SOFA SOUNDS

SOF&A
SOUTHERN OHIO FORGE & ANVIL
Artist-Blacksmiths Association of North America

AUGUST/SEPTEMBER 1987

MARK YOUR A.B.A.N.A. CALENDARS: Unless otherwise indicated, all meetings will be held at the Studebaker Frontier Homestead on Rt. 202, four miles north of I-70. Please don't park on the grass or block access to the production buildings. Donations for the newsletter support raffle are always welcome.

August 8th, 1 PM	BUSINESS MEETING followed by a demonstration on hatchet making by Ron Thompson and Ron VanVickle. Note this is the second Saturday to accommodate the demonstrators schedule.
August 15th, 9 AM September 19th, 9 AM October 10th, 9 AM November 14th, 9 AM	Work on the homestead gate wings. Hot dogs and beans lunch to be provided by SOFA. This is an excellent opportunity for members to learn intermediate-level blacksmithing on a complete project.
September 12th, 1 PM	BUSINESS MEETING followed by a demonstration by Larry Wood and Hans Peot on making a rifle barrel out of a single sheet of metal with the edges forge welded. Note this is the second Saturday also.
September 26th & 27th	1987 Quad-State Blacksmithing Round-Up. Volunteers needed on Friday and Monday mornings to set-up/take down.

MEETING NOTES:

Prior to the June 6th demonstration, several items were covered in the monthly business meeting:

- The group obtained a quantity of 3/8" square, 1020, hot rolled steel. This will be available at the meeting at the cost of $5.00 per 20' length. We are still trying to find a source of 1/4" and 5/16" square and will contact several mills about the possibility of a special run with the surplus being sold at the next Quad-State.

- Group officers were nominated to the Board for their consideration. For the next term Hans Peot was renominated as group President, Ham Hammond was nominated

for Vice President and Ken Scharabok was renominated for Secretary/Treasurer. Thes nominations were unopposed.

- Larry Wood announced that Scott Shoemaker attended the recent Knife Show in Knoxville, TN and had made a video tape of several of the demonstrations. Copies of this tape will be available from him. Contact Scott at 316 S. Main St., Miamisburg, OH 45324 if you are interested in a copy. Larry also mentioned the city inspected Scott's shop and informed him of a number of changes required to comply with city/zoning codes.

- The editor questioned whether or not the members desired to have the raffle results continued in the newsletter or to have that space used for other purposes. The concensus was to continue. The newsletter support raffle raised an additional $50.00. Results are: John Jacobs, anvil pick donated by the editor; Scott Murray, small top swage donated by Bud Rolston; Dennis Hoffer, anvil cutting block donated by Emmert Studebaker; Ron Van Vickle, tongs donated by SOFA; Ed Rhodes, iron block donated by unknown; Ralph Van Buskirk, blower donated by SOFA; Art Holz, book donated by Doug Fink; Emmert Studebaker, tape donated by Art Holz; Doug Fink, steel plates donated by Emmert Studebaker; Scott Murray, brass wine cup donated by Emmert Studebaker; Larry Wood, beautiful brass bowl and iron handle ladle donated by Scott Murray; Art Holz, pencil donated by Ham Hammond; John Patton and Ralph Van Buskirk, grinding wheels donated by Phil Sturr; Ham Hammond, files donated by SOFA; Brian Thompson, wrench donated by Dennis Hoffer; Larry Wood, saw for hand drill donated by the editor; Laurel Rose, shoot the cannon donated by Emmert Studebaker; Ken Scharabok, assorted hooks donated by unknown; Tom Ziegler, soap stone donated by Ham Hammond; Emmert Studebaker, demonstration piece from last Quad-State; Ray Armstrong, piece of lead donated by Dennis Hoffer; Robert Ream, brass wire donated by the editor; Ham Hammond and Brian Thompson, RR track assembly pieces donated by Brian Thompson; Ed Hulihan, farm blades donated by unknown and Ed Rhoades, muffler clamps donated by Art Wolfe.

For the "Back to Basics" demonstration, Ed Hulihan used a length of 1/4" x 1" stock to make a pair of tongs. It was concluded Ed had a length of A36 steel since both jaw areas cracked and one broke off. Hans Peot commented that most A36 now contains remanufactured steel (as does reinforcing rods) and thus you can never be sure of the carbon content from piece to piece. Ed used the 1/4" x 1" since, by forging out the jaw and reins, your swivel/joint section was already formed.

Brian Thompson brought along a mechanics vise on which he had welded lengths of angle iron as shown in the April/May 1987 SOFA SOUNDS. The old jaws were so beat up as to be useless. Now he has a great vise.

