New Jersey Blacksmiths Association

NEWSLETTER

Volume 4, No. 1 July, 1999

Special Enclosure: Tempil Chart

NJBA members' copies of this issue contain a special, color insert: the "Tempil Chart," "Basic Guide to Ferrous Metallurgy," which most of you will recognize. These charts are a wealth of information on the forging and heat treating of iron and steel. Thanks go to the Tempil Division of Air Liquide America Corp, So. Plainfield, NJ. that generously supplied these charts. Thanks also to NJBA Director Tim Suter for obtaining these charts for us.

July Meeting at the Fair

New Jersey Blacksmith Meeting General Meeting Friday, July 23, 1999, at 7 **PM** at Monmouth County Fair, East Freehold Park, Freehold, NJ. NJBA members will be providing a period blacksmithing demonstration in conjunction with the Longstreet Farm Exhibit during the County Fair running July 21 - 25. The general meeting will be held Friday Night starting 7 PM at the NJBA demonstration booth. Look for the Longstreet Farm Exhibit. Blacksmiths are encouraged to submit some of their work for a display at this venue on Friday night. All work will be displayed at the exhibit. This is a great opportunity for us to advertise NJBA and individual members. We can distribute business cards and talk to the public regarding our work. Free passes will be available for demonstrators.There will be no Iron in the Hat or Tailgate sales. A forge, several anvils, tools, stock and coal will be kept at the fair site for demonstrators. For more information contact David Macauley 732-206-1568 or drmacauley @att.com. For general information on the fair call: (732) 842-4000.

Directions from Garden State Parkway: Garden State Parkway to Exit 100. Take Rte. 33 west to Kozloski Rd., turn right. Follow signs to Park. **Directions from Rte. 9:** State Rte. 9 to Rte. 33 east (south of Freehold). Follow Rte. 33 to Halls Mill Rd. north exit. Follow Halls Mill Rd. north to intersection. Road name will change to Kozloski Rd. Follow Kozloski Rd. to Park on left. **Directions from Rt. 18** Rt. 18 to Exit 22, Rt. 537 west. Take Rt. 537 west to Kozloski Rd., turn left. Follow to Park on right.

August Meeting -- Hood Workshop

The NJBA side-draft hood-building workshop will be held **Saturday, Aug. 14, at the shop of Marshal Bienstock.** beginning **at about 9:30 am.** We will be working an assembly line of cutting, bending, drilling, riveting and welding.

Preregistration is requested (and we reserve the right to charge extra at the door). Send your check for $50 (made out to NJBA) to NJBA Director Larry Brown. (All proceeds beyond expenses go to the NJBA treasury.) Include your name, address and phone number with your check. **You must be an NJBA member to register for this workshop.** but you may join at the time you preregister. (See the back of the mailing cover of this issue for the application form.)

Please come dressed for work. All registrants are expected to participate in the work. Most of the cutting will be done already, but there will be a little work with shears, so bring your work gloves (and your safety glasses). Other members are welcome to help for the learning experience or the camaraderie.

Also: Bring all your junk, scrap metal, extra tools and books to sell or trade at the **tailgate sale**. There will be no iron-in-the-hat at this meeting.

Marshall's farm is at **663 Casino Drive, Howell** (Monmouth Co.), **NJ**, which is about **1/4 mile east of Route 9**. Casino Dr. is **a few miles north of I-195, and a few miles south of Rte. 33**. Either of these routes can be easily reached from the major north-south highways, including the Garden State Parkway, the NJ Turnpike, I-295, Rte. 18 or Rte. 34.

September Meeting -- Anvil Repair Workshop

The anvil-repair workshop will be hosted by the Orange County Farmers Museum on Saturday and Sunday, September 25-26.. For $100 and some sweat labor you get your beat-up old anvil repaired with freshly welded, ground and polished edges and face. Anvils missing chunks of the face can also be repaired, but may require more preparation, labor, and possibly money on your part. This is a two-day workshop -- welding on the first day and grinding and polishing on the second. For more information and to reserve a place, contact Greg Phillips 914-457-5671 or suresign@frontiernet.net

Lunch will be provided by NJBA with the generous assistance of OCFM volunteers in the **(heated) cook house.** Please bring an item for the **iron-in-the-hat.** As usual, **tailgaters are welcome.**

Directions to Orange County Farmers Museum: Take the **Garden State Parkway north** into New York State. Pick up the **NYS Thruway (Route 87),** and take it **north** to **exit 17** (Newburgh- Stewart Airport) after exiting and the toll booth DO NOT bear right onto Route 84, continue **straight to traffic light** at Route 17k. Turn **right (west) onto Route 17k** proceed **6.2 miles to Berea Road** on the right. Take Berea Road **500 feet to Orange County Farmers Museum** entrance on right. Between two brick pillars. (There is no phone at the museum.)

CARPOOLING from New Jersey: Contact David Macauley or Marshall Bienstock (see "NJBA Directors").

October Meeting

The October membership meeting will be held on **Sunday, October 24, at the forge of Dan Cruzan near Bridgeton, NJ.** (If you'd like give a demonstration, contact NJBA Director Steve Rhoades.) The tentative schedule for the meeting is as follows:

9:30 a.m. - arrival, coffee, socializing
10:00 a.m. - demonstrations begin.
12:00 p.m. - lunch, socializing, tailgate sales, IITH
1:30 p.m. - demonstration resume.

Lunch will be provided. Please bring a project you have made that to inspire us all. **Bring lawn chair** (and extra chairs if you can). Please bring something to donate to the **iron-in-the-hat**. And bring all your old surplus tools, supplies, books or whatever for the **tailgate sale**.

Dan's forge is near Bridgeton (Cumberland Co. NJ). **If coming southbound on the NJ turnpike**, get off at exit 2. Take Rte. 322 east to Mullica Hill. Take Rte. 77 south about six miles to Deerfield, which is at the intersection of Rtes. 77 and 540. From Deerfield, proceed west on route 540. Go past the 20 mile marker and at the next intersection turn left onto Harmony Rd. Go to the stop sign turn left onto Walters Rd. Go 200 yards and turn right onto Harmony Rd. Dan Cruzan's Nursery is the first farm on the right (146 Harmony Rd., Bridgeton, NJ. 08302, 609-451-0904). **If coming into NJ across Delaware Memorial Bridge** take Rte. 49 east, (pick up 49 at the foot of the bridge). Go past the 19 mile marker on Rte. 49, turn left onto Jericho road. At the next stop sign go straight across onto Moore's Corner Road. At the next stop sign turn left onto Harmony Road. Dan's is the first farm on the left.

Persons interested in **carpooling** should contact NJBA Director Bruce Freeman.

Monday Night Open Forge

We encourage any NJBA to join us at Marshall Bienstock's shop for the weekly open forge meeting at 7 pm *almost* every Monday evening. (Please call ahead on holiday weekends to make sure the shop will be open. See "NJBA Directors" for address and phone.) This is a great venue for beginners, but all are welcome. These are NJBA-sponsored events. Two coal forges and a gas forge are available for use. The fee, for those who make use of fuel and steel stock, is $5. We expect this fee will make these self-supporting events. **Protective eyewear is required, and hearing protection is strongly recommended.**

Report on Crane Hardware

We've been a little remiss in finding time to work on this hardware, but over the past couple Monday evenings Marshall Bienstock. David Macauley and Bruce Freeman made considerable progress on the bales for the millstone crane. We hope to finish this up by mid-summer and present it to the Washington Township Land Trust for their Obediah LaTourette Mill.

NJBA Board of Directors

Marshall Bienstock, Director until June, 2001
663 Casino Dr., Howell, NJ 07731
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mbienstock@worldnet.att.net
Larry Brown, Director until June, 2001
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Jon Folk, Director until June, 2001
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Bill Gerhauser, Director until June, 2000
415 Hutchinson St., Hamilton, NJ 08610
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856-423-4417
Andy Vida-Szucs, Director until June, 2001
13 Old Monmouth Rd., Freehold, NJ 07728
732-308-9039, 732-957-6043
osan@netlabs.net

Report on Scholarships!

The recipients of the two 50% scholarships to workshops at Peters Valley were Thomas Glynn and David Macauley. Neither has yet attended his chosen course. They will be letting us know what they learn either through a demonstration or other presentation, or through an article for the newsletter.

Report on May Meeting: Hammer-in and Elections

The May meeting was held at Longstreet Farm, Holmdel Park. About a dozen people showed up, despite the downpour. We had five forges fired up by mid-morning. Jim Claffey gave a demonstration of making horseshoes. Marshall Bienstock and David Macauley, on one forge, and Larry Brown, on a separate forge demonstrated tong-making. Jeff Morelli demonstrated knifemaking. Bruce Hay and Norm Nelson worked on a part to repair a vise.

The Longstreet Farm staff put together a nice spread of coldcuts for lunch. After lunch we held the elections. Jeff Morelli nominated himself and he and the slate of officers whose terms were expiring were reelected unanimously.

The sun broke through in the afternoon, and a few park visitors showed up to watch. As usual, one of the best parts of the meeting was just the chance to shoot the bull with other blacksmiths.

Report on the June Meeting

The June meeting was held on June 19 & 20 at Historic Cold Spring Village just north of Cape May NJ. We were guests of the Village and were well received. On Saturday, Jerry Goldman was in the blacksmith shop, where he spends six days a week. Outside, David Macauley was forging wrought iron and making candle cups from pipe. Beside David was Mike Mills, a former apprentice of Jerry's, was teaching his son Steve. Tim Suter gave a lively demonstration on making a cowbell then called upon a young man from the crowd to "tune" it. Bill Futer was on hand to describe his pattern welding technique. Steve Rhoades, also a former apprentice of Jerry's spoke to the visitors to the Village, narrating the activities and answering questions. Representatives of the Village came to thank us for coming and generally made us feel welcome. Lunch and fuel were provided by the Village. A warm sunny day with a cool breeze and a good sized crowd combined to make the day perfect.

Sunday Mother Nature let us know that she is still in charge. A steady rain with a cold wind reduced the number of visitors to a minimum. David Macauley and Marshall Bienstock worked with Jerry in the blacksmith shop. Braving the weather, Tim set up under a tarp to demonstrate. Steve gave Jerry's new apprentice, Jason Jones, some pointers, and Jason took the opportunity to join the NJBA. "Welcome aboard Jason." Lunch was provided by NJBA. Thank you to Tim for bringing two anvils a vise and a forge, David for bringing a forge, and Mike for bringing a forge, anvil and vise. Special thanks go to Jerry Goldman and everyone at Historic Cold Spring Village for being so hospitable. Steve Rhoades

Events Elsewhere

August 7 & 8, 1999. Sixth annual gathering of the **Berkshire Blacksmiths**. The museum is near Pittsfield, MA. Approximately 15 smiths and the society of the 17th century will set up displays and demonstrate various styles of smithing. The museum itself, is also an enjoyable place to visit. For info, contact Bill Senseney: 30 Frenier Dr.: Williamstown, MA 01267. Phone, 413-458-5641.

