



SOFA SOUNDS

OCTOBER/NOVEMBER 1985

Artist-Blacksmiths Association of North America

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QUAD-STATE ROUND-UP:

Final plans have been made for the upcoming Round-Up and it promises to be a great event. We still need volunteers to come on Friday, September 20th to help set up the homestead and possibly on the following Monday to put it back in shape. Other volunteers during the conference would also be appreciated. If you can assist as a volunteer, please contact Ron Thompson as soon as possible. Volunteers will receive a partial registration refund following the event.

As of September 7th, approximately 150 had signed up for the Round-Up, predominately from out of the local area. If you are planning to attend, please send in your registration form immediately so we know how many to expect, will have your registration package ready ahead of time, and also know how many dinners to order. If you have not received registration information, contact Dick Franklin at 233-4878.

Don't forget to bring blacksmithing-related items for the tool sale table (donations to SOFA - you set the price), auction donations to SOFA, or auction commission items (10% of final price to SOFA). Also plan to bring items for the display table.

MARK YOUR ABANA CALANDER: (Unless otherwise noted, all meetings will be at the Studebaker Homestead on Rt. 202, four miles north of I-70. Members are encouraged to bring guests and tools or items they have made for display. Please don't park on the grass.)

October 5th - 1 PM

BUSINESS MEETING followed by a demonstration on making leaves and veining by Hans Peot. Work on the homestead gate will start at 10AM and continue after the meeting and demonstration. Come early and bring your favorite forging hammer.

November 2nd - 1 PM

BUSINESS MEETING followed by a demonstration on making hinges by Larry Wood. Work on the homestead gate will continue as previously mentioned.

December 7th - 1 PM

BUSINESS MEETING followed by a demonstration to be announced. Work on the homestead gate will continue as required.

January 11th - 1 PM

BUSINESS MEETING followed by a demonstration to be announced. Work on the homestead gate will continue as required.

Creative & Friendly

MEETING NOTES:

I was unable to attend the August 3rd meeting; being on vacation. From a tape provided by Dick Franklin, most of the items discussed concerned the Round-Up. On other items:

- Emmert Studebaker noted that he was almost out of coal and was trying to line up another shipment of quality coal prior to the Round-Up.
- The didydium safety glasses finally arrived and were purchased by the group for resale. They went quickly at \$15 per pair. If you missed out, contact Ron Thompson as he may reorder if there is still sufficient interest. The didydium lenses block out yellow light from the fire making it easier to see in the fire with less eye strain.
- It was noted that Francis Whitaker is expected to lead workshops again next year and the possibility was raised of having him do a workshop for the group at the homestead. A project might be to complete the arch over the gate. The group officers will look into this possibility.

The raffle brought in an additional \$32.00 to support the newsletter. The tape didn't say who won the horseshoe belt buckle made and donated by Huber Heights member Dick Franklin. The brass watertub dipper made and donated by Keith Summers was won by New Carlisle member Hans Peot. Raffle items for future meetings are urgently needed.

I understand that Duane Wegley put on an excellent demonstration on making several items relating to blackpowder shooting. I'm sorry to have missed this demonstration.

The September 7th meeting had to be the hottest one on record. You could easily tell the ones who had been working on the gate by their sweat-soaked clothing.

Most of the business meeting concerned final details for the Round-Up. Everything seems to be falling in place nicely.

It was announced that Patterson Iron new and used steel yard has six-sided lengths in 3/16" and 3/8". Larry Wood pointed out they were cold rolled and, while they couldn't be used where a forge weld was required, they would be decorative in other pieces. Patterson is also suppose to have a supply of 3/8" square rods. Cost of this material is 22¢ per pound.

Probably due to the weather, attendance was sparce. The raffle brought in \$18.00. The wooden mallet for straightening twists made and donated by Hans Peot was won by Sidney member Bud Rolston. Other items raffled were a pack of six rivets, angle iron jaws for a post vice and a pack of six railroad spikes.

Following the business meeting the editor demonstrated making a pair of log tongs with help by Bud Rolston and Ham Hammond. After the heat got to me, Ham finished the handle. The completed tongs (see the Shop Tips & Techniques Section) will be cleaned up as a raffle items for the October 5th meeting. This was intended as a beginners workshop project but no one seem interested in swinging a hammer. Since I didn't have the pieces precut and drilled, the hot cutting and punching extended the demonstration time.

