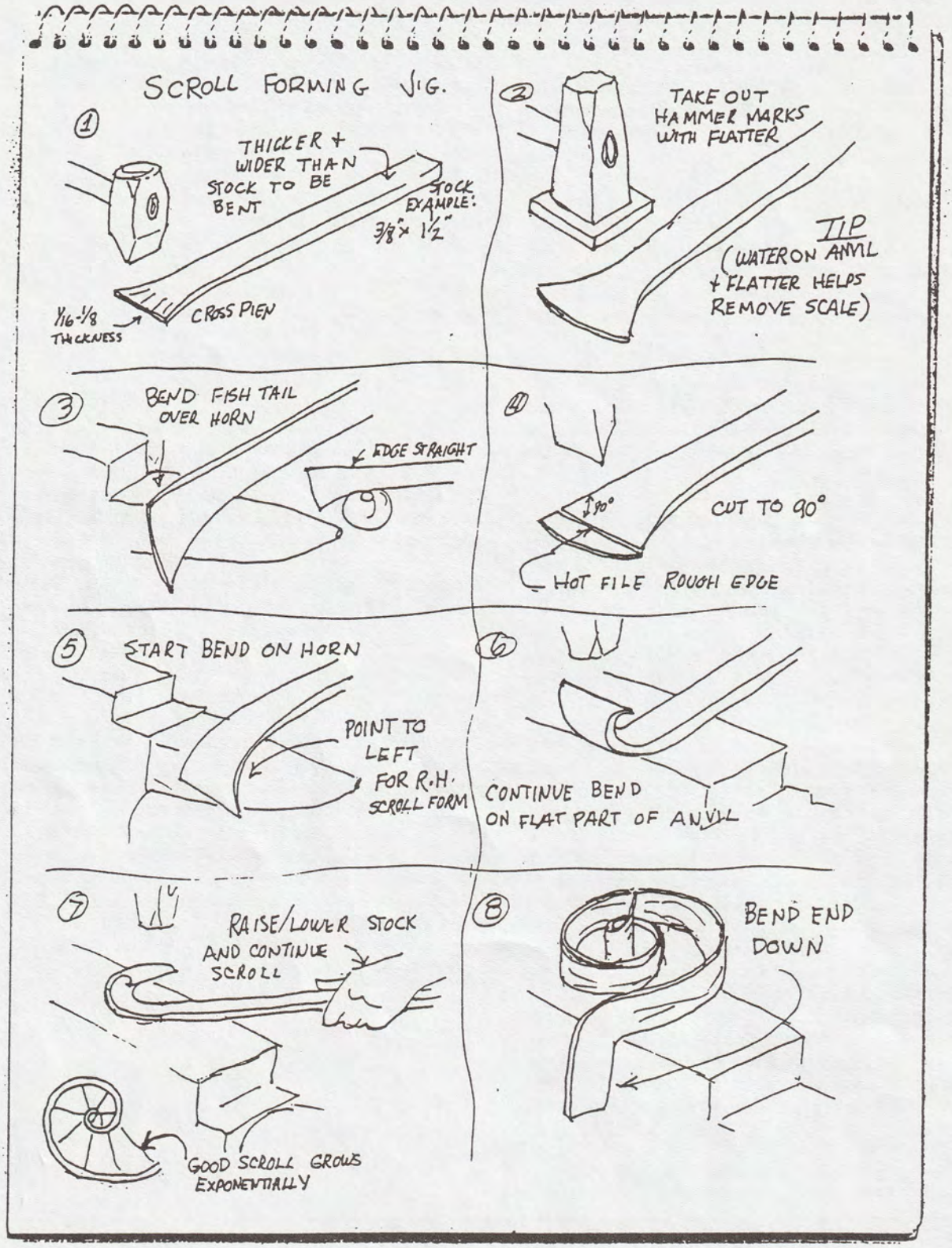
If a newcomer in the craft wants to prove the Super Quench, Robb suggests a test that he often demonstrates: Take a bar of 1/2-inch square hot rolled A-36. Forge and hot rasp a good cold chisel tip with a 5/8-inch taper on the bar. Chop saw off the chisel about 1-1/2 inches long. Heat to 1,550 degrees F. (cherry red but below orange) and quench in Super Quench. Rinse in clear water. Hold the chisel with tongs. Have someone hold the air cooled original bar on the anvil and with a large hammer use the chisel to cut through the other end of the same bar from which the chisel was made. If you don't strike the face of the anvil with the cutting edge the chisel will cut through the bar six or seven times and still hold its basic shape and cutting edge. This proves that the chisel is more than surface or case hardened, is extremely tough and has sufficient hardness to hold a cutting edge.

Thanks to "The Hammer & Tong", newsletter of the Blacksmith Guild of Central Maryland, June/July 1999 for use of this article.

Editors Note: This year Frank Turley from New Mexico will be demonstrating at the Guild Conference.

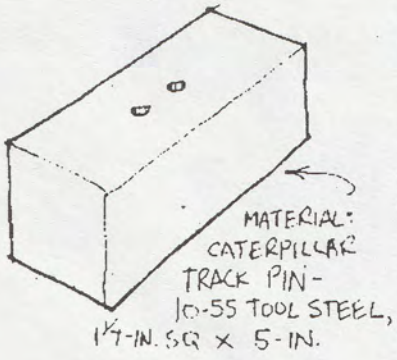
Editors Note: This year Frank Turley from New Mexico will be demonstrating at the Guild Conference in September.

Making a Scroll Forming Jig as taught by Frank Turley at the First Ever Saltfork Craftsmen Blacksmithing Conference, October, 1997 Drawings by Jim Richey



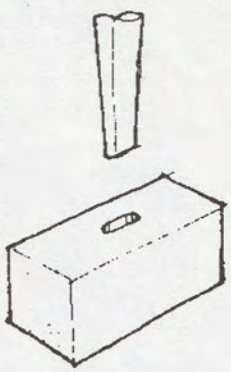
ROBB GUNTER'S HAMMER HEAD

1



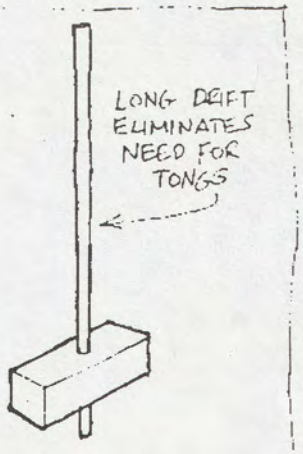
PREDRILL LOCATION OF SLOT. CENTER SLOT ON BLANK

2



SLOT PUNCH BOTH SIDES

3



DRIFT EYE

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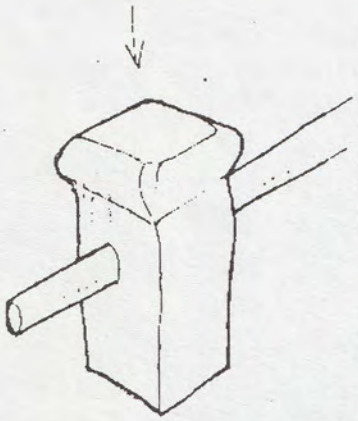

UPSET FACE

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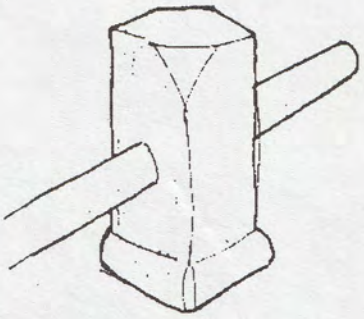
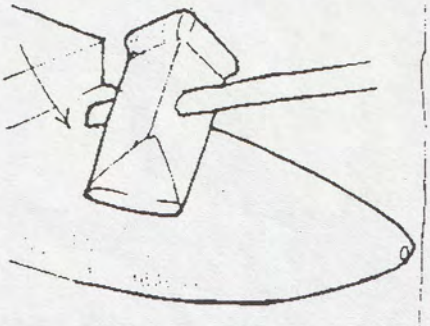