October 17, 1999. Hammer-A-Thon '99 at the Mountain Village Blacksmith Shop. The expansion is complete (or will be by that date), and the traditional christening of the forge will done. The demonstrators are Walt Scadden and Michael Sarri. Both of these gentlemen are outstanding blacksmiths. Walt's demo is going to focused on scrolls and architecural ironwork. Everyone who pre-registraters for the hammer-in will receive a Hammer-A-Thon '99 tee-shirt. The lunch is provided, a buffet that will put last years to shame. The Iron-In-The-Hat table will be stacked with some interesting objects. Lastly, there is plenty of room to tail-gate and tables to show off your prize works. For further information, contact Keith Foster 141 Moxley Road, Uncasville, CT 06382

Blacksmith Workshops in NJ

Peters Valley Craft Education Center
19 Kuhn Rd., Layton, NJ 07851 (973) 948-5200
pv@warwick.net http://www.pvcrafts.org/

Tuition is $312 for a 4-day course $380 for a 5-day course or $420 for a 6-day course. Lab fees range from $30 to $70 per course.

Levels: "B" - beginner, "I" - intermediate, "A" - advanced

Date	Instructor(s)	Title	Level
Jul 16-21	Carl Close, Jr.	"Gothic Details & Metalworking Techniques/Table Lamp Workshop"	I to A
Jul 23-27	John Rais	"Forging Titanium: The Introduction"	I to A
Jul 30-Aug 3	Paul Casey	"Multiple Parts & Mechanisms"	B to I
Aug 6-10	Scott Lankton	"Pattern Welding Steel"	I
Aug 13-17	Corrina Mensoff	"Forged Iron & Copper"	B to I
Aug 20-25	John Rais	"Contemporary Forged Hardware & Beyond"	B to A
Aug 27-Sep 1	Jim Wyckoff	"Making Metal Move"	B
Sep 3-7	Bill Brown	"Sculptural Forging"	I
Sep 10-14	Elizabeth Brim	"Basic Blacksmithing"	B

Blacksmithing Workshops in MD

Academy of Traditional Arts
at the Carroll County Farm Museum
500 South Center Street, Westminster, MD 21157
(410) 848-7775, (410) 876-2667
Classes are $100 per person. Call for further information.

Date	Class Description	Instructor
Jul 24-25	Basic Blacksmithing	Albin Drzewianowski
Nov 2 & 9	Blacksmithing Christmas Items	Bob Morris

Blacksmithing Workshops in PA

Touchstone Center for Crafts
R.D. #1, Box 60, Farmington, PA 15437
Ph: (724) 329-1370; FAX: (724) 329-1371:
Email: tcc@hhs.net; Internet: www.touchstonecrafts.com
(Abbrev: "B" - beginner, "I" - intermediate, "A" - advanced.)

Date	Instructor	Class Description	Level
Jul 12-17	George Dixon	"Chase, Chisel & Repousse Motifs of Samuel Yellin"	I-A
Jul 19-24	Federick Crist	"Toolmak'g for Architect'l Blacksmith"	B-I
Jul 26-31	Ray Rybar	"Damascus Steel & Blade Forging"	B-A
Aug 2-7	Bob Becker	"Traditional Forging"	B-A
Aug 9-14	Tom Latane	"Ornamental Lockwork"	A
Aug 16-21	Jim Batson	"The Highland Dirk"	B-A
Aug 23-28	Peter Ross	"Historic English Decorative Iron"	I-A
Aug 30	Sep 4 Mike Boone	"Forging a Decorative Grille"	I-A
Sep 10-12	Ray Rybar	"Basics of Damascus Knifemaking"	B
Sep 17-19	Ivan Bailey	"Hand-Forged Small Animals"	I-A
Sep 24-26	Jymm Hoffman	"18th C. Camping Equipment"	I
Oct 1-3	Hans Peot	"Tools from Scrap Steel for Beginners"	B-A
Oct 8-10	Jody Best	"Blacksmithing for the Completely Ignorant but Eager to Learn"	B-A
Oct 15-17	Glenn Horr	"Using a Hand-Held Air Hammer"	I-A

ABANA Board Nominations

Time to submit your name for election to become a member of the ABANA Board of Directors. There are a total of 15 seats on the Board, with five becoming available each year. Each Board member serves for a three-year term.

Any ABANA member in good standing (currently paid membership) can become a member of the ABANA Board. New candidates who wish to run for the Board must submit an endorsement form ten members of ABANA. This means that ten individuals who are in good standing with ABANA must sign a piece of paper endorsing you to the board.

The materials listed below must be sent to: ABANA Board Elections, P.O. Box 816, Farmigton, GA 30638-0816

- List of ten signature endorsements.
- Black & white photograph of the candidate.
- Written statement by the candidate about themselves and why they want to run for the Board.

Submissions must be postmarked no later than July 31, 1999.

An official ballot, along with statements and photographs of all the candidates will be mailed to each current ABANA member by August 31, 1999. These must be completed and returned by October 1, 1999.

Everybody knows someone who would represent them well on the board. Encourage them to consider running, or submit your own name.

The Scrap Corner

(A place of repose for bits and pieces that may someday be of use.)

- I bought a cheap (flea market) eleven-inch channel lock pliers for this. The handles were at about thirty degrees to the jaw surfaces. I torch-heated them at the far end of the pivot slot and bent them down to a near-right angle to the jaws. The serrated and concave gripping surfaces I built up with weld. and grinder-dressed parallel and rounded. This tool turned out to be very handy for lighter work not requiring a heavier non-adjustable bending wrench. - Tim Suter

Letters to the Editor

Dear Editor: I [have] almost finished a "Poor Mans Damascus" blade. Thanks to the article you published in the newsletter I set out to make one of these blades and am almost have finished it. I have about 14 hours in it, 12 being forging and welding. It is another one of those "No way I can do that", but then there was another way I hadn't thought of and it worked really well. I only have one or two major flaws in it, but considering what could have gone wrong I am very pleased. Again thanks for the interesting articles. -Bill Futer

Unclassified Ads

For Sale: Old Prentice Brothers Metal Lathe; graceful castings, 84" between centers, 10' overall. 8" swing, with single phase motor, all pulleys and gears; auto feed, 4 jaw chuck, tailstock, compound and crossslide. Sitting on a trailer waiting for you!!! $475. Trades considered. Contact Bill Ker, (732) 223-4188.

Books For Sale or Trade: I'd prefer to trade for tools, but will sell for cash: *Early American Wrought Iron* by Sonn ($160), *Old French Ironwork* by Frank ($80), *Early American Ironware* by Kaufman ($35), *Wrought Iron* by Aston ($12-$20); books by J.G. Holmstrom, Alex Bealer, Eric Sloane, etc. Contact Bruce Freeman (732-922-8408).

Rates for Photocopy-Ready Advertisements

Photocopy-ready advertisements must not contain photographs, solid black backgrounds, etc., and NJBA cannot be responsible if submitted copy does not reproduce well when photocopied. Send all copy to Bruce Freeman. **(See NJBA Directors List.)**

Size	Measurements (W x H, less margins)	Price
full page	7" x 9"	$50
half page, vertical	3.4" 9"	30
half page, horizontal	7" x 4.4"	30
quarter page	3.4" x 4.4"	20
business card	3.3" x 2" overall	10
bus. card (NJBA members)	"	5

Rate for Unclassified Advertisements

Unclassified advertisements must be legible, preferably typed, double-spaced, text only. Electronic copy is appreciated.

Type and Size of Ad	Price
12 lines (about 100 words)	$15
6 lines (about 50 words)	10
NJBA members, 12 lines.	5
NJBA members, 6 lines max.	*free*

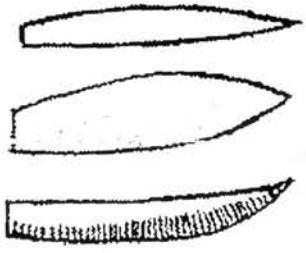
Ashokan, Spring, 1999

The meet started with a scheduled side trip to the Eric Sloane / Stanley Museum in Kent, CT, and to Vern Eads, a tool dealer located nearby. His barn and yard has the largest selection of tongs in one location I have ever seen! He also has an incredible number of other tools, etc.

Eric Sloane was an artist noted for his drawing of ear American life, tools, hardware and their use. The museum was not large, but very well done, it was set up by Eric Sloane himself in 1969 with financing by Stanley Tool Works. Viewing the museum is like walking through one of Eric's books. After his death, his studio was moved to the museum site and restored as an exhibit.

Located behind the museum is the Connecticut Antique Machinery Association buildings with a very impressive collection of steam and fueled engines. They were getting ready for a weekend of demonstrations, so if you want to go to the museum call this group also to get a schedule of events. (Connecticut Antique Machinery (860) 927-0050, Sloane / Stanley Museum (860) 927-3849.)

The demonstrator for the weekend was Bob Compton of western Massachusetts. This started Friday night with a slide show of his work and a question and answer session which covered a lot about working mica to make lampshades.

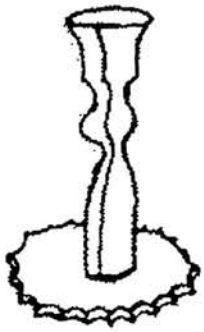


Saturday's demonstration started with Bob making a long leaf using a fold-forming technique. He then started a candle holder from 1" tubing, also showing a nice way of forming the drip pan, while describing a jig to help grind drip pans and other round flats evenly round.

Next he made a decorative coat hook out of 3/8" round.

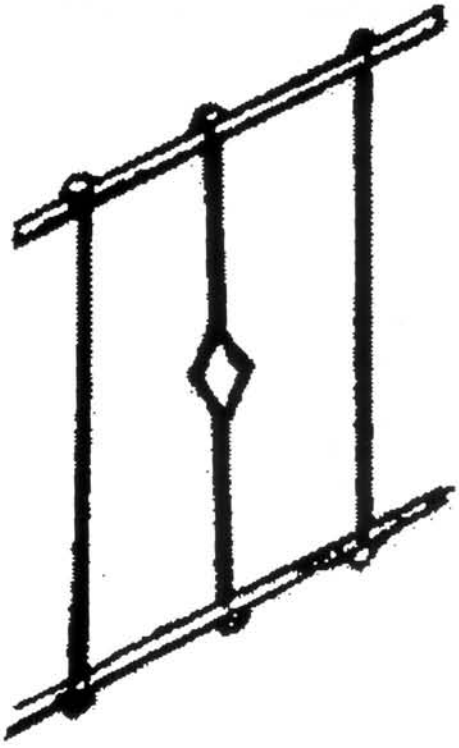
He finished the day by starting on a demo section of sloped hand rail. He had two balusters already started and forged the third as part of the demo. He split out about 4" of the center of the bar and then opened it up forming a diamond shape, he then used a "Smithing Magician" (of Blacksmith's Journal fame) under the treadle hammer to form the tenons on the ends of the bar. While using this tool he showed and described various techniques and tooling that he uses with it. He then used a jig he had to bend the tenons at the proper angle and set the tenon shoulders.

Sunday morning's demo consisted of forming a tenon on the bottom of the candle holder stem and attaching it to the base. He then finished the railing section by riveting the tenons through the top cap and the base using localized heat from an oxy-acetylene torch.