THIS AND THAT:

- Centaur Forge's 1985 catalog is now out. While it still caters mostly to farriers, they have expanded their line of blacksmithing equipment, including German-made tools. They also now carry some replacement parts for Little Giant power hammers. The catalog

includes a 9-page listing of blacksmithing-related books. For a copy write to Centaur at 117 N. Spring St., Burlington, WI 53105.

- Reminder that registration for the next Dayton Public Night School class in welding will be in November. Two nights per week, four hours per class. Classes are taught by SOFA member Ham Hammond. Cost is \$40. Contact the school at 222-7401.

- Kraus Sikes, Inc., a New York City based publishing firm, has recently announced its intention to publish THE GUILD, a resource directory aimed at bridging the gap between the interiors market and American craft artists whose work is appropriate for residential or commercial spaces. THE GUILD will be distributed to 10,000 designers and architects. For more information about THE GUILD, contact Toni Sikes, Kraus Sikes, Inc., 19 E. 95th St., New York, New York 10128 - (212) 289-5247. You will be required to submit slides of your work.

- EMPLOYMENT OPPORTUNITY??? I recently spent two days at Put-in-Bay on South Bass Island out in Lake Erie. My impression is that a blacksmith shop would do rather well there for the period between Memorial Day and Labor Day (the traditional tourist season there). There had to be somewhere between \$30-\$50 million worth of sailboats, yachts, and large cabin cruisers in port and I understand most of the season is this way. This would seem an excellent opportunity for a qualified blacksmith to demonstrate and sell his own (and possibly others on commission) typical retail merchandise (e.g., pot hangers, fireplace sets, candle holders, etc.) during the season and also to pick up larger commission ironwork (e.g., gates and grills) for the off-season period off of the island. A shop/retail sales area would have to be built (possibly with living quarters for the season upstairs). To check out this possibility further, contact the Put-in-Bay Chamber of Commerce or, better yet, visit. There is an antique/retail store there now called "The Blacksmith Shop" but they do not sell any ironwork. They are located in what was once the blacksmith/automobile repair shop for the island.

- Received a note from a SOFA member that he would like to see information on how to market hand-forged items in the newsletter. He would also like to see a demonstration on basic sword forging (steps involved, materials, design, problems involved, etc.). Can anyone help us here?

- For Sale: Reproductions of the plaque "The Arrow Smiths" appearing on the cover of the Spring 1984 Anvil's Ring and in the 1985 ABANA calendar. The cast aluminum copy has a nickel-like finish with buffed highlights. Weight is 9.5 pounds and the diameter is 17". Price is \$180 postpaid. Allow 4-6 weeks delivery after receipt of check payable to John Dittmeier, 6 West Mt. Vernon St., Smyrna, DE 19977. (Ten percent of the proceeds go to the National Ornamental Metal Museum for its upkeep of the ABANA inventory and Julius Blum & Co. library.)

FLUXES :

At the time I contacted blacksmiths listed as demonstrators by ABANA to find out what finishes they used, I also inquired as to what flux or fluxes they used. Their replies are as follows:

- Frank Turley (Turley Forge, Santa Fe, NM):

I started with borax as flux and have stuck with it for 21 years. I find it leaves the surface of the iron less roughened than proprietary fluxes which have iron filings. I sometimes use "E-Z Weld", but then I have the surface to clean afterwards.

- Francis Whitaker (Aspen, CO):

I have used E-Z Weld flux for over fifty years. It gives me the best, longest lasting welding heat of any flux. Some notes on its use: I flux almost always right.

in the fire, it is waste of time and heat to remove the pieces from the fire and flux them. Apply the flux when it will stick quickly to the scarf and the heel of the scarf. Do not turn until the flux has turned the color of the iron. Turn, flux the other side, and then the other two sides. An envelope of flux, with a higher melting point than the iron, gives the sticky, lasting welding heat. Bring the heat up slowly, watch the small iron particles in the flux, if they look like pepper on an egg, the heat is not ready. If the small iron particles are not melted, then neither is the iron to be welded. Be sure to get the welding heat back on the heel of the scarf, so the tip of the other scarf will have a welding heat to make a good weld.