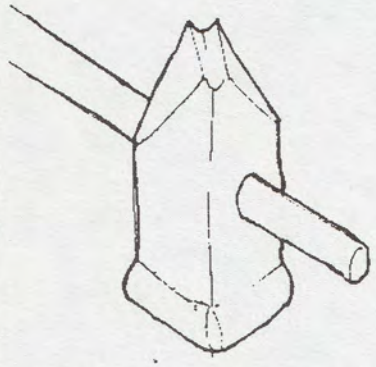
ROUND OVER CORNERS OF PEEN TO MINIMIZE "LIPS"

6



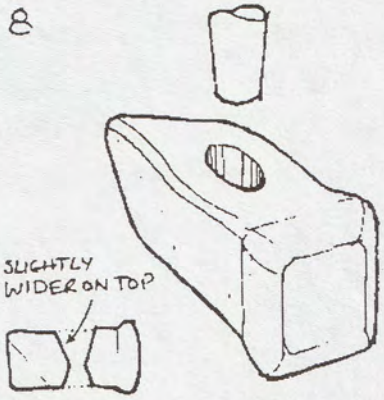
UPSET PEEN ON HORN. NOTE PEEN IS 45° TO HANDLE

7



DEAL WITH LIPS DURING FORGING OF PEEN. GRIND OR FILE FLAT

8



EXPAND EYE

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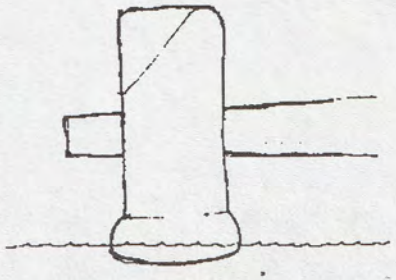


FINISH ON GRINDER. HEAT TREAT. QUENCH ¼-IN., ROTATE END TO END

JIM RICHEY

By Jim Richey Reprinted from Saltfork Craftsmen

Edge Bent Scrolls

The frame for the Chapter Rings Grille was out of wide thin stock and bent on the edge. The stock was 1/4" x 1 3/4" and was tapered down to 1/4" x 1" and then split and the two ends scrolled.

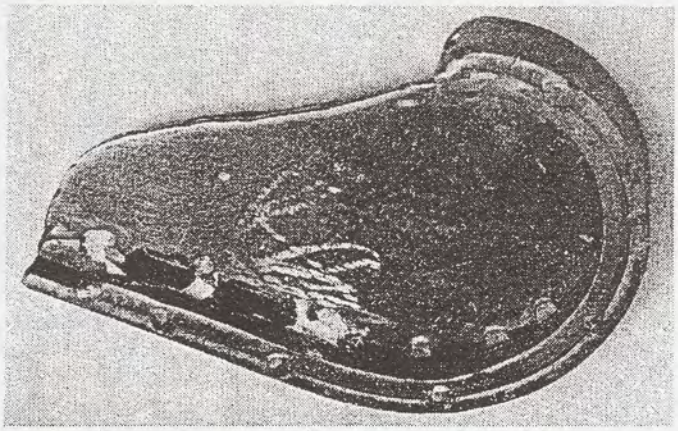
In edge bending the wide part of the scroll you have a problem with the stock buckling or bending in the other plane. It takes more force to bend on edge and regular bending forks and wrenches will make dents in the edge of the hot metal. The edges of the stock are also beveled and this makes the edge thinner yet.

We tapered the stock, split it and scrolled the ends close to the final shape but sticking straight out on the end of the stock.

We made several test scrolls to get the right length and width of the scrolls, then made a scroll jig to make the 200° bend.

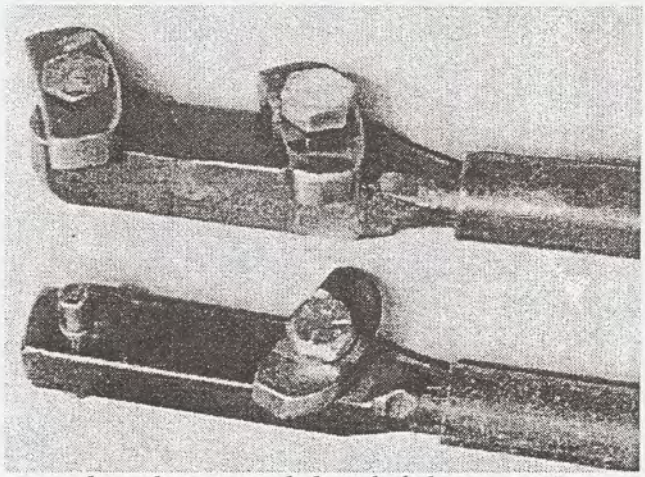
The scroll jig was different design of any I have ever seen, probably not new just new to me.

The scroll form was made from 5/16" x 1 1/4" to fit inside the final test scroll. A piece of 1/4" plate was torch cut to fit inside the form and welded to it to hold it in shape. The 1/4" plate was welded in the center (from top to bottom) of the form. This allowed the scroll jig to be used for right or left side scrolls by turning it over. It has a half inch lip on either side for the scroll wrench to catch on. As it turned out the scroll was too small and rather than make a new jig a piece of 1/4" x 1 1/4" stock was added to the outside of the 5/16" stock.



The bending wrenches were also different so as to make the difficult edge bends without marring the hot edge. They were of a type I had been thinking about for several years but had not had a need to make before.

The wrench is made from 1" square stock with one end drawn to round to fit inside a 3/4" pipe handle. Two holes were drilled in the square, 3" apart, and tapped for 1/2" high strength bolt. A 2" length of 1/2" x 1" stock was forged with one side rounded and a 1/2" hole was drilled in the center. This piece was

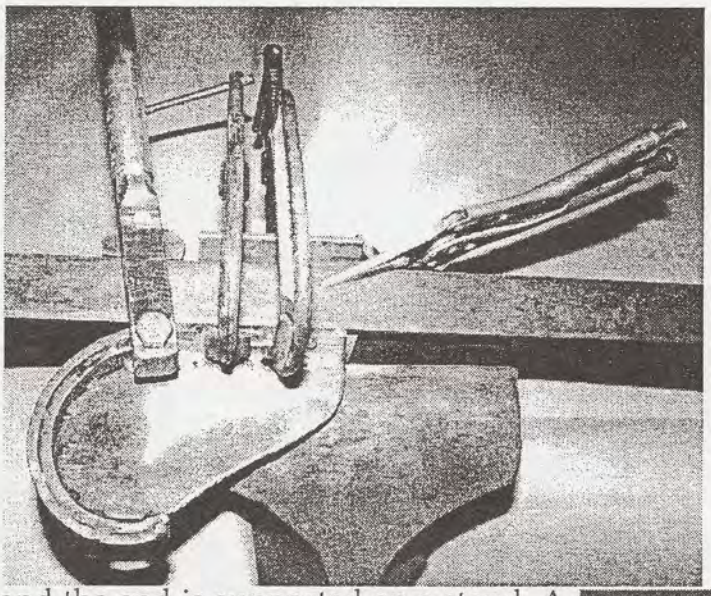


screwed to the wrench but left loose so it could pivot. A pivoting piece may be used inside the jig or just the end of the bolt with threads ground off may be used.

Edge Bent Scrolls

The scroll jig is clamped in vise in the correct orientation to make the right or left hand scroll. A mark was made on the scroll stock (from the layout) that indicated where to position the stock next to the scroll jig.

A 3" length of 3/16" x 2" angle is clamped leg down in the vise to hold the scroll stock level



and the end is supported on a stand. A second piece of the angle is put over the first, leg up and both angles and scroll stock are clamped together with a small vise grip.

C-clamps are used to hold the straight part of the stock tight against the jig.