During the demo on Saturday he listed these places as suppliers: *Mica*: Ashville Schoonmatzer Mica Co. 900 Jefferson Ave., Newport News, Va. 23607 (804) 244-7311. *Firescreen*: Este Wire Works, Palisades park, NJ (800) 524-0039 E.J. Darby And Son. Philadelphia, Pa (800) 875- MESH

Northeast Blacksmiths has been meeting at the Ashokan Field Campus of SUNY outside of Kingston, NY for over twenty years. The shop has one forge and, with "bench seating," can accommodate a large number of people viewing demos. A pavilion is usually set up with several forging stations for a "green coal" or beginner workshop. Friday night the demonstrator usually introduces himself with a slide presentation and a question and answer session. Saturday is the main demonstration and the main green coal workshop. Sunday is the wrap-up to the demo, and the green coal workshop is still available. The sleeping is bunkhouse style and the food is served in a mess hall, don't let the term mess fool you, the food is delicious. - Larry Brown



Your Anvil is a Great Tool

by Robb Gunter. The Forgery School of Blacksmithing

Helpful Hints on How to Make it More Efficient

Your anvil is probably the single most useful and versatile tool ever developed by man. Its design has been developing for thousands of years. The first anvils were large flat rocks. Both the Egyptian and Viking cultures used such stone anvils. Archeologists have found meteorites that were used as anvils in the Egyptian and Greek cultures even though they were predominantly bronze-age cultures and iron forging was somewhat rare.

The anvil design we presently know reached its present level of development in the mid 1700's in western Europe. Further refinements into the London pattern and the farrier's anvil came along in the mid 1800's. There are numerous other special variations in anvil design, such as: double bick, armorer's anvil, saw-maker's bridge anvil, jeweler's, and cooper's anvil, to name a few.

How "live" and anvil is is very essential for efficient work and is usually associated with its ring. Historically, anvils which didn't ring were considered inferior. This is not always true. A good anvil responds by bouncing your hammer upwards after each blow, whether or not it rings. Typically, wrought-iron base anvils ring more than cast iron or cast steel anvils. A dead anvil, one which doesn't reciprocate your hammer, requires much more exertion and effort from the smith. If your anvil rings to the point of distraction, try bending a "U" of 3/8" round stock and dropping it through the pritchel hole. It's easily removed when you need the hole for punching operations.

The height of your anvil is also critical. There seems to be an optimum height for each individual smith. It must be low enough to allow your arm and hammer to fully extend, yet high enough that you don't work bent over. Most of the students who come to my school find that an anvil, adjusted to where the top plate is wrist-high, works best. An anvil stand which allows for adjustment in height to suit the type of work being done is worth considering. A 100 lb. anvil is usually considered the minimum weight necessary for an adult. Having your anvil securely mounted to its base so that it does not bounce around is a must. Remember, in terms of what happens to the material you're forging, there are two hammers working on it, the slower one is standing still. The relationship of your anvil to your forge and leg vise should be carefully planned for maximum efficiency. The anvil is best when mounted at 90 degrees to your forge and no more than two steps away. Your vise should be no more than 3 steps from your forge. Some thought should also be given to the placement of benches, tables, and tong racks. Portable forge set-ups, typically used by farriers, are usually carefully planned for efficiency.

There are unlimited numbers of anvil tools (hardy tools) that can make your anvil a more efficient work place and usually the time spent making or maintaining your anvil tools is well spent. If you have more than one anvil, consider standardizing the hardy hole size either by having it machined to make it larger or sleeve it to decrease the size so that all your anvil tooling is interchangeable. Having a (mild steel) cutting plate that fits your anvil is a must. Developing your proficiencies at cutting and splitting on the top of your cutting plate as well as using the step or heel as a shearing surface is very valuable.

Mounting a steel ruler, or marking off measured 1/2" or 1/4" increments on the back side of your anvil below the well dressed edge, is extremely valuable for quick measurements on repeat forgings or when checking for accurate hole or bending locations.

A properly dressed and ground tool plate is a must for peak performance of your anvil. Edges should be carefully ground and radiused for the type of work you are doing.

Anvil Restoration

Since many smiths and farriers are using older anvils found in various states of repair, the remaining notes are the details of an anvil restoration process developed while I was the resident smith at Sandia National Laboratories, with the help of Karl Schuler, Ph.D., good friend and student. I have now used this process to restore 62 anvils of different make with great success.

This process works well on wrought iron base and cast iron base anvils with a good tool steel top. It was developed with the help of several metallurgists and welding engineers at Sandia National Laboratories.

Grind all surfaces to be welded. Expose good, clean material. Grid through all folds or fractured chips. Chamfer any holes or severe depressions in preparation for welding.

Preheat a wrought iron base anvil to 400°F and a cast iron base anvil to 450°F. The temperature can be verified with a "Tempil Stick" crayon available at your welding supply store, which melts at a given temperature (i.e., 350°F, 400°F, 450°F). A propane-fired weed burner works well to preheat the anvil. A wood fire can also be used if care is taken to wire-brush off all carbon and smoke deposits before welding. Be careful not to overheat the anvil, particularly the heel and hardy hole area, as it's a thinner cross-section and heats faster than the more massive parts.

If your anvil has a wrought iron base and the damaged area goes through the tool plate so that you have to begin the repair by welding to the wrought base material, use Stoody 2110 (or equal) 3/16" rod; DC reverse works best, however it will run AC; unlimited passes. Expect 45 Rockwell C as welded. When you can finish building up the repair area in no more than three passes (or layers thick) use Stoody 1105 (or equal) 1/8" rod; DC reverse (or AC); expect 50 to 52 Rockwell C as welded, which should be consistent with the original hardness of the tool plate. The Stoody 1105 is a particularly good match for the W-1 tool steel tops of most anvils and is designed to be impact resistant.

When welding to a cast iron base anvil and onto the cast iron base, a layer of NI rod (high nickel) must be put down first. Build up over the NI rod with Stoody 2110 (or equal) unlimited passes; DC reverse; expect 45 Rockwell as welded. the last three passes (or layers thick) use Stoody 1105 (or

equal) 1/8" rod; DC reverse; expect 50 to 52 Rockwell C as welded if you don't exceed three passes thick.

Cast steel anvils repair well using the combination of the Stoody 2110 and the Stoody 1105 (last three passes).

Repair to the horn of a wrought iron base anvil can be accomplished with 6010 welding rod as needed. If the point of the horn is blunted or slightly broken off, we usually put the end of the horn in a coal forge, heat it to a bright orange and forge it out to the desired shape using a 12 lb. sledge to back it up and a 2 lb. rounding hammer on top. Repairs to the horn of cast iron anvils are usually done by welding with the NI rod, and grinding.

If the area around the hardy or pritchel hole needs repair, weld using the above detailed process; however, inserting a chill (or form) made of 1/16" sheet copper into the respective hole before welding will save you a lot of grinding and filing to true up the hole.

The hard surfacing rods used here to repair anvils are quite gravity-sensitive during the welding process. If you can lean the anvil at 45° against a cinder block while welding on the edges, you'll have more of the somewhat expensive welding rod on the anvil and less on the floor.

After all welding repair is complete and you are sure that there is sufficient build-up to allow for grinding to the desired finish (check with a straight edge), post-heat back to 400°F or verify with the "Tempil Stick" that the anvil is still that hot from welding. Pack the anvil in vermiculite [expanded mica], available at most nurseries, to allow it to slow cool for a minimum of eight hours. this will minimize the potential for stress-cracking from welding.

Grind the anvil to the desired finish. We start the grinding process with a 24-grit cup stone on a large-body grinder. It is quit aggressive at quickly removing metal. Be careful to keep it running flat (sparks coming off of both sides of the cup stone). Continue the grinding process using flex-back metal sanding disks, starting with 24-grit and working down to 240-grit, in five or six steps. Until now, all edges should be kept sharp and square. With 100-grit or finer sanding disk, radius the edges to your desired shapes Near the anvil step, the radii are typically ground to a 3/16" or 1/4" radius and tapering to nearly no radius at the heel of the anvil. The edge of the step and the heel are usually left rather sharp and only broken with a file. A final polish can be done with a "Scotch Brite" disk, and you can usually see your face in the anvil top.

This anvil restoration process has been used on several hundred anvils around the country with great success.

(Reprinted from the Indiana Forge Fire, June-July, 1998)

The Blacksmith Studio at Touchstone

I recently attended the Grand Opening and Dedication of "The Hart Moore Blacksmith Studio" at Touchstone Center for Crafts, located in Farmington, PA. (in the southwestern part of Pennsylvania). This shop is amazing! Over $700,000 dollars went into building this state of the art blacksmith studio. There can be no finer blacksmith teaching facility in the country.

I don't know what the building size is in square feet, but it is a large beautiful post and beam building, housing twelve student forges and one nice stone demonstrator's forge on the one end. The forges are six on a side with all six getting their air from a large blower mounted on the roof outside. Richard Sheppard, the maker of the wonderfully crafted "Big Lick" Treadle hammer, fabricated all the student forges and they are made in the Sheppard style of well thought-out design.

The shop also has the 150 Bradley Compact Hammer from the old studio. And a brand new Kuhn Hammer from Centaur Forge. Plus a "Big Lick" and an ABANA-style treadle hammer. The new shop also has lots of other new tooling, bathrooms in the building, tool crib and another separate building that will be used as a gallery and a museum.

The new blacksmith shop was almost completely financed by the Eberly Foundation, a local foundation. Hart Moore, the man who the studio is named after, was the grandfather of Robert Eberly. It was through the generous support of Robert and Eloise Eberly and the Eberly family that turned the Hart Moore Blacksmith Studio and Museum into a reality.

In the museum building they had a small display of pictures and blueprints from the Yellin shop that George Dixon sent up. Dan and Judy Boone also came for the dedication and Dan had a nice lamp in the museum and a fireplace set displayed out in the shop.

In the dedication ceremony a couple of brass plaques were unveiled. One was for the Hart Moore shop and Ebery Foundation. The other plaque is for the stone demonstrators forge. It bears the honor of being named the James Campbell forge. Jim Campbell has been the Blacksmith shops manager for years making sure things are going well and searching out tooling for the old shop. Jim has worked hard to keep the blacksmithing program at Touchstone going in the past.

For anyone interested in getting Touchstone's catalog for this year you can call 1-800-721-0177, or 724-329--1370 or by e-mail at tcc@hhs.net. I have no connection with Touchstone other than the fact of being active in the Pittsburgh Area Artist Blacksmiths Association and we have had the good fortune of having the use of the old shop over the years for meetings and Hammer-Ins. We usually hold over one of the instructors to do a weekend demo for us. We are looking forward to getting to play in this new shop.

- Bob Selvaggio, Gibsonia, Pa

Jersey City Forge

by Andy Vida-Szucs

Marshall Bienstock, Josh Kavett, an unnamed professional photographer, and I paid visit to the now defunct Jersey City Forge. It recently went on the auction block and most of the stuff had already been rigged and hauled out of there. However, three rather interesting examples of heavy forge equipment remain and it was these for which we came to photograph for historical preservation and to see and touch for our own sense of history and wonder.

Josh discovered the place a few weeks before and I upon hearing about it I became very anxious to see the remnants of this once busy corner of Jersey City. We got into our vehicles at 1:00 PM. Josh and the others went on ahead while I stopped to eat. I showed up about twenty minutes after they did, so I was alone when I first walked in. I've found that no matter how much large equipment one sees, you are never quite prepared when you find yourself very suddenly in the presence of a behemoth you've never before laid eyes upon. So it was for me.

As I entered the gaping hole in the wall where one of the large doors had been left wide, I found myself face to face with a 6000 pound Bement hammer, No. 1347. It stood about twenty or so feet high and built from essentially four major structural components.

I've been around some large industrial equipment at times in my life but I have to tell you that this hammer just set me back in my "seat" in a way that's hard to describe. There was a mix of feelings that came over me. No single one of them so terribly strong, yet the cumulative effect was one of having been floored in the oddest manner for which words have no sufficiency.