Recently, I have been using Crescent Flux, same manufacturer, for faggot welds, welded collars, basket handles, etc. It cleans up better than E-Z Weld. It takes a bit of adjusting to get used to a different flux. Try the touch system, if the pieces stick in the fire, they will stick on the anvil. Watch the sparks, if no sparkler sparks are above the fire, it is not ready.

- Clem (Malot) Mellott (Harrisonville, PA):

I use E-Z Weld or just plain 20-Mule Team Borax. I have also welded with sand and powdered glass, E-Z Weld or borax give the best results. More important is a clean piece of steel properly scarfed and a clean, neutral fire. Clean fire can only come with a good, low sulfur, low ash coal, coked well and free of ash as this creates cold spots in the fire. You must be prepared to weld the instant your piece is ready as speed is important. It may take more than one heat to finish the weld completely.

- Steve Kayne (Kayne & Son: Custom Forged Hardware, Candler, NC):

I use Anhydrous Borax or just Borax dried out in an oven at 300°F for an hour or so. I find it's easy to use, it's cheap and readily available. When I miss a forge weld, it's not the flux or the coal, it's simply that I broke too many of the rules.

- Dimitri Gerakaris (North Canaan, NH):

For 90% of all welding I use "E-Z Weld" by the Anti-Borax Co. of Fort Wayne, IN. For very thin metal (like 16 ga) welds, I use "Crescent" (also by Anti-Borax). Health note: Never use borax - its fumes are bad for your health.

- James Wallace (Memphis, TN 38106):

I use both "Crescent" and borax, both for different welds. The Crescent is my standard for almost everything. Borax is used only when I run out of Crescent or to re-weld a cold shut. NOTE: When using borax, you must really clean up afterwards or some time later a white fuzz may appear.

- Nol Putnam (White Oak Forge, The Plains, VA):

We use E-Z Weld, purchased through Centaur Forge in 25 lb drums for the most consistent welds. Especially good as pieces to weld do not "slip" apart so easily as with say Borax. Highly recommend E-Z Weld.

- Paul Boccolucci (Five Acres Blacksmith Shop, West Valley, NY):

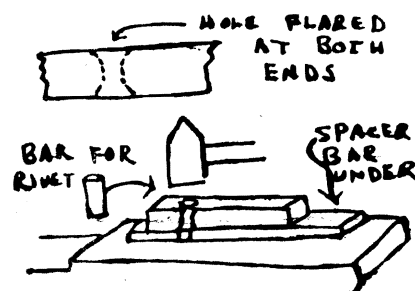
- I use Borax exclusively. I have tried Cherry Heat and others with iron filings, but always return to plain Borax. It works fine for all my welding.

As you can see, the sides seem to be about equally divided between borax and a commercial flux, such as E-Z Weld. Personally, I use both. For faggot welds I use a formula Bob Zeller gave to me of three parts borax, two parts baking soda, and one part salt (heated at about 350° until it forms a solid cake and then powdered) and E-Z Weld for lap welds. I also occasionally mix the two using the borax-based mixture for its penetration ability and E-Z Weld for its surface protection, holding ability, and that it starts to spark (the iron filings burning) when you approach welding temperature.

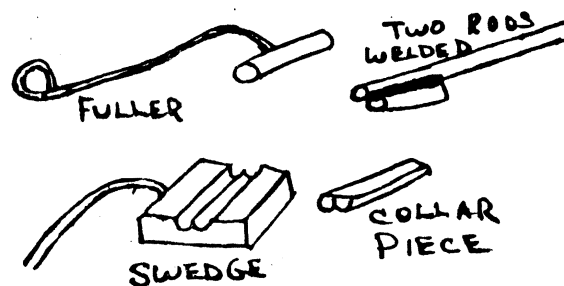
SHOP TIPS AND TECHNIQUES: (When a shop tip or technique from one newsletter has been repeated in another newsletter (and I picked it up from there), the original newsletter is cited as the source. In most cases, these tips or techniques have been paraphrased from the original write-up or illustrations for consistency of format. While the information presented in this section (and elsewhere in the newsletter) is believed to be accurate, SOFA and ABANA bear no responsibility for injuries or other adverse actions which may result.)

- When adjusting tong reins use a piece of wood shaped to the space at which the reins are comfortable to hold, then heat and clamp the jaws about the work to be held by the tongs. (From a demonstration by Oscar "Bud" Oggler as reported in the newsletter of the New England Blacksmith's Ass'n).