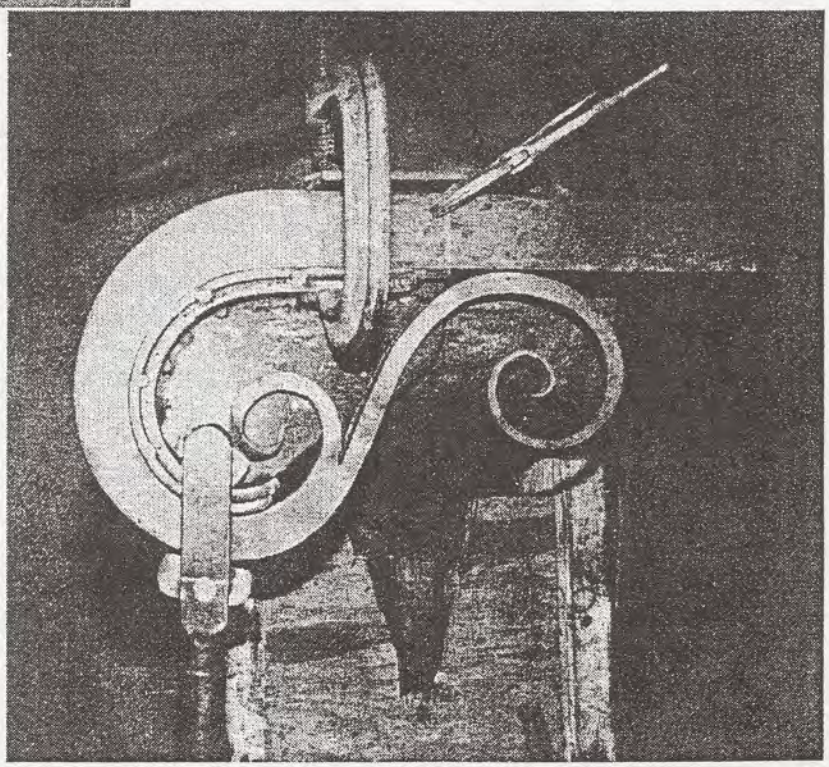
A 2" - 3" length of the stock just past the straight part of the jig is heated with a rosebud torch and bent tight against the form. Do not try to bend stock past where it is hot enough to fit to the form. A wooden mallet or a set hammer was used to coerce the stock in a few places.

©1998 Clay Spencer

Watch for any buckling. Buckling allows the scroll to appear to be turned tighter than it really is. Flattening will appear to open up the scroll.

Heat the buckled area and use a flat sledge hammer underneath and a flatter on top to flatten the stock before proceeding to bend more. If you go too far with the buckling, take the scroll off the jig and flatten it on the anvil or with a treadle hammer.

If the total length of the frame piece was too long, the scroll would have to be opened up a little, and reset shorter on the jig. Then it would be bent a little tighter to achieve the correct length. If too short, then it was opened and set longer on the jig and corrected. These corrections were usually less than 1/4".



Editors Note: Bill Fiorini will be demonstrating damascus at the Fall Conference. Here is a preview from the Potomac Blacksmith's Newletter.

SPRING FLING #7 WORKSHOPS: TWO ACCOUNTS OF BILL FIORINI'S DAMASCUS PROCESS WORKSHOP

April 13-15 at Carroll County Farm Museum

. . . First, by Len Mills

I must begin by saying a few things about the great job Bob Morris and the Carroll County Farm Museum have done in setting up the blacksmithing school There are two rooms, five or six anvils with tongs and racks at each forging station in each room. There is a welder, work benches, and everything else you might need. There were also two Little Giant power hammers [supplied by Bill Gichner] for this course. Great job, Bob, and thanks!

I took Bill Fiorini's Damascus [pattern welded steel] Process class to learn how to forge weld.

The first thing about forge welding is clean the steel. Bill recommends grinding the steel to remove all the dirt, grease, and mill scale. Weld tack bead on both ends of the billet. Weld a square bar on the billet for a handle. The tack bead is needed because different types of steel have different extrusion rates. Use small material: ¼"x1"x6", and use an even number of pieces. For instance, four pieces:

¼"x1"x6" of 1095
¼"x1"x6" of 1018
¼"x1"x6" of 1095
¼"x1"x6" of 1018

Bill likes L6 which is band saw blade (.70 carbon). After welding the four layers to half the thickness and the same length and width , i.e. 1"x½"x6", cut, clean by grinding, and then weld again, producing 8 layers. Do this again and again until you arrive at the desired number of layers. Bill said that 8 to 256 layers or any number in between is all that you need.

Bill does not believe in folding the steel and welding. He uses a wedge cutting tool (hack) to cut the billet so he knows how the steel is layered in the billet. Bill's flux is 4 parts borax to 1 part boric acid by volume. The borax is 20 Mule Team laundry detergent, in a green box, with no additives. The boric acid is roach killer that you can buy at a farm store.

When welding, Bill uses a touch stick (¼" round with taper drawn on end) to test the billet to see if it is ready to be welded. The billet is heated on its edge, then the touch stick is heated and touched to the billet on and at different places. If it sticks, the billet is ready to be welded. On the first heat, flux one side, reheat, flux next side, reheat, etc. until all four sides have been done. Clean the scale off the touch stick and test to see if the billet is ready to be welded. The first weld is at the anvil with light hammer blows. The next welds and the drawing out are done at the powerhammer.

Also, a few words about the coal fire. The billet should be laid flat on top of the fire, not stuck down into the fire. The sides should be stacked high with coal that is burning and turning into coke. Put the green coal on the outer edge of the fire. That way the coke on the inner edge can be fed into the fire as needed.

. . . Next by Jan Kochansky

For random patterns, 128 to 256 layers will give good results.

To simplify welding, start with small bars, such as ¼"x1"x6", using two of 1095 and two 1018. A thin piece of bandsaw blade (L6) may be added for contrast. A 6 inch billet can be welded in one heat. Tack weld the bars together and weld a square bar handle on one end. Forge weld and draw out to hald the original thickness.

Types of layering:

Random - showing a kind of wood grain pattern (mokume) on the faces and parallel lines

(magame) on the edges.

Turkish - Use 21 to 64 layers, forge to 3/8" square and twist. Combine with other twisted stands, straight strands, or with some twisted in the opposite direction. Flatten each strand before rewelding into another billet.

A good welding flux is four volumes of 20 Mule Team borax mixed with one volume of boric acid powder. If using a gas forge, adjust to a reducing atmosphere, with flame coming out of the door about six inches. Flux all four sides of the billet, and do the first weld on the anvil, hitting in the middle to force out excess flux. Even if using a press, it's best to do the first weld on the anvil.

Use light, rapid blows to weld. Flux more heavily on edges. In a coal fire always keep an edge down. Keep the width down. Wider faces tend to give more welding problems. If you do get a flux pocket, cut into it with a hot cut, then force the flux out by forging in from either side of the cut.

Remainder of process:

Mosaic and composite.

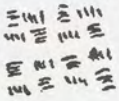
A 6 x 6 mosaic is found in old gun barrels (9 x 9 if fancy). Start with 1/4 to 3/8 square x 6 inches long.

An alternate: All blanks the same, with a nickel jacket - "spiderweb" pattern.

Parquet pattern:

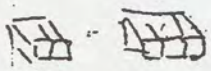
4 pieces of an 8 layer billet

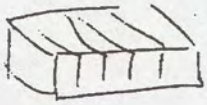
then 4x4



don't go further.

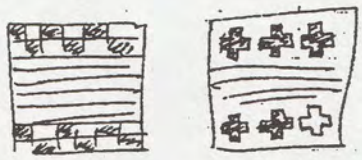
Parquet pattern knife:

Weld  then weld together



and slice piece from end for a blade.

Twisted bars welded to edges - hold together and provide extra pattern.



"Bernard pattern"

Flowers:

Start with 8 layers - reforge on diamond.

Checkerboard pattern fullered on faces

Weld in round bars.

To get spacing, use angle iron - thicker at point - gives distortion.

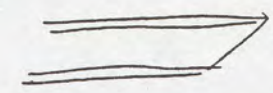
arc weld

angle

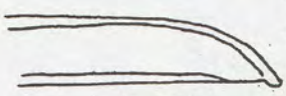
or add layer of Ni, L6, etc.

Making a blade:

Forge to thick blade size, cut end at 45°,



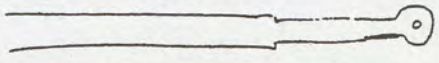
then forge tip down.