The sense of history that came over me was very surprising. I had not expected to feel such a thing as my eyes fell upon this giant that now stood quiescent in the dark, cool silence of this deserted place. I could only think of all the hot metal and all the lives that through and by this relic of an age gone past.

Then I began paying specific attention to the moving parts of this great machine and one of the first things to hit me was the enormity of the falling weight. I was looking at perhaps 4500 pounds of solid steel in the ram itself with perhaps another 1500 in the piston and rod. The upper die was actually small in comparison to the rest of it ... maybe 700 or 800 pounds of steel?

Looking up, I saw two huge frame members rise perhaps fourteen or sixteen feet above me and tied together by the steam cylinder. (By the way, these hammers were run on air; you should see the plumbing for this stuff, *wow*!). The cylinder itself is about four feet long and about sixteen inches in inner diameter (we know this because we retrieved one of the piston rings from the shop floor). The five-or-so inch diameter piston rod descended downward to the ram.

I went around to the other side and saw the levers that in the capable hands of a hammer driver lent control and life to the great Bement. Once again I thought of all the lives that literally had touched this machine and wondered what may have become of them and what they may have been like.

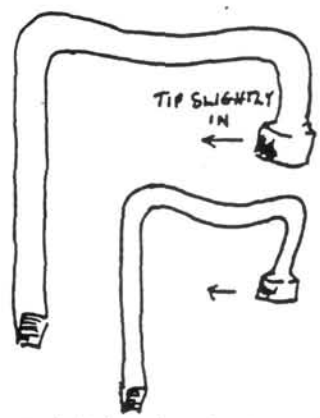
The next hammer was a 6000# Chambersburg. What a sight! Just like the Bement in every respect only the sow block hadn't been removed. Then the horror I'd been told to expect came into sight: the piston rod cut in two places by an acetylene torch. As I choked down my revulsion of the vision I moved on to what, for me, was the best of all: a 3000# *single* frame Chambersburg in what appeared to be well used but excellent condition. It was the spitting image of my 250# hammer of the same manufacture, only this one hadn't taken up smoking as a child and had been placed on anabolic steroids early on. *I want it.*

What machinery! And it is pretty much up for grabs. The buyer sold off the smaller Chambersburgs that were also there (two) but could not find any takers for the larger hammers. These hammers will probably see the wrecking ball in the next few weeks if nobody takes them away, so if anyone here knows of any businesses that may have need for a large hammer that will cost them next to nothing, or perhaps some living history museum or other preservation minded group, please let me know and I will pass the word on. I find it troubling to think of these machines being broken up for scrap. It would be a terrible shame.

It was very good experience, though perhaps a bit bittersweet.

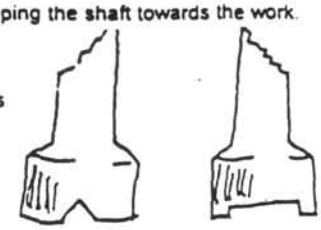
TIRE-WRENCH HOLD-DOWN

During 'Show & Tell' at the October meeting of VIBA, Skip Kennedy brought in a couple of those tire-wrench hold-downs. As Skip points out, the idea is not new but, he feels that the slight bend he puts in the business end of the hold-down is.



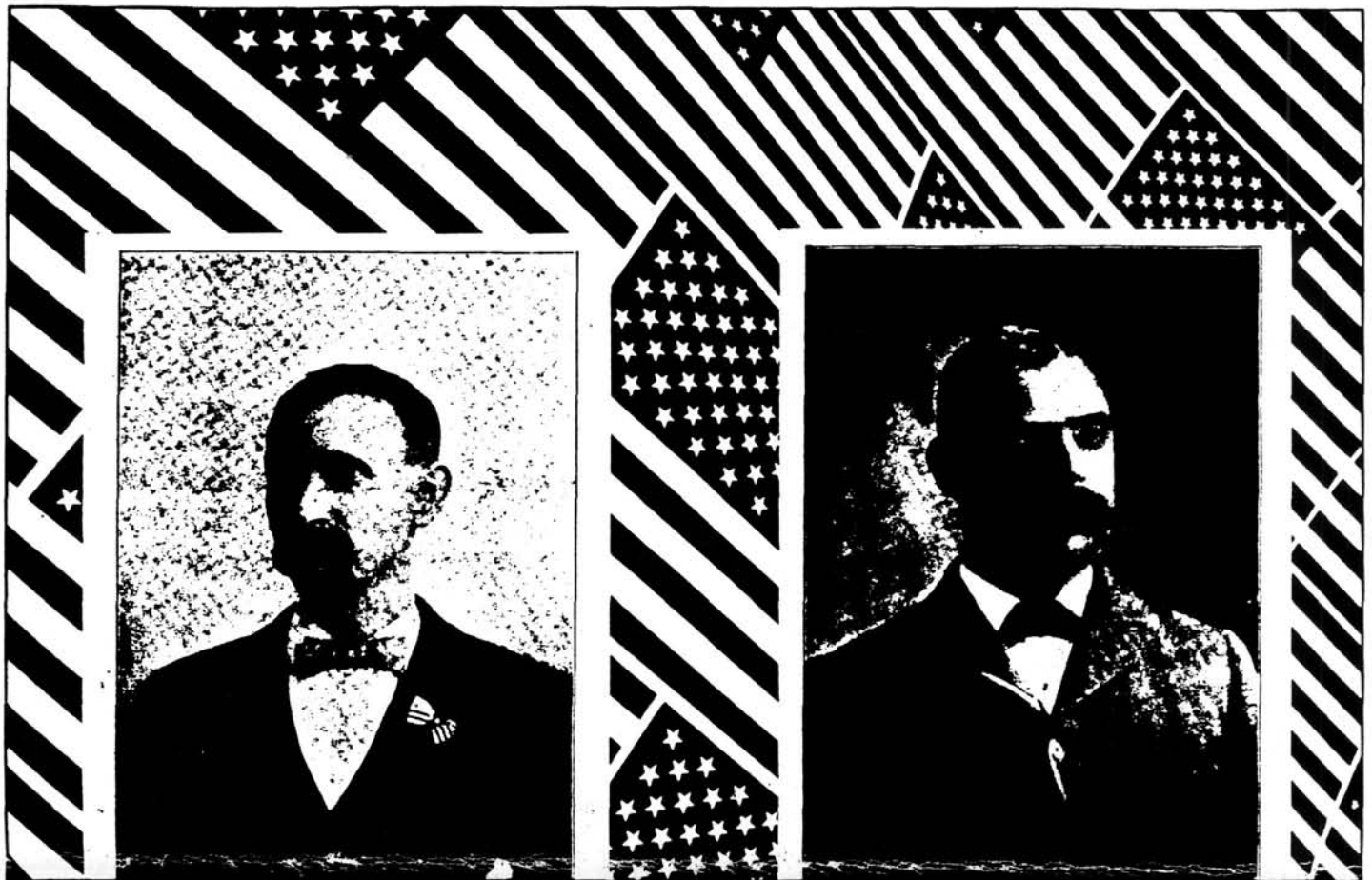
According to Skip, he stumbled upon the innovation by accident. He noticed that the hold-downs he had would move out (away from the pritchel or hardie hole) at times, loosening off and letting the piece being worked on to shift. Skip compensated for this by bringing the tip back, just slightly, towards the shaft. He says that, no matter what length your tip is, this bend will result in the hold-down jamming the work tighter to the anvil. He adds that loosening the hold-down off, when work is completed is still an easy matter of tapping the shaft towards the work.

Skip notches the 'wrench' tip of his hold-downs for different uses;



a pie-wedge cut out of both sides for round stock and a slot for flat.

Vancouver Island Blacksmith Association



James Hay Frederick C. Budden

HAY-BUDDEN: ALL AMERICAN ANVILS!

From **The Blacksmith and Wheelwright,** ***January Edition, 1899 . . .***

Historical Sketch of an Enterprising Concern

Not many years ago the solid wrought anvils used by American blacksmiths were all imported. It has been since demonstrated, however, that wrought anvils could be produced in this country not only equal but superior to many foreign-made anvils. The Hay-Budden Manufacturing Co. were the American pioneers in this line, and as thousands of readers of *The Blacksmith and Wheelwright* are users of these anvils, there is no doubt but what many will be interested to learn more about this enterprising establishment.

The officers of the company are as follows: James Hay, president; Frederick C. Budden, vice-president; Walter F. Ring, secretary and treasurer. In connection with this article we are fortunate in being able to present faithfully correct portraits of these three gentlemen.

James Hay was born in Elgin, Scotland, and arrived in this country about 1880 with practically no means, but with considerable experience as a blacksmith. After securing employment at various times at horseshoeing and general blacksmithing, he finally obtained employment with E. W. Bliss Co., of Brooklyn as a die forger. This position he held until about 1890, when he formed a partnership with Mr. Budden for the manufacture of die forgings.

The business was established at Frost street, Brooklyn, in a small building and in a small way. Mr. Hay and Mr. Budden personally worked at the forge, and their only other helpers were the few employees. Oftentimes in the morning the result of the previous day's labor would be delivered by wheelbarrows to the various customers, while the labor of getting out the work would be continued far into the night.

By hard work and strict attention to business the business prospered, and additions were continually being made to the

plant, until about 1893 the manufacture of anvils was called to the attention of Messrs. Hay & Budden, and they decided to furnish the blacksmiths of this country with an anvil made in America. It was then evident that their facilities at hand and buildings were not large enough to meet the requirements of this growing business.

About this time Walter F. Ring, who was a native of New York city and had experience in the hardware line and in the rolling mill business, joined forces with Mr. Hay and Mr. Buddeen, with the result that the business was incorporated under the style of "The Hay-Budden Manufacturing Co." and it was decided to move the entire business to its present location.

It was soon demonstrated that anvils could be manufactured in this country not only equal, but superior, to those manufactured elsewhere, and hearty encouragement was given by the blacksmiths to this industry, with the result that the present plant occupies 52,000 square feet of ground and gives employment to 250 hands, and that $150,000 are paid out in yearly wages.

This concern not only supply the wants of the home trade, but ship their anvils to all parts of the world.

The great success of the Hay-Budden anvil, not only at home but abroad, fully demonstrates its superior quality. Hundreds of testimonials could be printed here from blacksmiths who have used these anvils. They are made with the greatest care from start to finish, the intention of the manufacturers being to make each anvil as perfect as science and skill can produce. Many readers will be interested in the following graphic description of how anvils are made in the Hay-Budden works. We are indebted for the following article and accompanying illustrations to the *Iron Age*, said article having appeared in the issue of that publication dated May 11, 1899:

Making A Solid Wrought Iron Steel-Faced Anvil

(From *The Iron Age*, May 11, 1899)

Although the ordinary anvil is being gradually displaced by steam and drop-hammers, it is more than doubtful if it will ever be entirely superseded by any other device or appliance upon which to pound and shape things. It is essentially an adjunct upon which the skill of the blacksmith depends in the closest degree, and without which his vocation would be seriously hampered. It's form has not been changed materially in the memory of man, the only alterations being such as have been required by special operations or the whims of the user.