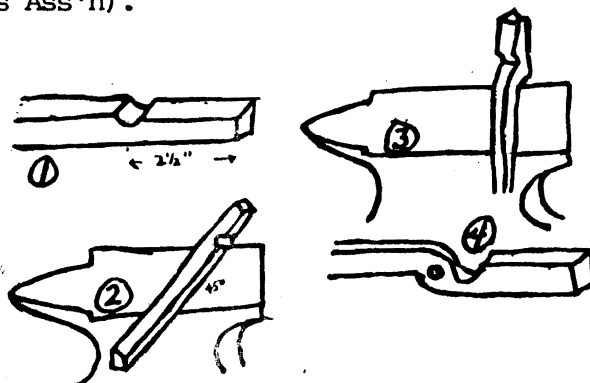
- To patch a misplaced hole first flare it out at the ends and cut a rod to put in which will be a rivet and completely fill the hole, flared at both ends so it will stay in place. By putting a spacing piece under the work with a hole for the rod to stick through you will have enough on the bottom end to fill the hole completely. Grind off any excess. (From a demonstration by Bob Bergman as reported in the newsletter of the Upper Mid-West Blacksmiths Ass'n).



- Bob brought along some tools he made to use with a power hammer, one being a simple rod welded to an offset handle to be used as a fuller. He also had swedges which are made to give collars some design. To make the tool, he welded a couple of 1/4" round rods together and pounded them into a piece of steel to make two side-by-side grooves. Then an offset handle was welded on the swedge. You can make the swedge with a post for use in your hardie hole as well. Also, three rods could be welded or whatever combination you might want to use. (From a demonstration by Bob Bergman as reported in the newsletter of the Upper Mid-West Blacksmiths Ass'n).



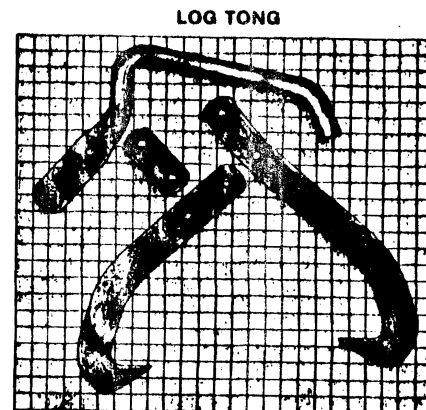
- Box tongs are one of the most useful ones, and I have made them often at workshops. One of the problems has been getting enough material to forge the box end, the jaw comes out too long, and the box too short. Here is the method I now use: 1) using a 3/4" top fuller or 3/4" round, forge 3/4" square at 2 1/2" from one end down to 3/8" (halfway), 2) place at the usual 45° angle, with the groove to the right, and the end of the groove farthest from the end right on the corner of the anvil. Flatten to form the start of the eye, 3) turn counterclockwise, and at 90° to form the eye, in the usual manner, and 4) the result is the full thickness of the stock to be spread out and



formed into the box jaws. Little or no upsetting is needed, and the long box resulting holds material better than a short box at the end of the jaw. With a little upsetting, a 1 1/2" box may be formed, for wider sizes. For wider stock, I forge a short jaw, then weld a crosspiece of 1/4" x 1 1/2" with a "T" weld, then bend into the desired width box. (By Francis Whitaker from an open letter to fellow smiths).

- At workshops it is not always possible to find the correct rivet for tongs, I use a 5/16" rivet, with a drilled hole (it is more accurate). To double head a pin, here is the method I use: 1) Cut 5/16" round 1" longer than thickness of tongs eyes. Lightly burr the pin so it will not fall out in the fire. Heat one end only, place on two 1/2" spacers, mushroom the end to about 1/2" in diameter. The spacers will keep the pin centered with an equal amount top and bottom, also keeping the tongs together, 2) repeat, placing the mushroomed head in a bottom rivet set, mushroom the top end, then finish with a top rivet set. Don't have a rivet set! Make them at once, they will always be handy, and will give your rivet jobs a professional look. Besides, the tongs will stay in shape longer. (By Francis Whitaker from an open letter to fellow smiths).