Lap end over edge of anvil, in case there are any cracks.

Bill normalizes three times, then anneals in furnace at almost critical temperature.

His forging handles are 5/8" square. Break corners, then wrap with sash cord.



The Stream Bed Bed Bridge

by Marcia McEachron

The stream bed bed bridge is a fanciful idea that I came up with in the development of Elwell Toddler Park in southeast Minneapolis. I was selected by the neighborhood committee to design and create some functional art for a small neighborhood toddler park. The park is designed to be like a home--a front porch, living room and bedroom. A drainage area separates the back section of the park from the front. It was an wonderful opportunity to suggest a bridge--with wooden cedar boards that would echo and even spring a little like a bed. It's become since its installation the "Goodnight, Bridge" for parents to draw their children home. The bridge thunders and boards bend a little: of course, that feature is being worked hard by the wee ones. Jumping on the bed is finally allowed!

One of my favorite images is the dancing bear image from European blacksmithing. I incorporated a Russian bear into the bed to intrigue the children. All the while I was creating this bridge in the studio, everyone thought I was making a gigantic ironwork bed. There was alot of surprise when I told them it was a bridge. Guild member, Bill Hanson stopped by a number of times and helped weld on the bridge on a weekend and an evening. It's always nice when someone drops in carrying a welding helmet. Four hands and two heads are better than one. I used some hollow pipe for the uprights and cut some baskets in half and topped the uprights with a medium sized bearing to make a quick and easy finish. Bends and curves of waves are made from square tubing and plants with forged angle iron.

There are still things to put up--a fence like a front porch will enclose the front end of the park. The neighborhood moms discovered the toddlers like to make a race for the street to play with the big cars, so some decorative fencing is next. The design of the toddler park is intriguing patterned after the layout of a home. If you would like to experience this concept near its completion, take a toddler in hand and visit Elwell Park at 6th St. Southeast between 7th Ave and 8th Ave Southeast.

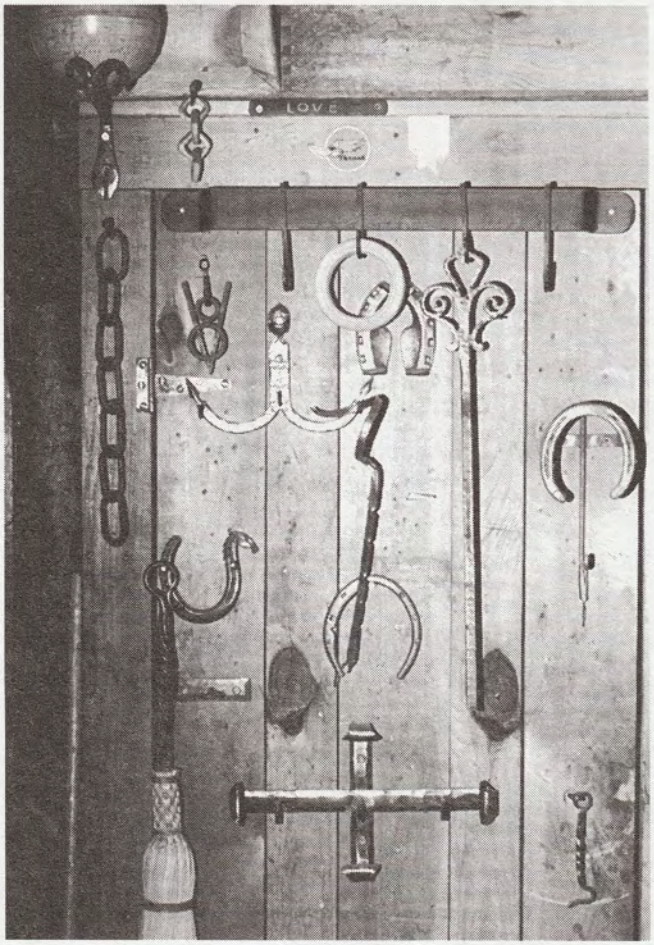
Hammer In at the Pete Stanaitis Farm and Forge

June is the best month for a blacksmith outing especially when it involves a sunny day, an idyllic Site, food forges and new ideas. Now that is positive chemistry!

Pete Stanaitis hosted a Hammer In that defied the heat of the day with plenty of good spirits and tools to play and learn with. Demonstrations went on all day--Bob Walsh, Pete Stanaitis and Monty Bygd. Marcia McEachron demonstrated her " 7 minute fish"on the power hammer and Aaron M. from Zimbabwe forged a hunting spear for lion.

Cover Photo

This photo was taken of a cabinet door in Paul Hubler's Shop in Rockford, Minnesota called Piety Forge. The picture was taken by Bob Fredell 15 years ago. On this cabinet door Paul hung samples of the blacksmithing items he enjoyed making. His shop looked like the smithy of 100 years ago. Paul was a cabinet maker before he embraced blacksmithing. It is a nice remembrance of someone whose talents inspired so many in the art of blacksmithing.



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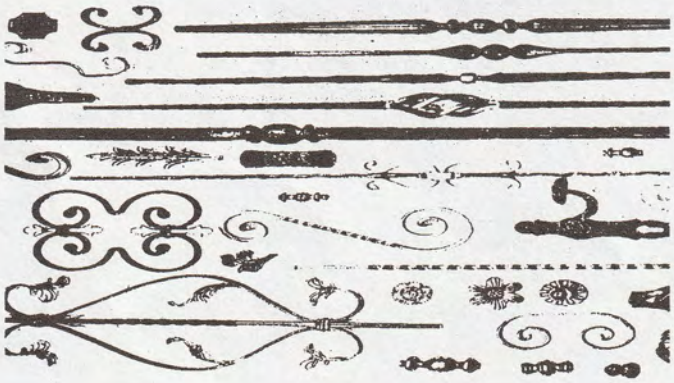

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BOTTLE OPENER

by
Doug Merkel
From Hammer & Tong
Vol.14 No.2 April/May'99

Stock: ¼ x 1 x 24.

Tools: ¼ or 5/16 inch punch, Drift from 5/16 to 1 inch, 3/8 spring fuller.

All work is done hot.

Neck down to about ½ inch at 1 ½ inches front the end with spring fuller. Taper behind the fuller marks for about 4 inches. Upset and forge the end into a circle over the far side of the anvil. Hot punch a ¼ or 5/16 inch hole in the center. Drift hole to approximately ¾ inch (+/-) or until you can get it over the tip of the horn of your anvil. Continue to forge over the tip of the horn until the hole is approximately 1 ¼ to 1 ½ inch inside diameter, round up the edges of the hole and the edges of the handle. Upset the hole to an oval shape.

Use the ¼ inch punch to knock down a small tab on the inside of the circle next to the handle. Then place over the pritchel hole and set this small tab below the plane of the forged circle. Cut off the excess to make a handle of the length you want (we started with 24 inches so we had a handle while forging). Decorate/punch handle to your desires. Wire brush and apply hot wax or oil finish. Begin again with what is left from your original 24 inch piece.

GET IT HOT, HIT IT HARD, QUIT WHEN YOU'RE DONE!