The blacksmiths must as prerequisites embody certain features. The body and horn should be able to withstand the severest usage, while the face should be able to resist the blows of a

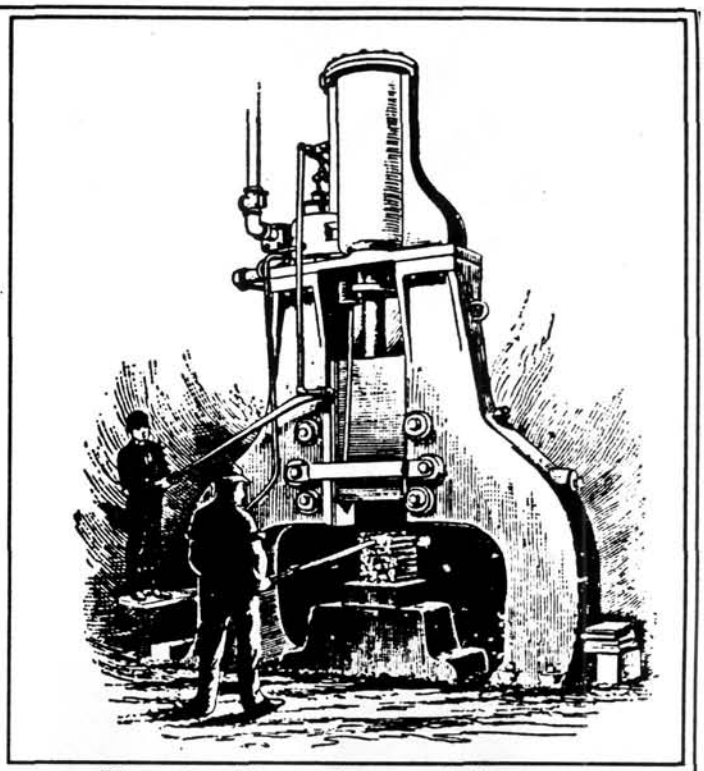


Figure 1 -- Hammering wrought iron scrap.

ESTABLISHED 1880.
THE BLACKSMITH & WHEELWRIGHT

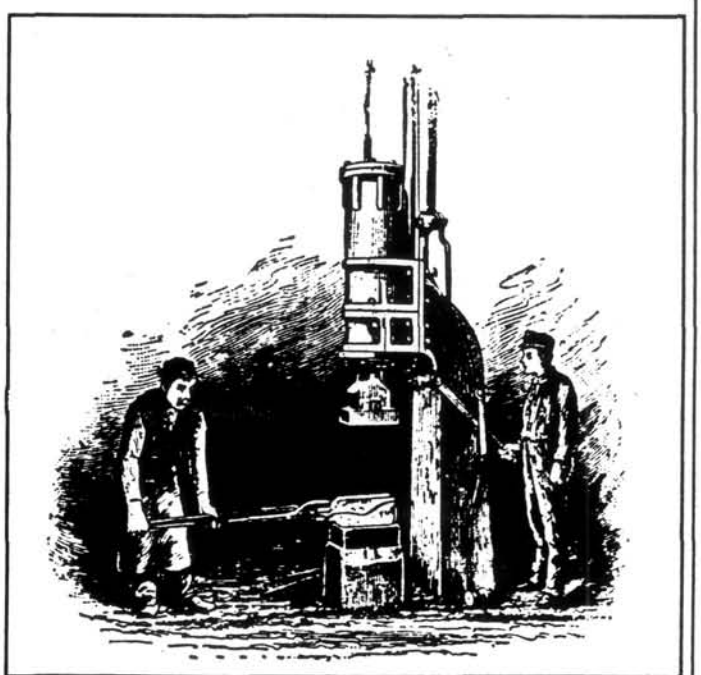


Figure 2 -- Welding steel face under the hammer.

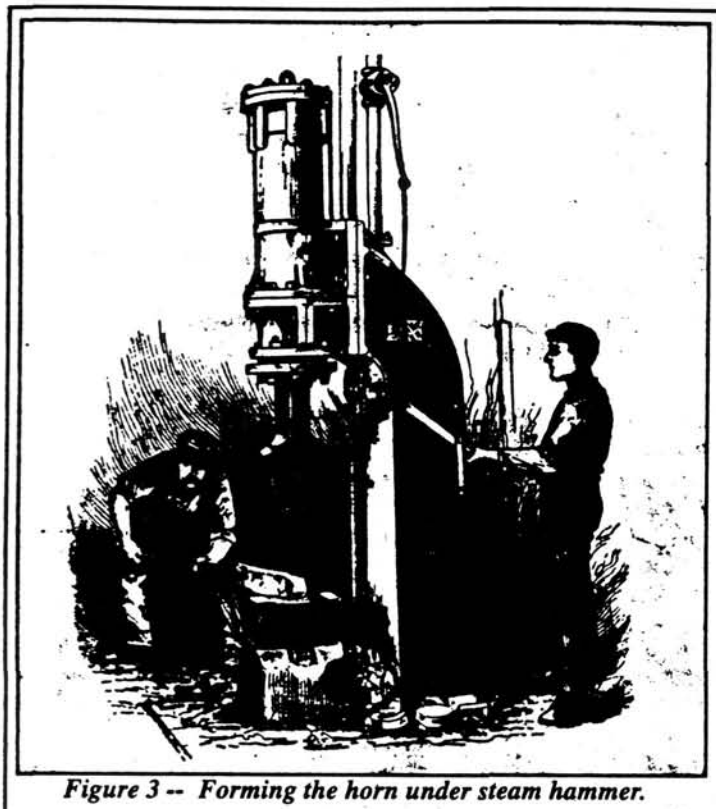


Figure 3 -- Forming the horn under steam hammer.

hard faced hammer, to resist chipping or flaking and to be unaffected by the heat imparted by the article operated upon. It is essentially a rough-and-ready tool, in the use of which but little discretion is exercised, and which, if it fails from any cause, will undoubtedly be emphatically condemned.

The tone of an anvil, upon which more or less stress has always been laid, may or may not mean that it is a superior anvil. While all anvils could not enter an "anvil chorus," it yet remains a fact that a poor anvil may have a rich and perfect tone and at the same time be weak in its structure. On the other hand it may be put down as being almost axiomatic that the good anvil is invariably of good tone. Judging, therefore, its physical characteristics is not always a safe and sure guide. The old blacksmith who pounded for years upon the same anvil probably appreciates its ring more than any other feature, and to him it means a harmonious instrument of high grade.

Figure 4 – Finishing the horn by hand.

SOLID WROUGHT STEEL-FACED ANVIL

The wrought solid body steel-faced anvil built by the Hay-Budden Manufacturing Co., of Brooklyn, whose works a representative of *The Iron Age* recently had the privilege of visiting, is made essentially of three parts: the wrought iron base, a wrought iron body and a steel face of special composition. In the making of an anvil these three parts are manipulated separately and brought as near as possible to their final form, when they are united by welding, the anvil brought to its true form, tempered and finished. The method of manufacture and the material employed in all the parts insure the integrity of the finished article.

It is very evident that the selection of material is of prime importance, since it controls the quality of the output. Skill in the manipulation insures good results as far as workmanship is concerned, but without perfectly adapted materials to start with the utmost skill and experience would be thrown away. The best material may be, of course, spoiled in the handling, but a quality of the highest grade is necessary to perfect results. Wrought iron is used for the body of the anvil, for the reason that it is less liable to be injured by the successive heatings and hammerings to which it is subjected than steel, and for this reason the result can be more surely relied upon.

In watching the various operations one cannot but be impressed with the proportion of hand work. At every single step except one the man is the important factor. It is the individual who judges the heat, controls the hammer and finally influences the form of the finished article. This dependence upon skill makes it impossible to produce close and accurate standards as far as size and contour are concerned, and since this is not absolutely essential but little attention is paid to it. One anvil may and does differ from another in magnitude, and since the work to be performed upon it is not of the accurate kind as understood in some mechanical operations there is no good reason why any attempt should be made to follow a pattern closely. In order to satisfy the whims and to meet the various views of blacksmiths it is desirable to have a varied assortment of different widths, lengths and proportions for the same weight of anvil. This permits every blacksmith to find an anvil that suits his ideas.

As has been said, in only one step is the workmanship overshadowed by a machine--namely, in forming the base. This is an operation which has little to do with the final product, as it is simply a pedestal supporting the working face, and the method here pursued in making it is merely introduced as a labor-saving and economical operation.