- Like the ice seller's tongs, log tongs use mechanical advantage to keep a grip on the work. Since the handle pivots on one gaff, and is connected through links to the other, the pressure of the "bite" is proportional to the weight of the load and can be used one-handed. To fashion these tongs, first cut 3/6" (or 1/4") x 1" stock to lengths of 9 1/2" and 11 1/2" and forge to the shape shown in the illustration. The points and shank areas should match. Next forge the handle out of 1/2" to 5/8" x 13" ϕ to the shape illustrated. The flattened area should be 3 1/2" long and 7/8" to 1" wide. To complete the parts cut out two link sections 2 1/4" long out of 1/8" to 1/4" x 1" stock. 1/4" to 5/16" pivot holes should be drilled as follows: the handle gets two - 1 3/4" apart, the longer gaff gets two - 1 5/8" apart, the shorter gaff gets two - 1 11/16" apart and the links get two - 1 3/8" apart -- all holes measured from the center. The end holes should be centered 1/2" from the end. To assemble,



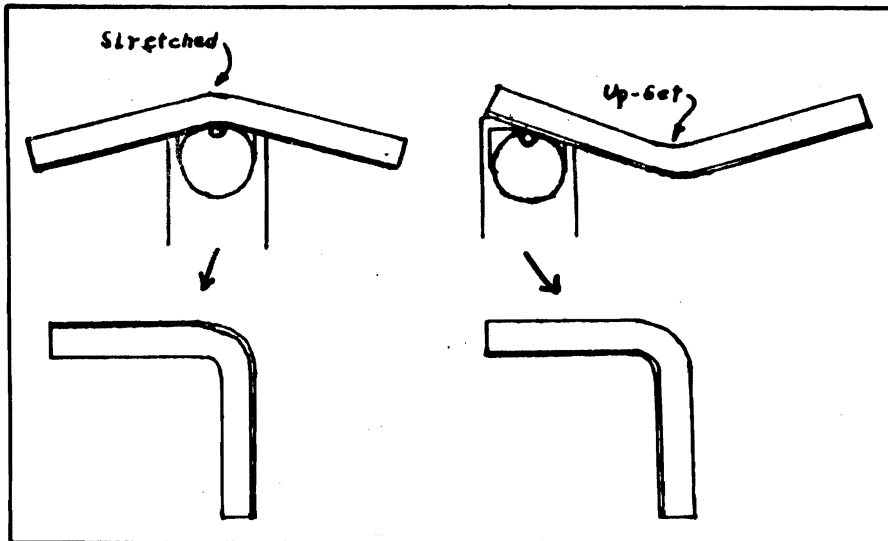
A	3/16" X 1" X 9-1/2"	top gaff
B	3/16" X 1" X 11-1/2"	bottom gaff
C	(2) 1/8" X 1" X 2-1/4"	scissor links
D	5/8" X 13"	rod handle
	(4) 5/16" X 1-1/2"	bolts/nuts

the upper hole of Part B goes with the inside hole of Part D. The inside hole of Part B goes with the outside hole of Part A. The two links go through the outside hole of Part D and the inside hole of Part A to form an unequal square. Before fastening, round corners and spray paint as desired (red or yellow for field work). Fasten together with rivets or nuts and bolts to match the pivot holes. If nuts and bolts are used, grind the protruding bolt to about 3/16" from the nut, slip in a piece of broken hacksaw blade, and then rivet down cold to lock the nut on the bolt. The nut should be just a little loose when you do this. Remove the hacksaw blade piece. It should have allowed enough clearance between the parts so they work freely to permit easy grabbing and release. If the bolts still bind, back off the nut a little without twisting the bolt. Using these dimensions, with two pair of these tongs, you can carry two fireplace length logs up to 8" diameter easily. To carry larger diameter log sections, lengthen the gaffs as desired. (Adapted with permission from The Mother Earth News, July/August 1985, pgs 80-81, copyright 1985 by The Mother Earth News, Inc., P.O. Box 70, Hendersonville, NC 28791, one year subscription \$18.00). ((The pair I made required about \$2.00 worth of stock and about one hour to complete (unpainted). Thus, at \$15 to \$20 a pair, these might be good sales items for you production smiths. - ks)).

- To locate punch marks on hot metal, blow on the metal; scale will form where you blow, and you will be able to see your punch marks. (By Mike Chisham from Pounder's Press, newsletter of the Southwest Artist-Blacksmith's Ass'n).