FIRESCALE REMOVAL

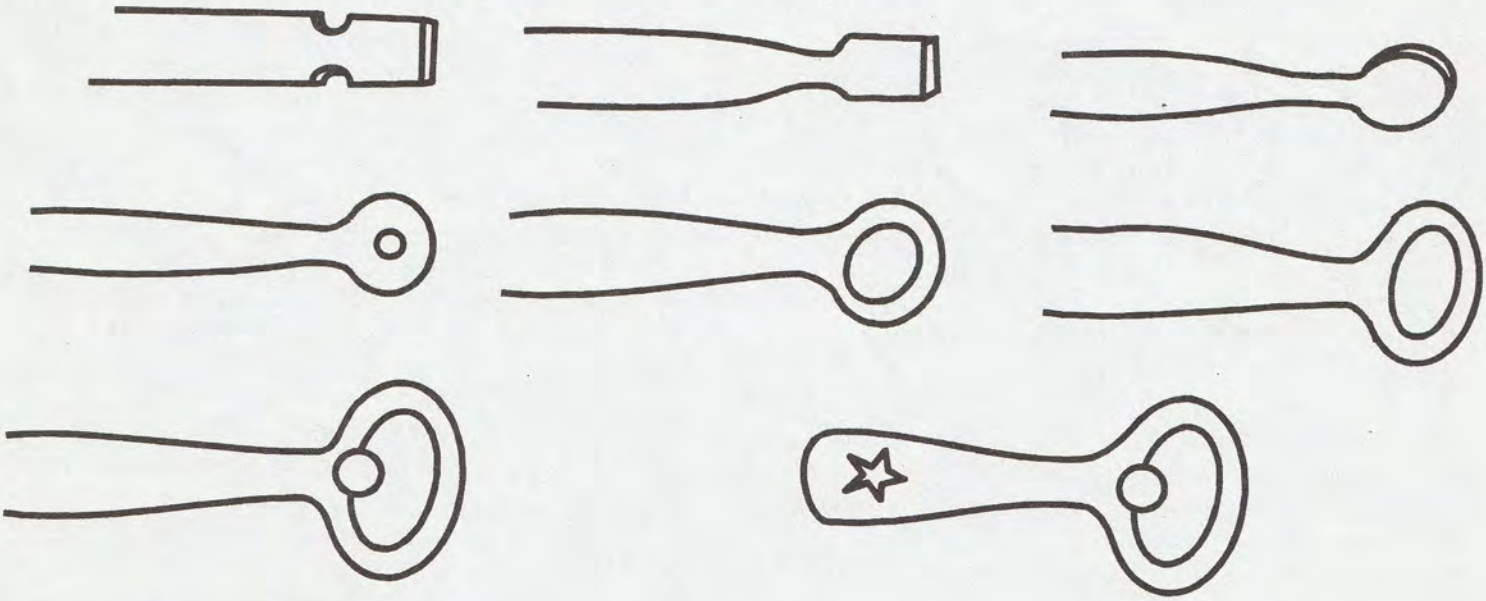
from
Pittsburgh Area Artist-Blacksmith Assoc.
April 1999

Cheap and Easy Fire Scale Removal Tip

Try soaking pieces overnight in vinegar to remove fire scale. A 5% vinegar,which is good quality vinegar like the kind used for pickling,works well to clean pieces. It is especially effective in production work. I recently cleaned about 50 letter openers with little effort by soaking them overnight.

A product that works even better than vinegar is concentrated stop bath used by photographers to process film. It is the same chemical composition as vinegar (acetic acid),as cheap as vinegar,but has a couple advantages. First,stop bath can be mixed in a higher concentration than store-bought vinegar. I used two ounces to a gallon of water. Also, stop bath is colored yellow and will turn clear when it loses its effectiveness. That bright yellow color, however, may cause visitors to your shop to wander what your are using to clean steel.

After soaking awhile, the steel may look black and yucky. When you remove the pieces, they must be rinsed well to stop the acidic action. The surface of the steel may get a brown film on it which is easily wiped away with an oil-soaked cloth or some steel wool. Once dried and clean,the steel is free of scale and ready to finish.



An Orthopaedic View

by David C.M. Schiff, MD, FACS, Fort Bragg, CA

Dear Bob,

I read the article regarding tennis elbow on page 22 in the May/June 1998 *California Blacksmith.* I really enjoyed the article but do have some additions to make.

As a practicing orthopaedic surgeon who sees probably three to five such cases a week and has had it himself and who actively works at the forge, I have some comments as follows.

The problem with lateral epicondylitis or tennis elbow has to do with tendon degeneration and micro tears which occur with age.

I don't believe that early preventive measures are very helpful. I have not seen this work at all, and I haven't seen any exercise of any kind work. In my course of training as a fellow in upper extremity reconstructive surgery, as well as in my practice in orthopaedic surgery in Fort Bragg of 20 years, I have never found anyone who does prevention exercises that have materially affected the course of this particular problem.

I do believe that there are some things to do.

Edward Martin taught me that the hammer needs to be balanced properly. Narrowing the neck of the hammer haft below the actual head and providing a grip that is comfortable in the palm is critical. He used a hoof rasp to narrow the neck, thus improving the hammer's polar moments with the thinner neck and hammer mass at the hammering end and the thick handle at the other. This allows the hammer to pivot better than if the mass of the haft is distributed equally along its entire length.

But as we all know, those of us who strike the anvil with the hammer, the wrist goes in a thumb-to-littlefinger motion or radial to u1nar deviation. We tend not to strike it in a palm-up-pound-palm-down motion. Lateral epicondylitis or tennis elbow is mostly associated with bringing the wrist up and bringing it against resistance. In my practice of orthopaedic medicine in the past decades, I have found the following to be most useful: I typically tell people to take over-the-counter Advil, but they need to take three tablets at one time since the prescription strength is 600mg. and the over-the-counter strength is 200mg. Three tablets, three to four times a day is a standard dose.

One in good health and without stomach problems can safely take 800mg. of Advil or Ibuprofen four times a day at the maximum. I frequently give patients some samples of this or another type of anti-inflammatory agent. In addition, I provide a tennis elbow band. This is a band of material that has absolutely no stretch. In principal, if you take one hand and put it around the forearm of the other and then squeeze the fist of the

hand that is free you will find that the forearm increases in its girth. When muscles shorten they increase in their cross-sectional area.

A band that will stretch around the forearm does very little, but a band that is unyielding to the expansive volume of the forearm with power grip will prevent tensile forces from being built up on the micro-tears in the tendon and will diminish the amount of pain. After measuring the patient's grip on the dynamometer, I typically see an increase of 10 to 20 pounds with much less discomfort. I tell people to wear this two to three finger breadths below the tender point on the elbow and put it on tight with the hand grip relaxed. Amazingly enough it does not seem to cause circulatory problems, but obviously one must be careful not to use something that makes a tourniquet. The band I use is relatively inexpensive; it is made out of nylon and has a velcro closure. Rubber or any type of elastic is not nearly as effective since it stretches with the increasing girth of the forearm under power grip.

The last thing that I tell patients to do is to rub the sore spot. We don't know exactly what this does - if it turns down the volume in the brain, makes someone less sensitive to pain or desensitizes the area. Probably all of them work. We do know from peripheral nerve

injuries in the upper limb that over-stimulation, tapping, rubbing of a cut nerve in the fingers will diminish the very unpleasant and disagreeable sensation that is present from the injury.

This same principle applied to a sore part of the elbow over the tendon also is helpful. Whether or not it brings in new blood supply is pure conjecture since no one has proven it in a peer review journal.

With regard to surgery, I have operated on a number of people with this condition. They have all gone back to work. I believe that surgery is an option only after six to nine months of conservative care. Having had this problem myself from doing manual work in the operating room, such as spine surgery and the like, I find it to be very difficult, but the type of treatment that I have discussed above has been successful.

Lastly, I believe that cortisone should be used with caution. There are a number of references in the literature that indicate tendon rupture can occur after corticosteroid administration. There is a loss of the subcutaneous contour in women, and so a dimple can frequently occur and the skin can become thin and discolored because the subcutaneous fat, which is minimal in the forearm, will be dissolved with the corticosteroids. Finally, corticosteroids in mammals tend to stop tendon collagen repair for as long as 89 days, collagen being the tensile fibers that make up our tendons and ligaments.

I believe that this type of educational information belongs in our journal, and I am very pleased to see the column originated. In summary, successful treatment of tennis elbow does not require injections. It does require the tolerance of some discomfort, the use of a simple inexpensive band, desensitization of the painful area and when using the hammer, if one is starting out cold, some warm up. Lastly, thinning the hammer haft so as to provide a polar moment of inertia in the hammer handle is probably important, but to my knowledge has not been quantified.

Sincerely,

David C.M. Schiff, MD, FACS

CBA **Editor's Comments:** Many years ago I bought this hammer just for the handle. I marvel at how the capable owner had reduced the handle to the minimum, perhaps like a golf club. Where he grasped it was, I am sure, comfortable for him and tapered so that he could easily hold the handle in his grasp. He removed the excess wood above to give a flexible extension of his arm and a beautiful handle. He must have had a good arm and eye to handle that three-pound head! I sent this picture to David and asked if this followed Edward's handles. Here is his answer.