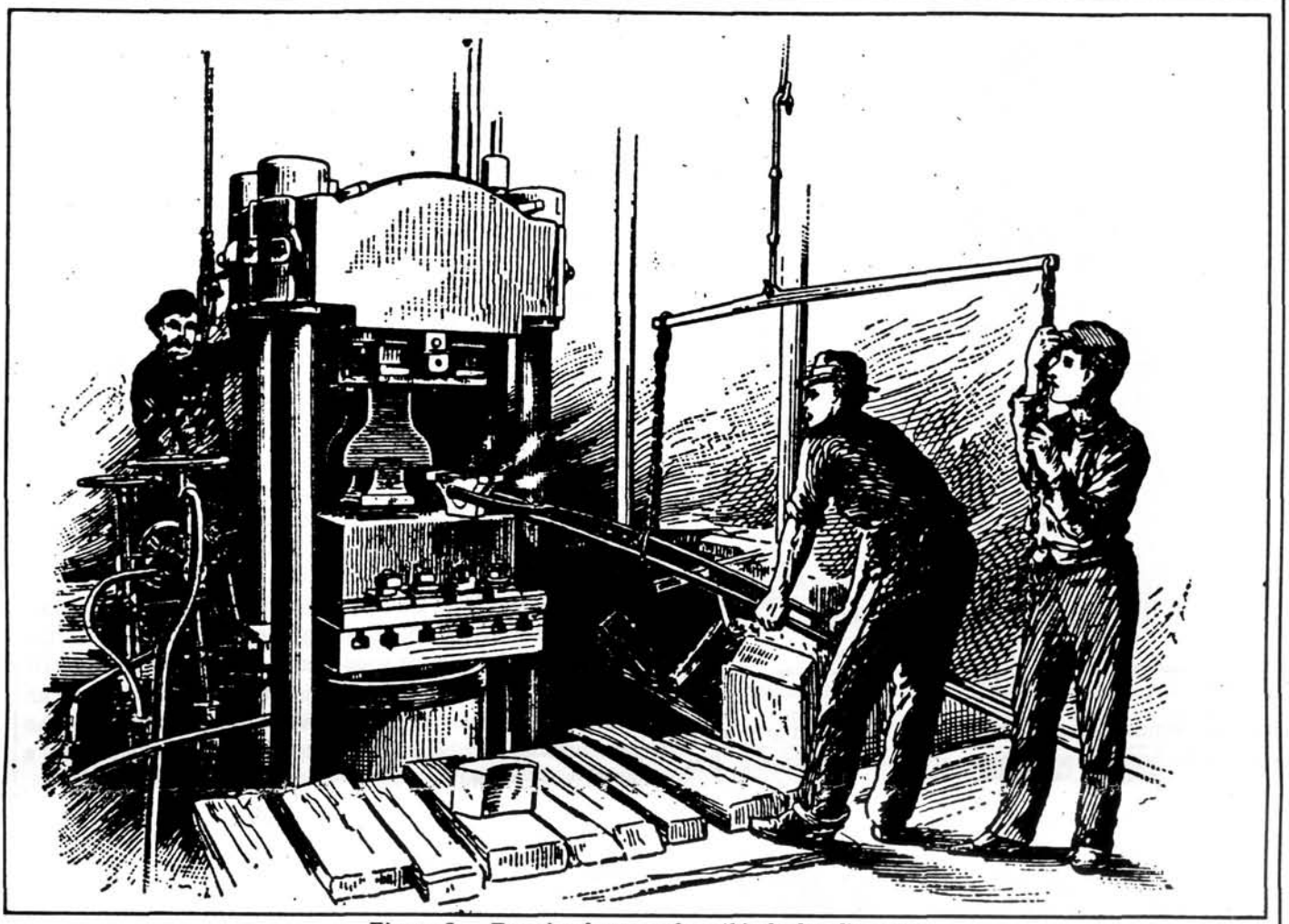


Figure 5 -- Forming bottom of anvil in hydraulic press

THE WROUGHT IRON BILLET

The wrought iron scrap for the base and upper part of the body is cut to proper size, bundled, heated in a furnace and welded into a compact mass under the steam hammer, as shown in *Figure 1*. The billets then pass to a second furnace, after which their paths diverge. The one which is to be incorporated into the upper part of the anvil is rough hammered into shape and is then ready to receive the steel face. This is a flat bar of steel of such composition as will take a certain temper, maintain its elasticity and resilience, and be so tough as, with the aid of the wrought iron backing, to resist fracture. The billet and steel are heated in the same furnace and welded with the steam hammer shown in *Figure 2*. From this engraving it will be noticed that the workman handling the billet places it upon a roughly curved die which forms the lower part of the upper part of the body. The blank then passes to another steam hammer, *Figure 3*, with which the point is drawn down, the tail of the anvil rough shaped, and the given dimensions approached as near as may be practicable. The final operation on the top is done by hand, as illustrated in *Figure 4*. The sides are here brought truly parallel, the horn is tapered and properly curved on the under side and the

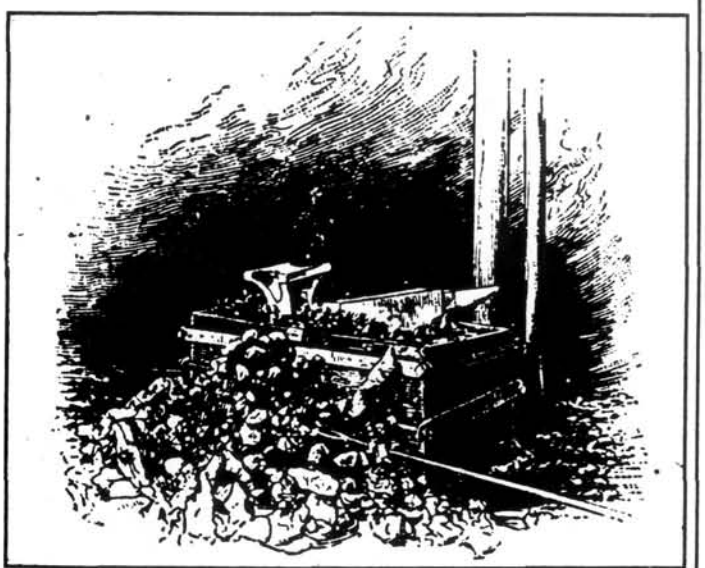


Figure 6 -- Heating top and bottom parts for welding.

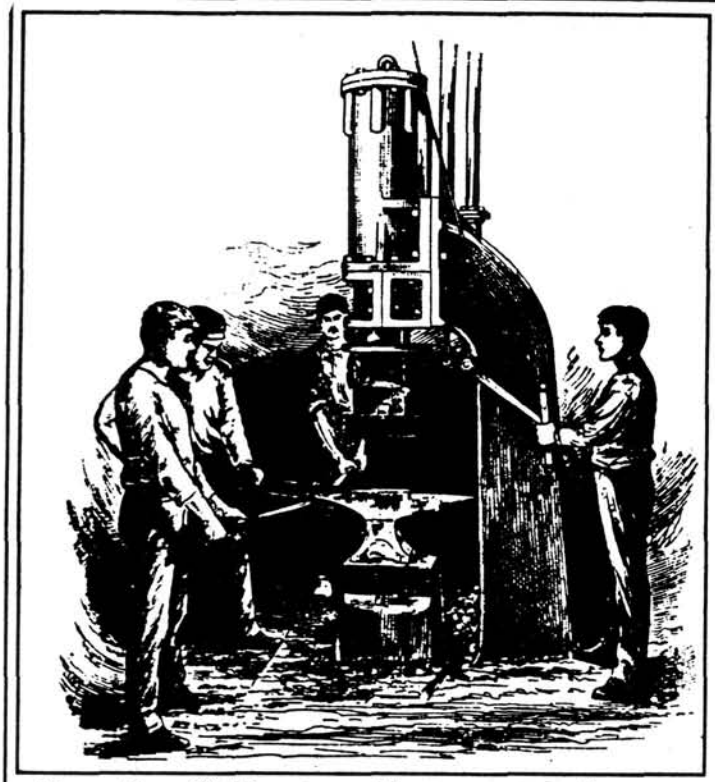


Figure 7 -- Welding top and bottom parts under steam hammer.

top practically finished. During these operations pritchel and hardy holes have been formed in the top of the anvil.

Another billet passes from the furnace to the hydraulic press shown in *Figure 5*. What we may term the anvil of this press moves toward the rear, reference being had to the engraving, so that the billet can be dropped into the opening above the ram. The anvil is then moved back to a central position, water turned on and the ram is forced upward, completing the lower part of the anvil, with the exception of a slight burr due to excess of metal which has been squeeezed out around the edge.

This finishes at one operation the bottom, which is next ready to be welded to the top. The small coke heated furnace shown in *Figure 6* supports both top and bottom parts, the parts to be welded being placed next the fire. When the proper heat has been attained the base is placed upon the anvil of a steam hammer, the top centrally held upon it, as illustrated in *Figure 7*, when the two parts are perfectly incorportated.

The next step, and one of the most important, as far as the appearance of the finished anvil is concerned, is illustrated in *Figure 8*. From the welding hammer the anvil is taken to a cinder box and by means of sledges the joint is thoroughly hammered down, the surfaces are sprinkled with water and smooth hammered to remove the scale, after which the hammer is placed face down in a furnance and when the steel portion has reached a dull red heat it is placed in the hardening tank, *Figure 9* and streams of water thrown upon it. The anvil is left in the tank until cool. Before hardening the anvil has been roughly ground on the face, and after hardening it is taken to large grindstones, where it is ground upon the edges and the face trued up.

Figure 8 – Finishing Anvil by hand hammering

TESTING

At first glance it would seem unnecessary to test each anvil. This would appear to be of little consequence, as the material is first intimately known, the various operations are carefully performed, and the product should seemingly meet the requirements in every instance; but this is not relied upon. Each heat of steel for the face is incorporated in one or more anvils, and upon their completion they are tested in every way possible with the hammer. They must resist indentation with a hard, heavy hammer, must be free from all tendency to chip on the sides or flake on the top, and even under the most severe treatment must remain free from all cracks. Not only is this policy pursued when each new heat is commenced, but it is followed in the case of every anvil turned out. After grinding the body of the anvil is painted and the face varnished and covered with heavy burlap, which prevents the face from being damaged in shipping.

The Hay-Budden Co. are now turning out about one hundred tons of completed anvils per month and their trade extends over the entire world. In this connection it may be of interest to note that during the past few years the importation of anvils into this country has steadily decreased. By far the largest supply of foreign anvils has been received from Great Britain, which country in 1893 sent here 1,567,746 pounds; in 1894, 704,764 pounds; in 1895, 1,085,054 pounds; in 1896, 859,580 pounds, and in 1897, 605,211 pounds. In 1898 the total importation amounted to 777,903 pounds, valued at $47,797.

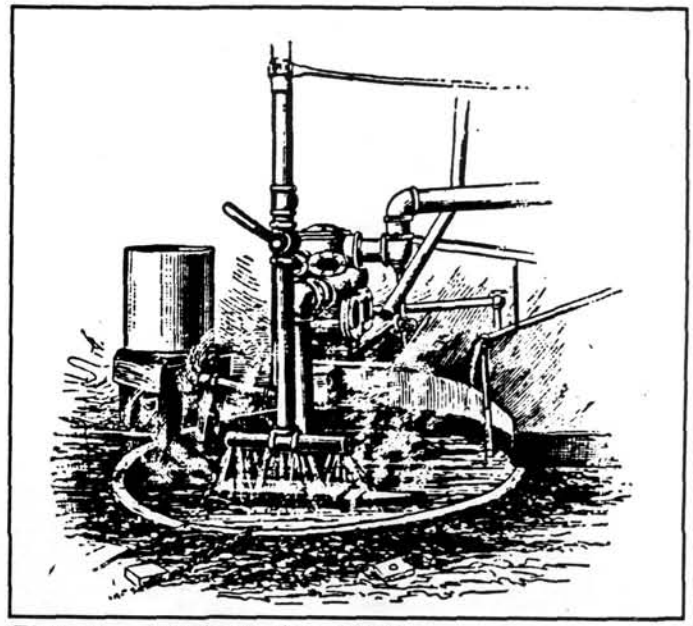


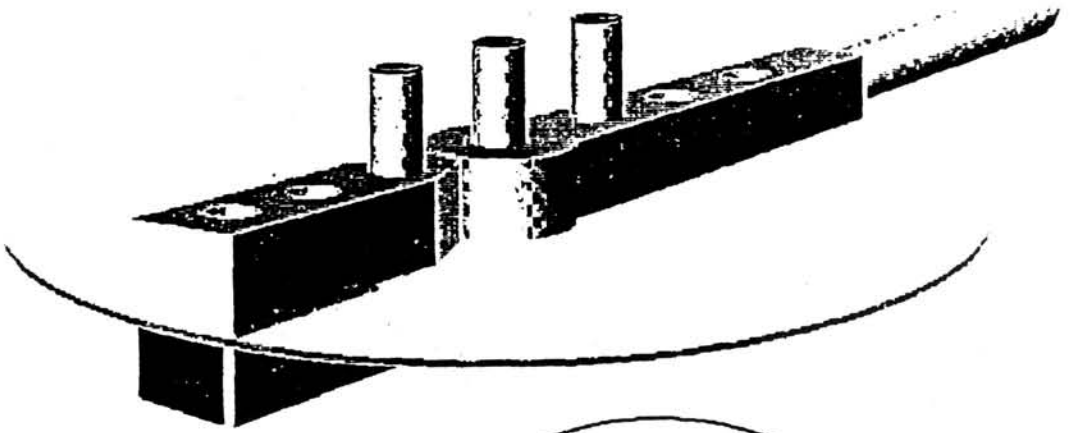
Figure 9 -- Hardening face of anvil.