(Continued on page 9)

Bending Angle Iron



By Harry Robinson

In bending of metal consider this fact, i.e.: a right angle with a piece of 1/4" by 2" flat stock with an even heat at point where the bend is to take place, the outer edge will have a stretching effect. The inside edge will be reversed, the metal will increase in size or upset. Therefore, if you were to bend 1/4" by 2" by 2" angle iron at right angle, the energy exerted on the one web is not sufficient to stretch or upset the entire web, therefore distorting the angle. To overcome this problem, one must stretch or upset that portion to be bent in accordance to the direction bent.

Owen David. Mr. David was two times British Champion Farrier, and is a working blacksmith at a coal mine in the hills of Wales.

Mr. David astounded the crowd with his wizardry at the forge as he produced various shoes and tools, using many techniques and tools none of us had ever seen before, and with the smoothness and exactness that comes only from many years at the anvil. On more than one occasion he had everyone keeping time with their feet to a lively tune he would tap out while he and Mr. Marshal drew out heavy stock.

One of the many things Mr. David taught us was a scarf unlike any I have seen. I was so impressed with this scarf that I had to try it shortly after returning home. Time and time again I tried to miss a weld using this scarf by fumbling, dropping and generally fouling up, but succeeded in mission one only after a long day in a dirty fire and dropping one of the pieces twice at an orange heat. So I have duly dubbed this G.O.D.'s Scarf. The procedure is to bend the two pieces being jumped at about an 80° angle, 3/4 of an inch from the ends, and upset, keeping your angle. The end of the scarf is then planed and bent sharply back up. It gives you a non-slipping scarf that produces a layered weld. Try it, you'll like it.

[Editor's Note: See the sequence of illustrations in Figure 1 to supplement the discussion above.]

ILLUSTRATIONS BY ARLENE HOLDER

G.O.D.'s Own Scarf

By Daryl Nelson

[Reprinted from *Blacksmith's Gazette*, Vol. 1, No. 1]

In late August in a small town in Eastern Washington, a group of about 15 smiths and farriers gathered for a two-day palaver, hosted by Chesaw Ideal Forge. The agenda had included Tom Bredlow and two more men. Mr. Bredlow had to cancel at the last minute, leaving many people disappointed and even kept some from attending. Little did they know, for the men who did perform were also masters at the forge. Mr. Bob Marshal, from Mission, British Columbia, Canada, and a small, brawny man from Wales, Mr. Glyn

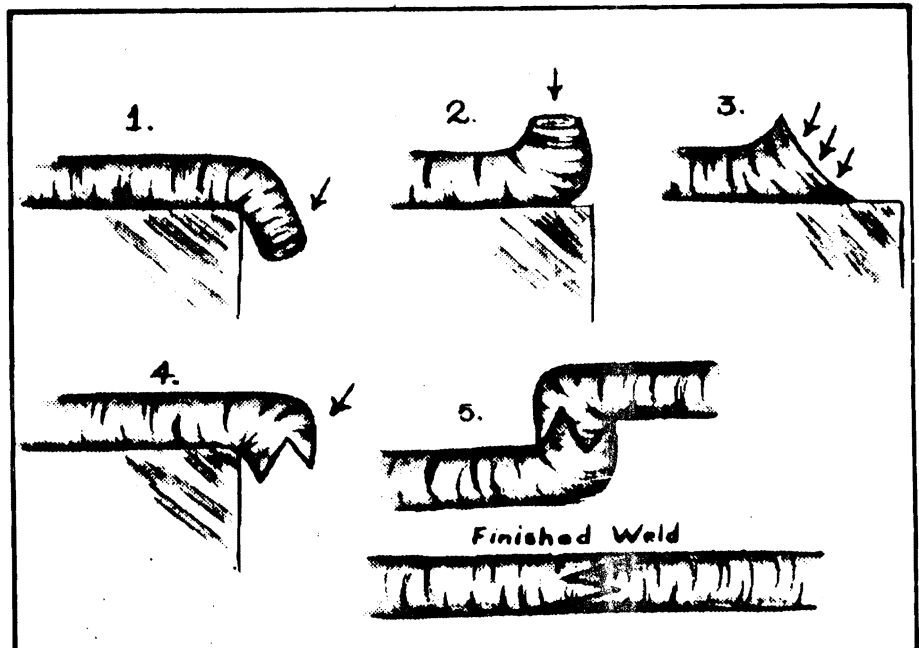


Figure 1. Sequence of steps in preparation of G.O.D.'s Scarf.