Dear Bob,

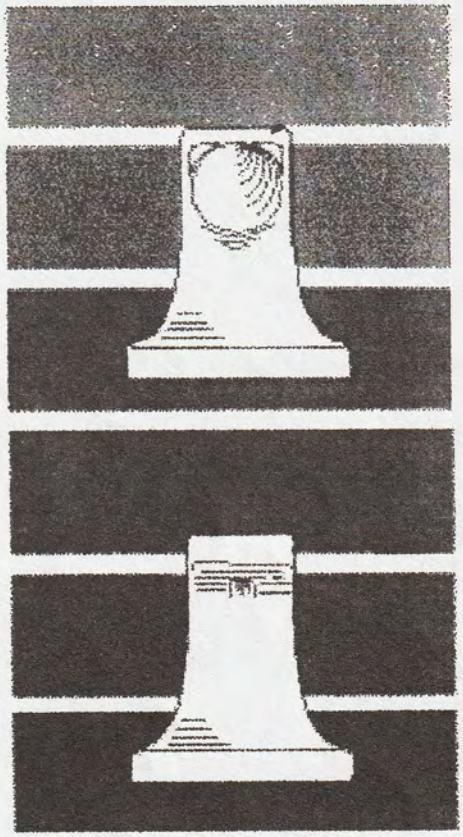
Thanks for the photo which I am enclosing. Yes, that is very much like what Edward taught me and what I have since done to my handles. It is actually rather amazing how smooth you can make a handle by chucking the head in a post vise and using the reins of a pair of tongs to smooth the wood after you have used a course rasp on it. Edward did this for me on my primary hammer when I visited him, and I have since done it to all of those that I use with any frequency in the shop. I do believe it makes a significant difference. Edward also modeled the amount of radius of the curve where you grip significantly differently on the outside from the crowned side so that, as Edward said, when I pick it up in my hand I don't have to look at the head to know with which end I will be striking.

I must say that I have not even come close to approaching his facility, but an interesting point nonetheless. I treasure the hammer handles that he prepared for me.

Best wishes, David

Reprinted from California Blacksmith, Bob Thomson, Editor

ABANA CONFERENCE 2000



When: July 12th -16th, 2000

Where: Northern Arizona University, Flagstaff AZ

Focus: Bridging the Past to the Future

Get a load of these demonstrators

Anthony Robinson Anthony is from Stanton-upon-Hine-Heath, Stropshire, England. His best known work is the gates in the great hall of Winchester Castle. A blacksmith since 1964, Anthony is enamored with forging stainless steel. The grace of his forms and the rich gleam of his chosen metal combine to give his work a rare and exquisite quality. At the ABANA Conference Anthony will demonstrate the forging of stainless steel.

Hans Peot Best known for his gas forge plans, Hans has also offered plans for a mechanical trip hammer and a pattern cutter. Parenthetically, Hans was the Assistant Program Director for the B1-B Bomber. At the conference he will demonstrate making tools from scrap steel for the beginning and intermediate blacksmith. He will also demonstrate the use of his gas forge.

E. A. Chase Perhaps you may remember the beautiful lamps of Mr. Chase as seen in the winter 1997-98 issue of The Anvil's Ring. Mr. Chase has the ability to make his sculptures in iron flow into graceful natural forms. Mr. Chase has been teaching and demonstrating since 1958 and will be a welcome presenter at the ABANA Conference.

Watch this space in the next four issues of Metalsmith for more Information on the ABANA Conference 2000

Guild Video Library

T-1 1990 Metalsmith Madness(D. Stiegler)
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T-3 88/89/90 Hubler Hammer-In (JaroslavValek)
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T-5 88 Metal Madness/Hmong Knife making
T-6 Monty Bygd Hammer-In/Ollie Juaire Demonstration
T-7 Power Hammer Rebuilding Workshop Fred Caylor. 3 hours.
T-8 92 Metal Madness(Jack Brubaker)
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T-10 92 ABANA Conference
T-11 92 Monty Bygd Hammer In
T-12 Howard Clark Knife Making Workshop
T-13 94 Tunnel Mill and David Norrie
T-14 93 Metal Madness(George Dixon)
T-15 93 UMBA Conference(Daryl Nelson)
T-16 94 UMBA Conference
T-17 94 Bemidji Conference(Doug Wilson)
T-18 95 UMBA Toby Hickman
T-19 95 Bemidji Conference (Batson)
T-20 95 Metalsmith Madness (Ed Grove) Punch and Chisel Workshop.
T-22 95 UMBA Conf at Haverhill
T-23 94 ABANA Conference Yellin's Legacy Intro to Hossfeld Bender
T-24 95 UMBA Robb Gunter
T-25 Bemidji Blacksmith Conference 1996 Guild Meeting (Jerry Biersch)
T-26 Hershel House Vol. 1,2,3
T-27 96 UMBA Brad Silberberg
T-28 96 Haverhill (David Wilson)
T-29 96 Madness
T-30 96 Tunnel Mill(Paul Hubler)Grapevine
T-31 Francis Whitaker Blacksmiths Foundation
T-32 1996 Northern MN. Conf.(Doug Hendrickson)
T-33 1997 UMBA Conference (Mike Boone)
T-34 Condensed Version of T14
T-35 1997 Northern MN. Conf.(Billy Watson)
T-36 1997 BAM Ozark Conf (Uri Hoffi & Mike Boone)
T-37 Tom Latane Making Norwegian Trunk Key
T-38 3 tapes (17 hrs) 5 day workshop with Uri Hofi.
T-39 97 UMBA Joe Anderson
T-40 97 Tunnel Mill (Fiorini, Hubler, Steve White
T-41 97 MADNESS (Ivan Bailey
T-42 97 Regional UMBA(Peter Renzetty)
T-43 98 Spring UMBA (Beau Hickory)
T-44 Robb Gunter Basic Blacksmithing (Commercially Produced)
T-45 98 Bemidji (Rick Dunkerly
T-46 98 Haverhill (Bob Patrick)
T-47 98 Bill Callaway
T-48 98 Fall Conference Peter Ross
T-49 98 Fall Conference Nol Putnam
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Forge Welding: The Basic Stuff

by David Mariette

So you've cleaned out your fire and you're ready to start forge welding. This is article two of a series of articles that focuses on the technique of forge welding.

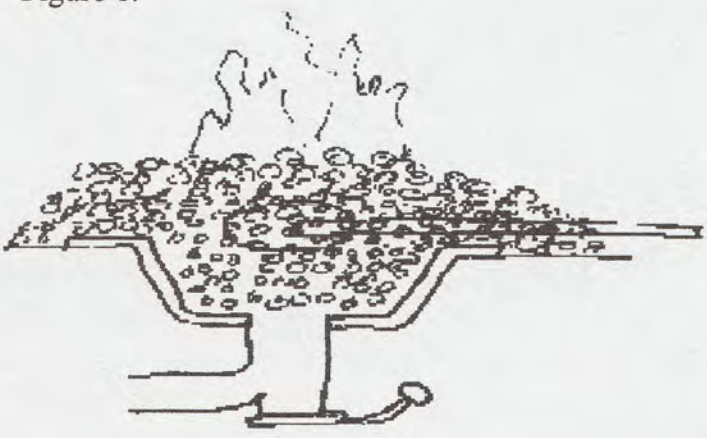
The first question that could be asked is, how do I know when my fire is ready to be used for welding?

Let me give you an ex rcise that will help you to learn.

In a previous article I discussed the importance of your fire and why it is the first key to unlocking the mysteries of forge welding. A clean well coked fire that is built up enough to put your heat center on a level plane with the edge of your forge or fire pot is a must. As discussed earlier every forge, every different type of fuel, or combination there of will give you an infinite number of variables that will challenge your ability to know when your fire is ready to weld. Use this technique to help yourself make that determination. As I am still learning myself, I still do this. Call it a warm up excersize.