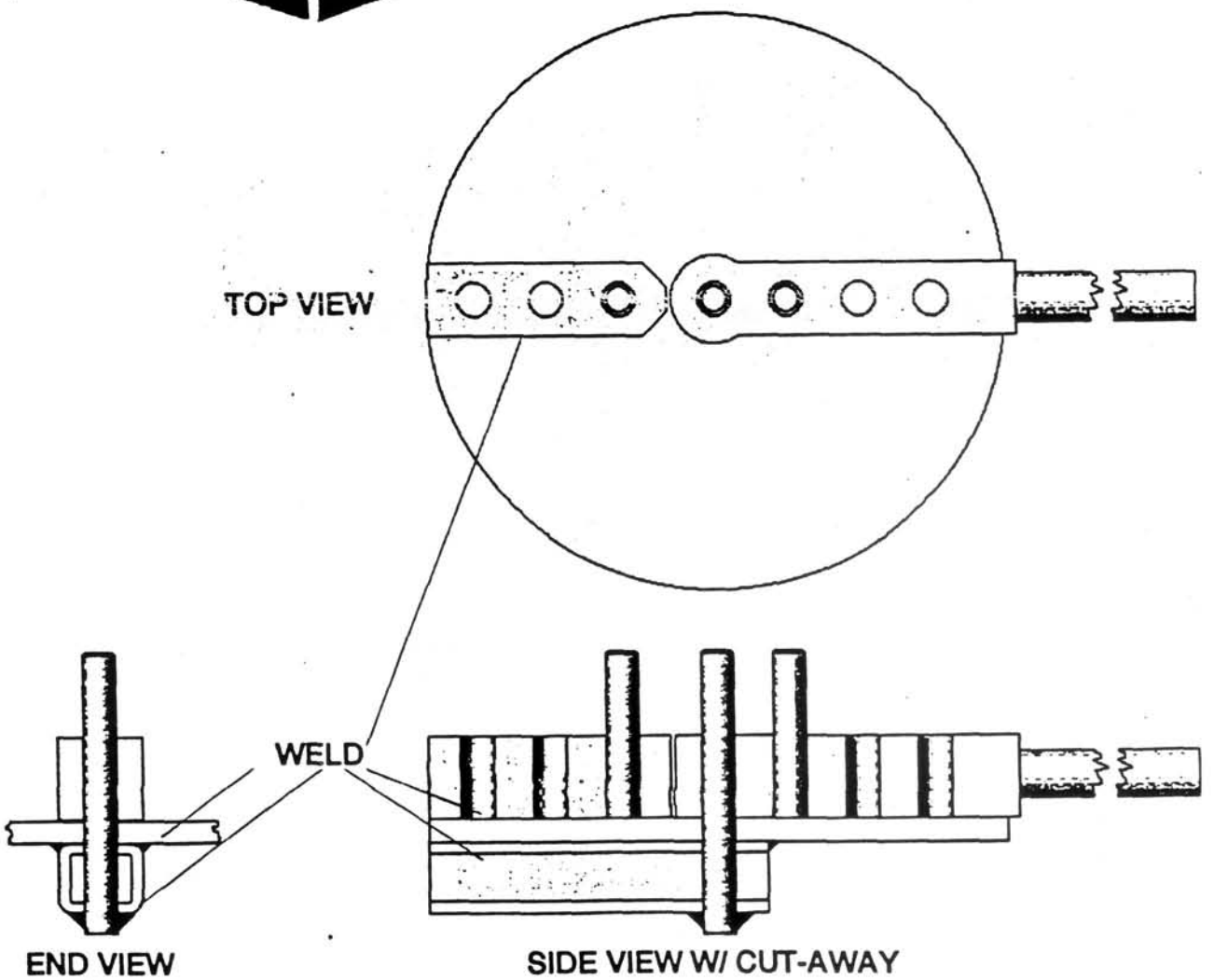
From:
HOT IRON NEWS

Spring 1999

NORTH WEST BLACKSMITH ASSOCIATION

FROM GRAMPA'S TOY SHOP





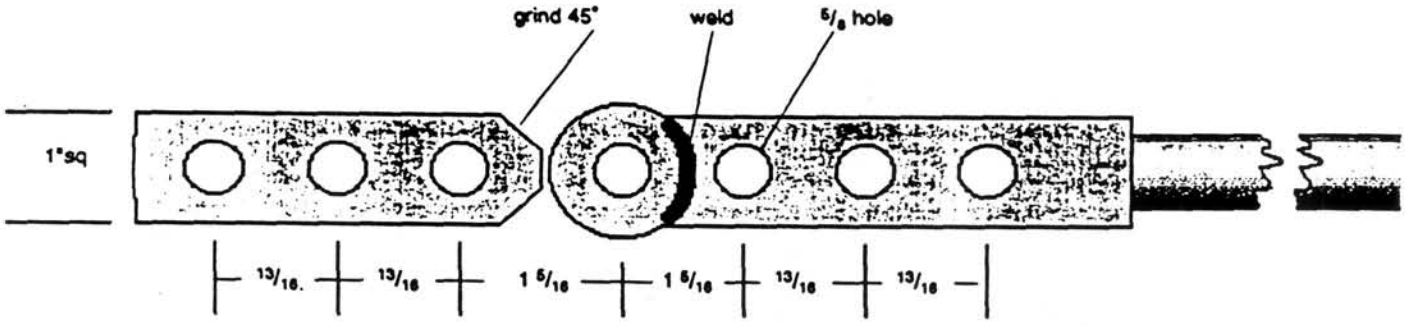
reprint from:

WINTER 1992 THE HOT IRON NEWS

Bruce Freeman, editor Tim Suter, assistant editor. Volume 4, Number 1 July, 1999

FROM GRANDPA'S TOY SHOP

"This is the handiest bender not only for scrolls but for other projects as well."



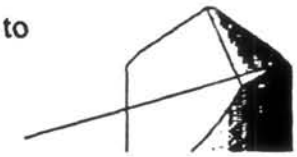
1" square stock with 1 1/4" round boss welded on with 1/16" wall bronze bushing in center hole to take wear. Grind & weld boss deep and grind clean.

2. Bottom plate is a 1/4" x 8" circle with 1" tube x .125 wall welded to the bottom.

3. Center pin goes thru plate and 1" tube welded to bottom side. Lots of strain on center pin.

4. Bending pins made of tool steel - 2 1/2" - 2" long. I use potato digger bars 5/8" dia. which are already hard.

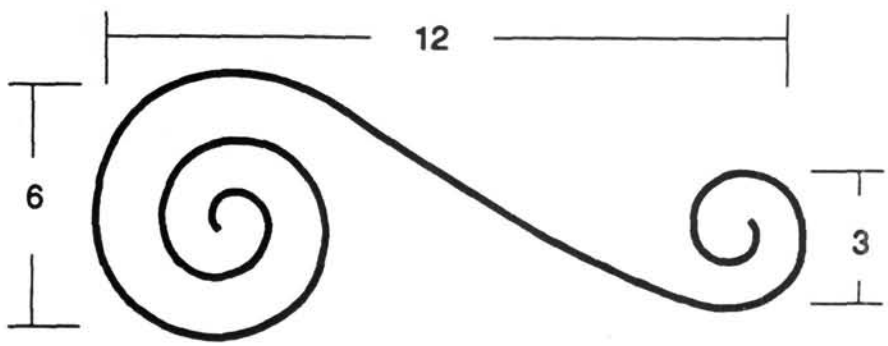
5. I used 1" square HR iron - maybe should have heat treated(lye) holes. May distort due to side pressures.



6. Drill holes with pilot drill - 9/16" or 19/32" drill. Then 5/8" drill. Grind corner off 1/8". Makes a type of reamer drill that works on movable arm. Leave a shelf on bottom of hole to keep pins from dragging.

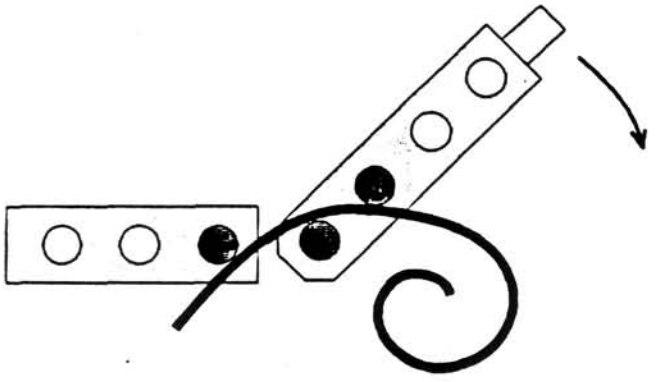
7. Weld 5/8" stub on movable arm. Put 24" long pipe over this for leaverage.

8. 45° angle on stationary block lets movable arm go back past 90° to help pin clearance and increase chance to bend better, closer.

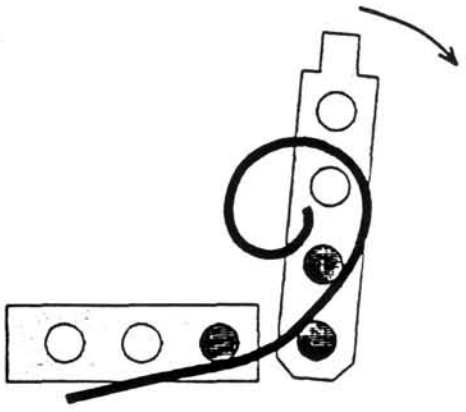


To bend scrolls I use scroll forms to get basic shape, then use 3 pin bender to

FROM GRANDPA'S TOY SHOP



BEND



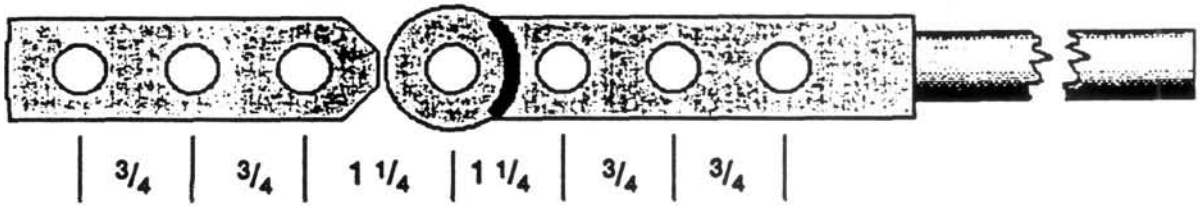
STRAIGHTEN

adjust scroll to proper width and length, etc.

I use a block 1 1/4" square with one square end and other end curved ⊙ over center pin. To bend parts square, ⌐ round ⊃ with pins outside hole. Can bend 1/2" square or round HR bar cold on large radius or small radius hot; 90° bends, etc. To cut down on clearance between pins use pipe or tube over pins or just the center pin.

FOR MY SMALL BENDER

Same frame, 1/4" x 8" plate and 1" tube on bottom. Same as large bender.

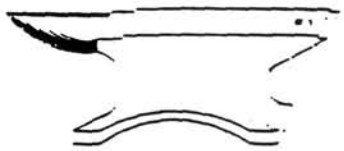


3/4" square stock heat treat(lye), 1/2" potato bar pins, 1 1/16" round center pivot with 1/16" bronze bush. I put wooden dowels (short ones), in empty holes to keep scale out when hot bending.

Sincerely

Grandpa Hixson

Anvil Repair



Joseph Beckham
Applications Engineering Lab
ITW Welding Products Group-McKAY
Troy, OH

As with any type of repair work, it is important to know what you are dealing with prior to starting. Many hours of frustration and rework may be averted by taking the time beforehand to understand what is going to be needed and what the potential downfalls may be. The first step is to find out what type of metal is in the anvil body.

Determining Anvil Base Metal Type

There are essentially two types of metals used in anvil body construction. One way to help determine what type of anvil you have is from history. Most of the European anvils have a wrought iron body. They have remained basically the same composition for hundreds of years. Anvils were not made in the United States until around the mid 1800's. These domestic anvils usually have a cast iron body. So, if the origin of the anvil is known then we can make an educated guess on what type of metal the body is.