TEMPERING COLORS - AND THEIR EFFECTS

POINT CARBON	ANNEALED	NORMALIZED	BLUE	PURPLE	BRONZE	STRAW	LEACHED.
5 Point (MILD)	NO EFFECT	NO EFFECT	NO EFFECT	NO EFFECT	NO EFFECT	NO EFFECT	NO EFFECT
40 POINT (medium impact)	Soft-like mild. Drill, grind, sharpen tools before heating. Use like mild.	Soft, but tough. Drill, grind, sharpen before heat treating. Use like mild, only stronger.	Tough, will still bend, still relatively soft.	Tough Uses: Tongs, triangle dongs Tougher than mild.	Tough. Uses: Pry bars, axes, saws, knives, shafting, splitting mauls, froes.	Semi-hard. Uses: Knives, wood carving tools, draw knives, hot chisels.	Hard Uses: Hardies, cold chisels, punches, wood carving tools, augers (not as good as higher carbon).
30-50 Point Common finds	TIE RODS, DRIVE SHAFTS, CRANK SHAFTS, PISTON CABLE, RAILROAD SPIKES, MOST SAE, AXLES.		RODS, SUCKER RODS,	(This chart is a handout from Larry Wood's Introduction to Blacksmithing course. He compiled it from a number of source books)			
100 POINT (high)	Soft- but tough. Drill, grind, sharpen before heat treating.	Semi-tough. Uses: Kitchen knives, some springs, dinner gongs, tongs.	Tough, semi-hard Uses: Axes, splitting mauls, knives, froes.	Hard Uses: Knives, some wood carving tools, hot chisels, drifts.	Hard Uses: Hardies, cold chisels, punches, wood carving tools, augers. A fairly safe temper (most tools)	Hard Uses: Stone tools. Tools that should hold an edge but sustain no impact or bending.	Brittle Uses: Edge only can be used on stone if rest of tool is tempered..
80-100 POINT Common finds	COIL SPRINGS, LEAF MAY RAKE TEETH, PICKS, MATTOCKS, RAILROAD RAIL, AXES. NOTE: Coil springs makes a good dinner gong, poker, pinch bar, or cold chisel. Old bed springs yield small angle iron and small med. to high carbon rod.	SPRINGS, WRENCHES, TORSION BARS, SOME ENGINE VALVES, HOLLOW VALVES ARE DANGEROUS!!					(8)
150 POINT (TOOL)	Semi-soft, tough. Drill, grind, sharpen before heat treating.	Tough.. Uses: Hot chisels, drifts, forming pins.	Hard Uses: Hardies, cold chisels, punches, more brittle than lower carbon.	Hard Uses: Stone tools, drill bits, machine tools, plow points.	Hard Uses: Drill bits, machine tools, stone tools, files, rasps, plow points, some wear surfaces.	Brittle Uses: Files, some wear surfaces..	TOO BRITTLE TO USE
100-150 POINT Common finds	TOOL STEEL, GRADER BLADES, PLOW POINTS, DRILL STEEL, MACHINE TOOLS, FILES, RASPS, STONE TOOLS, JACK HAMMER BITS.						
WORK CHART AT HEAT COLORS	DARK RED Forging-malleable with some difficulty. Can work iron but requires harder hammering. Carbon steels will surface crack.	CHERRY RED Forging-more malleable. Can work iron & low carbon steels. Quench most steel here for maximum hardness.	ORANGE Universal-very malleable. Can work iron and steel. Punch holes & upsetting	YELLOW Universal-very, very malleable (watch for burning) can work all materials. Upsetting very easy. Welding possible with carbon steels	WHITE OR YELLOW WHITE Welding heat. Molten on surface. Note: watch for burning, particularly if part is deep in fire.	SPARKLING (PAST WHITE) DESTROYS CHEMICAL AND PHYSICAL PROPERTIES OF METAL * Note: Cold hammer carbon steels lightly while cooling.	

- By Francis Whitaker (from the newsletter of the Arizona Artist Blacksmith Ass'n).