Start with a piece of 1/2" by 1/2" stock that is about 24 inches long. Place the iron into your fire. Remember, do not poke it down into the fire. Slide it in level, and no deeper than the edge of your fire pot. (Figure 1) Make sure you have at least two to three inches of coke on top of your bar, then pack your coke in and around your stock if necessary with your rake. Your bar should be resting snug in your coal. It should not be set in loosely.

Figure 1:



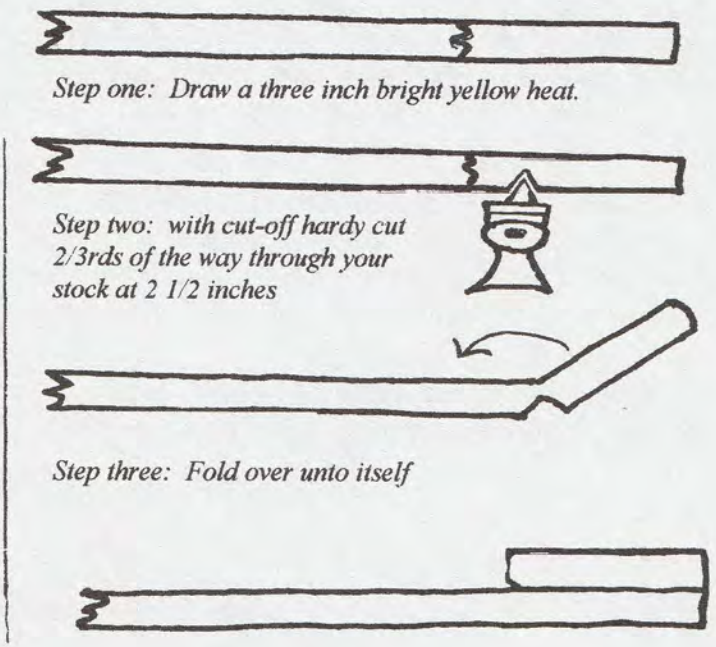
Until the week that I spent with Bob Patrick at the Ozark School, I had this notion that I had to be able to see my iron in the fire. After all, how would I know how hot my iron was if I could not see it? This is a common mistake. Just about any and all of my forge work for my first three to four years of blacksmithing was done in a propane forge. Like biscuits in an oven I would find myself constantly checking my iron (or biscuits) to see if it (or they) were ready. It is a difficult habit to break. Cover it up and pack it in tight. This keeps the heat in and the oxygen out. If you have to see how hot your iron is, pull it out and look at it, then put it back into the coke. Whether you are welding or just forging, learn to develop this technique for heating your iron. This is the technique we teach in our beginning blacksmithing classes, and is also discussed in the "First Fires" section of your "Guide to Blacksmithing".

Draw a yellow heat on about the last three inches of the bar. With your hardy cut off tool in your anvil, at a distance of 2 1/2 inches from the end of the bar, cut into the bar about 2/3rds of the way through it, and fold the end of the bar over onto itself. (Figure 2) Then place the bar back into the fire, and bring your iron up to a welding heat.

How will I know when my iron is at welding heat?

First, check your calendar. Check the posi-

Figure 2:



Step one: Draw a three inch bright yellow heat.

Step two: with cut-off hardy cut 2/3rds of the way through your stock at 2 1/2 inches

Step three: Fold over unto itself

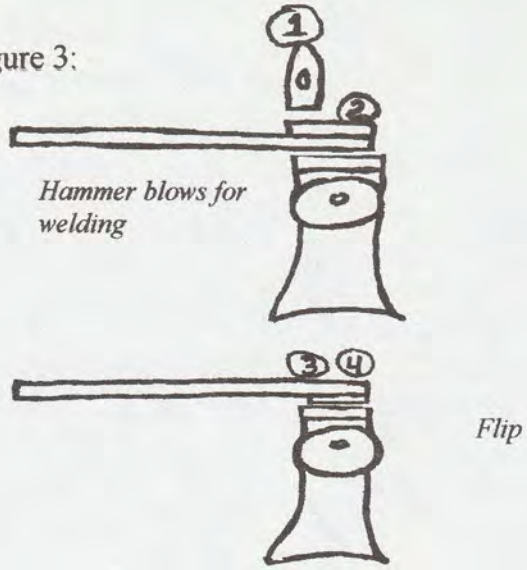
tion of the moon in relation to the position of the North Star. If you were born on an even day of the month and the vector created by moon's trajectory across the evening sky lies to the south of the North Star, your iron will take 2.5 minutes to heat up. If you live in the southern hemisphere, or you were born on an odd day of the month you are on your own. Have I made myself clear?

Prior to having spent a week with the master, at the Ozark School, this explanation would have been as good as any in my book for as much success as I was having trying to forge weld at the time. Actually, there are a few good ways to know, but first, keep in mind that this is going to be a learning process. I am not going to be able to offer up the magic formula. You are going to have to do weld after weld, time after time, and you will get better at it. What may work in one situation may be different in another. Practice! Practice! It will ultimately be your magic key. Every time I light up the forge for whatever reason, I try to weld something together. As I am still learning, not every weld that I do, works. I am having some success with it now, and it is quite fun.

Watch your fire. Your iron will not get any hotter than your fire. If your fire is a only a bright red color, that is as hot as your iron will get. When you look into your fire and you see that bright yellow color, your fire is approaching welding temperature. You will see an occasional red or orange spark that will flow out of your fire as the air passes through it. When you see a bright white burst coming out of your fire, shut off the air and rotate your stock in the fire 90 to 180 degrees. Now sing, "I've been workin' on the railroad. All the live long day." Remove your iron from the fire. If what you see resembles one of those sparklers that you had when you were a kid, enjoy the show while it last, then cut off that piece and start over. I suggest that on your next attempt you pick up the tempo of your song. If what you see is a very bright yellow piece that looks wet and there are little wee tiny sparks dancing off of it, take it to your anvil, and with fairly light but firm blows of your hammer weld it together. (Figure 3) First make two blows on one side, then flip it and make two more blows on the other.

There, congratulations, you've welded two pieces together. Continue to draw out the end of the

Figure 3:



bar about and inch or so. If your iron is still at a yellow heat start to round off your bar by hammering on the diamond. Forging your weld on the diamond stresses your weld, if it holds together, you have been successful. It was a good weld. Before you start to round off your bar, be sure your stock is a bright yellow, or near welding heat. As you continue to forge this piece, because of the chemical changes that have occurred during welding, the welded area will want to continue to be forged at a higher heat. If it gets to cool, say a cherry red, and you are still forging, it is quite likely your weld will break. I am not a chemist. I do not know the technical nature of what has happened. That is just the way it is.

As a caveat I would suggest that determining welding heat by relying on that white carbon burst from the fire is not always a reliable indicator. If you think your iron is at welding heat and you have not seen a white burst, just pull the iron out of the fire and look at it. Sometimes the best way to get a weather report is simply to go outside and look. Also, you may have some small pieces of iron burning up in your fire that are giving off phantom carbon bursts, and your iron is not yet up to temperature.

The Scarf:

Scarf. It is an interesting word. It is both a noun and a verb. It is something to wear around your neck to keep you warm in the winter. It is also my preferred method of consuming a quarter pounder with cheese. As relates to blacksmithing it takes on a

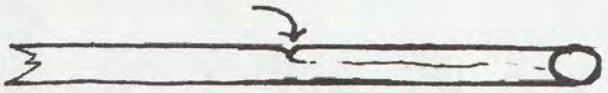
whole new meaning, but it still remains both a noun and a verb.

Referring back to the piece that you just welded, drew out, and rounded off, there is still a spot on the bar where you see that the piece was folded back. (Figure 4) As hard as you may have tried you no doubt were unable to forge it out. It is still there.

A "scarf" is a method of preparing the surfaces to be welded so that they will blend together. It is a shape that you give these surfaces. Hence, the shape you give it is a scarf, the noun, and the process

Figure 4)

This little divot will not go away



A scarf will prevent this and allow it to blend with the parent material.