Another method of determining the base material is called a spark test. A grinding wheel or disk is used to produce sparks that then can be used to determine metal type. For best results, use at least 5000 surface feet per minute on the grinding equipment. Surface feet per minute can be determined by

$$\frac{\text{Wheel circumference} \times \text{Wheel RPM}}{12}$$

The sparks should be directed downward. The sparks should be observed for their color, shape, length, and activity of the sparks. The spark stream has several specific items that can be identified. **Carrier lines** are usually continuous and solid lines that appear as long tails behind the spark. At the end of the lines they may branch into three lines that are called **forks** or into more than three lines called a **sprig**. Sprigs can occur at different points along the carrier lines. These are called **bursts** and are generally either **fan** or **star** shaped. Carrier lines will sometimes enlarge for a short distance then shrink back in size. They can either be at the end of a carrier line (**spear heads**) or elsewhere along the carrier line (**buds**). By becoming familiar with the spark stream and practicing on known samples, the spark test can be fairly accurate at determining the metal type.

Cast Irons have short dull red to straw color carrier lines and have many repeating small sprigs.

Wrought Irons have long straw-colored carrier lines, which usually are whiter away from the grinding wheel. Carrier lines typically end in spearheads or small forks.

If there are a large number of buds then there is probably a high sulfur content in the metal. A high sulfur content is a big problem since it causes weld bead cracking. If the anvil has a high sulfur content, then the anvil is essential considered non-weldable.

Other distinguishing methods include:

Base Metal	Color	Chisel Test	Fracture	Torch Test
Wrought Iron	light gray	easily cut	bright gray "fibers"	fast melting
Cast iron	dull gray	not easily chipped	brittle	melts slowly

Repair Preparation

The repair area should be free of grease, oils, paint, rust, and dirt. The area to be built-up or the crack that is to be filled should have relatively smooth surfaces. Deep cracks should have their ends drilled out prior to performing work on them. This will help to prevent the cracks from cracking any further. A V-groove should be prepared, either by arc gouging or grinding, to allow easy access to the root of the crack. The cracks should be completely removed to sound metal. Holes to be repaired may also require beveling to allow good access during welding. All repair surfaces should be ground smooth prior to welding, especially after arc gouging. This will allow the weld metal to easily flow and make sound welds. The better the preparation is, the better the chance is that the repair will be successful.

Actual Repair

On wrought iron anvils, the preheat should be 250°F minimum. The cast iron anvils should be preheated 450°F. A soaking preheat should be used on either anvil type. A general rule of thumb is an hour of preheat for each inch thickness of metal. Note: thickness may also mean the width across the anvil and is not limited to anvil height. Care should be taken to evenly distribute the heat. Thinner sections such as the heal or horn will heat faster than the body, so more time should be spent heating the body up to temperature. Care should be taken not to overheat thinner sections. Heat control is going to be one of the biggest keys to successfully completing the repair. The heat should not be allowed to drop below the preheat temperature during welding. This typically should not happen unless there is a break in the welding for a period of time. If the temperature does drop below the recommended preheat temperature, heat the anvil back to temperature prior to doing anymore welding.

The anvil should be positioned so that most of the welding can be accomplished in the flat or horizontal position. The electrodes are easier to control and require the least welding skill in these positions.

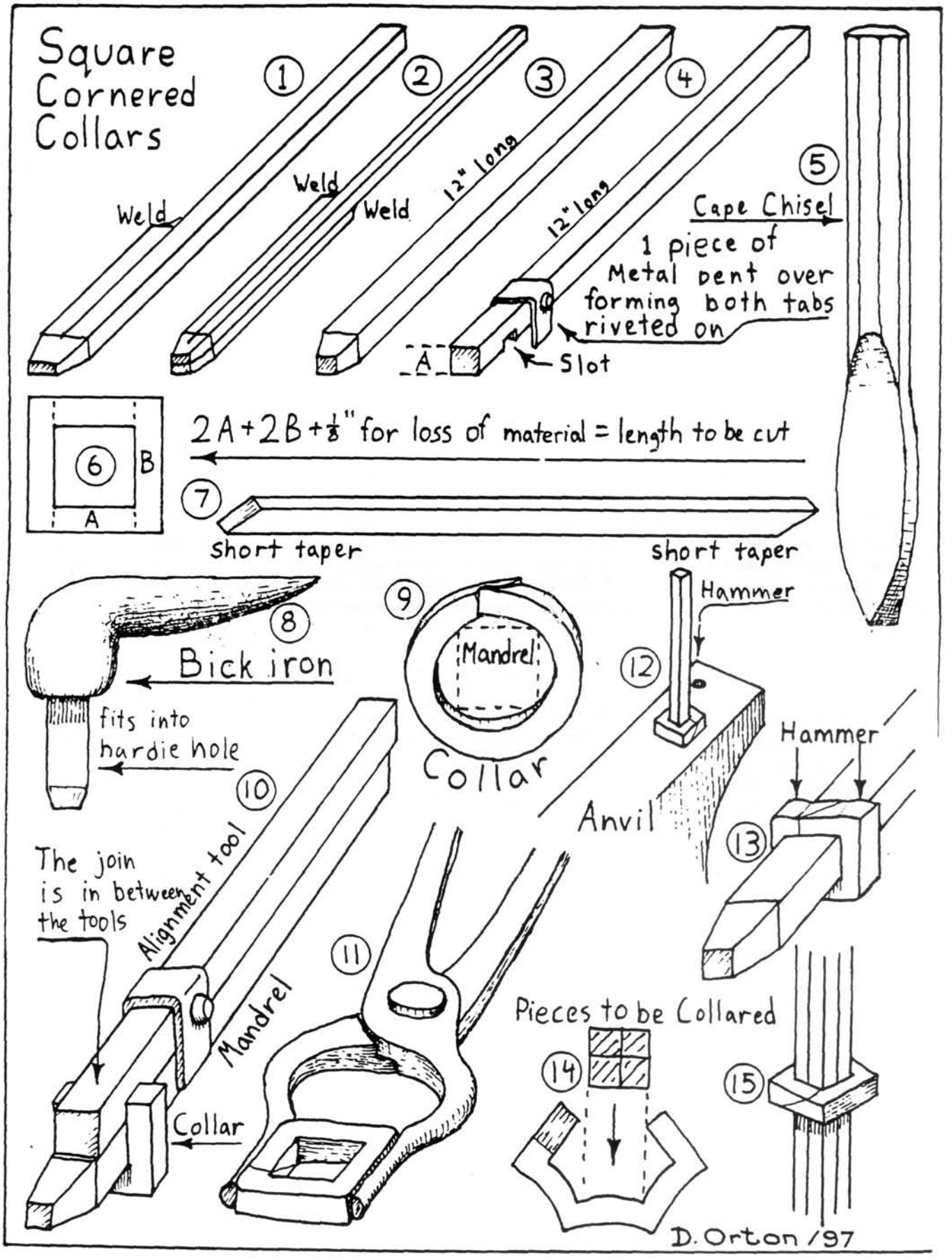
Defects that are only in the body of the anvil should be done McKAY Hardalloy 32(a martensitic alloy with about 30 HRC{Rockwell C hardness}). On wrought iron anvils only, a mild steel electrode (AWS E7018, E6010, etc.) may be used to rebuild the horn or build up depressions. This is a low cost option, but the result will be a much softer anvil that will wear down faster. Mild steel welding electrodes should not be used when a hard cap layer is to be applied, especially on cast iron anvils. The mild steel electrode deposit is too soft and may cause cracking in the overlay. It is like putting a marshmallow between two graham crackers and hitting it with a hammer.

Corners or broken heals should be rebuilt using McKAY Hardalloy 32 electrodes. Deep depressions should be built back to shape with McKAY Hardalloy 32. If two sections are to be joined then an AWS E7018 (McKAY 7018 XLM) for the wrought anvils or an AWS ENiFe-CI (McKAY Cast-Alloy T-60) for the cast iron anvils should be used. The final two to three layers on repairs in the face area should be overlaid with Hardalloy 58(a martensitic alloy, about 60 HRC). McKAY Hardalloy M932 (martensitic alloy about 38 HRC) can be used as a possible replacement for Hardalloy 32 and will give a slightly harder surface with better resistance to dings and deformation.

Once welding is completed, the anvil should be allowed to cool to room temperature in still air. On deep repairs or cracks on cast iron body anvils, a slow cool may be necessary to prevent cracking. This can be accomplished by either covering the anvil in sand or with a suitable shop blanket.

A disk grinder or hand held belt sander can then be used dress up the anvil and put a finish on the anvil. Most welding product manufactures offer technical assistance on using their products. If you have further questions or problems call the manufacturer, they can be used a valuable resource.

Reprinted from: Southern Ohio Forge & Anvil



Ocmulgee Blacksmith Guild May-June '98

Nineteenth Annual Early American Wrought Iron Conference

Saturday and Sunday, September 11 and 12, 1998

Demonstration Schedule: (each day)

9am to 12noon — Dorothy Stiegler
1pm to 4pm — Jonathan Nedbar

For: Blacksmiths, metalworkers, farriers. All areas of interest and skill.

Activities: Demonstrations each day, tool swap, auction, *Iron in the Hat* drawing, slide show.

Where: Delaware Agricultural Museum and Village, 866 North DuPont Highway, Dover, DE 19901

Nineteenth Annual Early American Wrought Iron Conference

Registration Form

Name_____ Phone_____

Address_____

City_____ State_____ ZIP_____

Adults:	Both days	_____ $45
	Saturday, September 11, 1999 only	_____ $30
	Sunday, September 12, 1999 only	_____ $25
	SORRY! I'm late! After September 1, 1999 for both days	_____ $55
Children (under 18)	Both Days	_____ $20
	One day only	_____ $12.50
Dinner on Saturday Night	_____ x $11=	_____

TOTAL AMOUNT ENCLOSED for adults, children and dinner $_____

PAYMENT: _____ Credit card or _____ Check enclosed, made out to DAMV

MC or VISA (circle one)
Acct. Number_____
Exp. Date_____
Signature_____

Tear off and mail this form to DAMV, 866 North DuPont Hwy., Dover, DE 19901.
AVOID THE LATE FEE - Register before September 1, 1999!

How to Join or Renew your Membership in NJBA:

NJBA dues are $15 per year. Please make out your check to

"New Jersey Blacksmiths Association."

Please mail checks to

NJBA, 222 Laurel Place, Neptune, NJ,

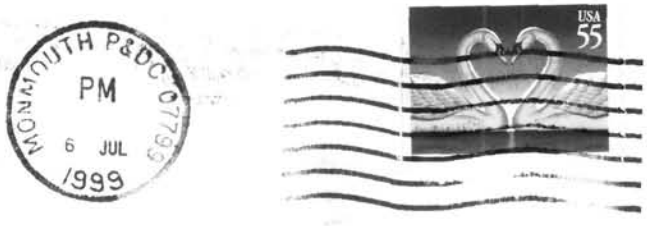
along with the information requested below. You will receive the most recent newsletter as an acknowledgment of your membership. Annual dues are due on June 1. If you join in April through June, you will not owe renewal dues until June of the following year. If you join at another time of year, your will owe dues the following June.

(The following information will be listed in a roster available to other members.)

Name_____ Home Phone_____ Day Phone_____

Address, City, State, Zip_____

Electronic Mail Address_____



New Jersey Blacksmiths Association

Newsletter

222 Laurel Place
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