-- To thread pieces use a gun tap. It requires no back and forth motion. Once the threads are started the tap can be run into the hole without any backing up. This saves time and work when thread tapping.

-- Use a product called "Rapid Tap" when drilling or tapping. A single drop will make the drill bit or tap cut much easier.

-- After forming or punching a hole for a rivet, run an electric drill bit through it, after it cools, the size of the rivet. This produces a true cylindrical bore and a smooth fit for long rivets.

-- When forge welding two pieces, as they near welding temperature, touch them together in the fire. When they first stick together, it's time to take them out and weld them. Remember to get the area in the back of the scarfs up to welding temperature also so both scarf tips weld nicely.

- More by Francis Whitaker (from the newsletter of the Northeastern Blacksmiths Ass'n).

-- The proper length for a hand hammer handle is from the inside of your elbow to your fingertips, about 16" in most cases. Hold the handle near the back end for forging.

-- How much is your material going to stretch out? Work accurately. Lay out and figure an "elongation factor" before you go to work. Drawing a sharp taper doubles the length. Use surface area or weight method to find how much the stock will elongate for a particular job.

--- Any steel stock book will give you the weights per foot of every size material. For example, 1" square weighs 3.4 lbs per foot. 1/2" square, which is 1/4th the size, weighs .85 per foot. If you neck down a piece of 1" square and draw it out to 1/2" square, it will quadruple in length. Other sizes are not as easy to figure, but the formula works.

--- By area, the same rule applies - 1/2" square is 1/4th the area of 1" square.

--- The best way is to make test pieces for tapers, especially for scrolls, AND WRITE THEM DOWN. After a while, the thumb will tell you; it can really be educated. In critical cases, I resort to math, but mostly I trust my well trained thumb.

-- Harden from the lowest temperature which will get it hard; for fine grain and toughness as well as hardenss. Hammer face is heated dull red for about 1" and quenched to depth of 3/8" - 1/2". Move it around so it won't sit in a pocket of boiling water. Take out, scratch clean, watch for temper color (sky blue), especially at the edges, then quench again NO deeper than before, until it remains wet. Repeat the process with the peen, then cool first 1/2" of both ends again to insure against over-tempering.

-- Use good steel - don't waste time on poor material. Use one kind and stick with it.

-- A well made and well tempered tool will last a lifetime. My original scroll tongs are made of tool steel and have lasted 50 years without realigning. My other tools are alloy steel.

-- Make a note on how a tool was hardened the first time and see if that hardness is right. If not, you will know how to correct it.

-- Break test to determine tempering colors for an unknown bar of steel. Draw out a sample of the steel to a small square and mark on one side with the hardie at 5/8" intervals. Harden, then temper with a wide spread of temper colors along the length. Try breaking the bar at each notch to determine relative brittleness at each temper color.

-- Typical tempering colors: woodcarving tools - straw; screwdrivers - blue, and blacksmith tools - blue to gray-blue.

-- Don't use tool steel for springs (too brittle), use spring steel.

-- For an interesting decorative twist, weld a pair of rounds together side-by-side at one end, one larger and one smaller diameter. Heat, clamp in vice, and twist together. Then reheat, cut off the weld, and unwind the smaller bar and discard it. The larger one will have a corkscrew twist.

-- On helper stands: 1) the top should be wide enough, 2) the top should not rotate, 3) you should be able to pick the stand up by the top without it coming apart, and 4) for special jobs, such as making baluster-tenons under the power hammer, a stand with a "U" top is very good.

- Still more by Francis Whitaker from the newsletter of the Appalachian Area Chapter - ABANA)

-- When testing metal for heat use the back of the hand, not the palm. The palm tends to close when grasping anything. Also, the back of the hand is more sensitive.

-- When using a hacksaw use the full length of the blade. All the teeth are made to use and you will finish quicker.

-- When using a scroll form keep a continuous tight pull when forming the scroll. This will keep the scroll form uniform.

-- Keep the heat on the part you are forming and the heat should be uniform.

-- When making scrolls, never hit twice with the hammer in the same place nor hold the scroll in the same place on the anvil for two hammer blows. This under penalty of kinks, flat spots or being sent home from school, or writing this lesson 50 times.

-- When measuring a drawing to determine the length of metal to be used, use wire solder. It is easy to bend and will hold its shape.

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