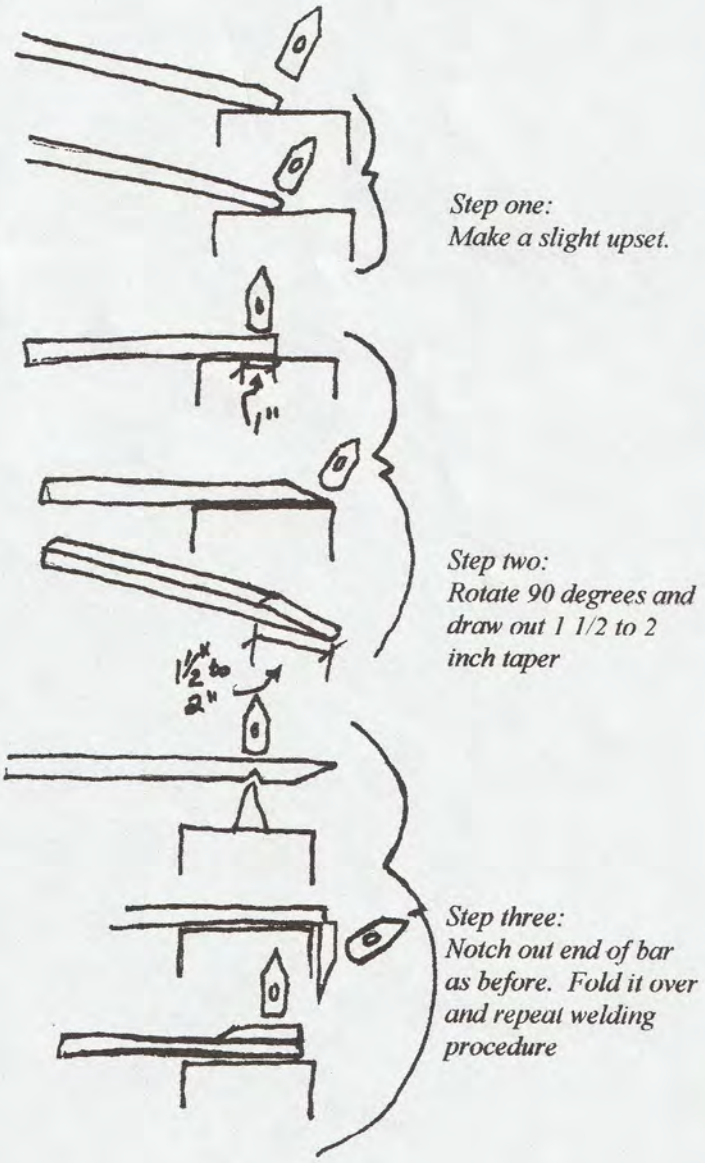
of making the shape is to scarf your material, the verb.

There are many different shapes of scarfs. There are as many different scarfs as there are shapes of material to scarf. At the school Bob taught us several ways to scarf our material as it related to a particular application and type of material. Most of these I will cover in time, but for now let us return to our bar that we just welded. If the end that you were forging on is still hot, cool it. Turn it around and draw a yellow heat on the other end of the bar. Upset the bar one direction slightly on the end then rotate 90 degrees and draw out a taper on the end starting back about one inch from the end. (Figure 5) Your taper should turn out about 1 1/2 inches to two inches long with a slight radius on the end. Moving back about two inches from the high side of your taper (for lack of a better term), cut about two thirds of the way through your stock just like you did before, fold it over on to itself, and put it back into the fire. Draw a welding heat again just as you did before. This time as you go to your anvil make your first blows of the hammer lightly but firmly on the end that is folded back where it joins the parent material. Make a couple more on the top. Flip it over. Make a couple on the other side. As you draw out the material observe the joint. Did it blend nicely? If it did, Good job! If it needs a little help just go back and get another welding heat and continue to blend the seem as you draw out the end.

There, you just did it again, another weld, and you did it without any flux either. If you are curious as to whether we were ever taught to use flux, yes we were. In subsequent articles I will get into that. The most important thing in forge welding is the heat not the flux, and that is what this excersize was all about, beginning to learn about welding heat.

You have my sincere apologies if you are more confused on the subject now than when you started reading the article. It is a lot to digest. Look on the bright side, you are just getting started.

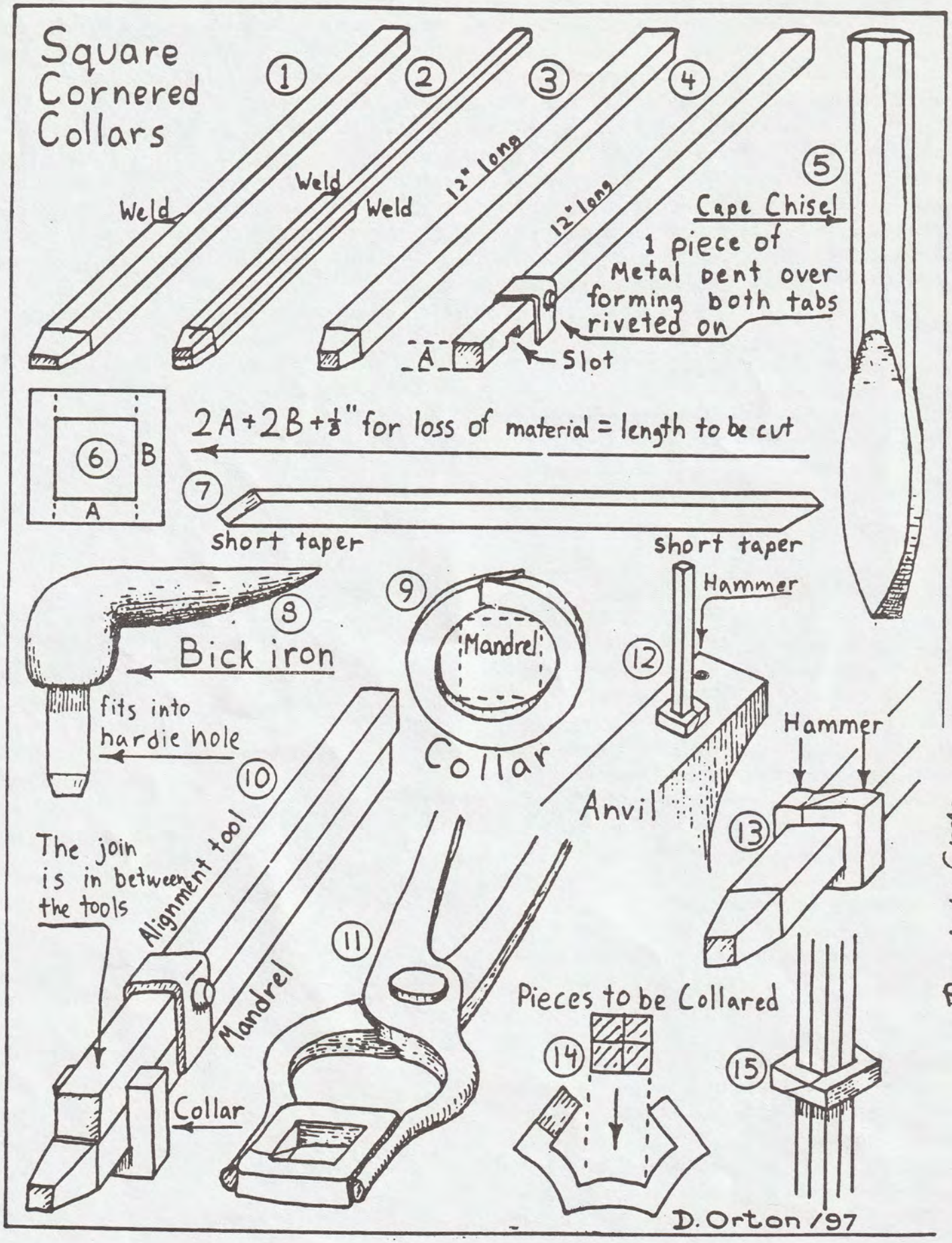
Figure 5:



Step one:
Make a slight upset.

Step two:
Rotate 90 degrees and draw out 1 1/2 to 2 inch taper

Step three:
Notch out end of bar as before. Fold it over and repeat welding procedure



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