Art Holz brought along two beautiful damascus-pattern knifes which I believe he made. Art has volunteered to give a demonstration on the proper way to use files and hacksaws at one of the future meetings.

Emmert has finished his reproduction of a small Civil War-era cannon and test fired it for the group. Emmert did a beautiful job on it.

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The July 11th business meeting was short since it mostly consisted of pass around items which will be covered elsewhere in this issue.

The newsletter support raffle brought in an additional $42.00. Thanks goes to all who donated items. Winners, item and donators were: Steve Roth, chisels, Hans Peot; Owen Vance, calipers, Hans Peot; Ron Thompson, number punches, Hans Peot; Steve Roth, tin snips, Hans Peot; Brian Thompson, crosspeen hammer, Ralph Van Buskirk; Ron VanVickle, C-clamp, Art Wolfe; Hans Peot, jackhammer bit, Phillip Sturr;

Scott Shoemaker, kitchen utencil set, Emmert Studebaker; Doug Fink, 3/8" cable, Ken Scharabok, Ham Hammond, large throw bolt, Emmert Studebaker; Robert Ream, eye bolts, Art Wolfe; Judy Ditmer, grease gun, unknown; Ken Scharabok, oak tree, Emmert Studebaker; and Duane Wegley, assorted items, mostly Art Wolfe.

Following the business meeting, three forges were used to make tools out of used jack hammer bits. A special thanks goes to Phil Sturr for donating about a dozen drill bits. Hans Peot headed the group in the main shop and turned out a hot cut hardy, two hot cuts (straight and angled) and demonstrated faggot or billet welding. Also demonstrated was the "American" and "European" style of striking. The first uses the striking hammer like a sledge hammer, just using a shorter stroke. This problem with this is you must lift the head each time. The latter style holds the hammer (assuming you are right handed) with the right hand near the head and the left hand lower on the handle with the hammer kept to the right side, left foot forward. The hammer essentially pivots with the left hand lifting the head by pushing down on the handle. Andrew Holly pointed out the arc is about two to three times faster than the first approach. Actually, it comes down to what you are use to doing and what you feel comfortable with.

In the Wagon Shed, Ron Thompson and Duane Wegley made small anvil mandrels and Duane made of bick for working horns. Dick Franklin made a lathe tool rest for a woodworker. I am sure more tools were made which I missed seeing.

The weather started out very hot and muggy but a rain storm quickly changed that situation. We would like to have this type of hands-on meeting at least once a year.

SHOP SAFETY TIPS: (By Bill Callaway from the newsletter of the Arizona Artist-Blacksmith Ass'n)

Most of us tend to overlook simple hazards when working in our shops, dismissing exposure by simply saying to ourselves, "I was only breathing those acid fumes for ten minutes", etc. I will try to cover a few hazards which many of us face and advise on how to handle them.

- ACIDS: Acids are normally found around the shop in a number of forms. We use sulfuric, hydrocloric, sparex and acids contained in soldering compounds for cleaning metal surfaces and preparing some metal surfaces before soldering. These fumes when inhaled into the lungs can cause the equivalent of a burn within the lungs. These burns will give off fluids which will interfere with the exchange of oxygen. In serious cases this could lead to pulmonary edima (suffication) or swelling of the lungs caused by fluid.

- COAL SMOKE: I have on several occasions breathed coal smoke, heavy with sulphur fumes. When these fumes are breathed into the lungs and contact the moisture there, a form of sulphuric acid can be produced.

- HANDLING ACIDS: When handling acids and chemicals always do so in a well ventilated area. It is advisable to always wear a good respirator designed for chemicals.

- SAFETY: Always have an eyewash solution at hand or plenty of water nearby when working with acids. Acids can be neutralized with bicarbonate of soda and water. Never pour acids down the drain. ALWAYS ADD ACID TO WATER TO DILUTE.

- COKE OVEN WORKERS have a high degree of kidney cancer. The kidneys are the blood cleaning filters in the body. Any toxins in the blood may be filtered out in the kidneys where those toxins could remain and cause permanent damage. Blacksmiths burning coal should do so in a well ventilated area.

- ZINC PLATED: Never forge or weld materials which have been plated with zi (galvanized). Several poisonous fumes are given off which can make you very ill.

- FORGING COPPER: Copper fumes or oxides of copper are poisonous causing irritation to the lungs and intestines. Copper oxides may cause metal fume fever. You may run a temperature and feel nauseous for a day or two.

- CADMIUM PLATED HARDWARE: Increasingly nowadays we buy cadmium plated hardware (e.g., bolts, nuts, etc.). NEVER FORGE CADMIUM HARDWARE. Severe damage to the brain, nervous system, lungs and kidney may result.

THE BEST ALL-AROUND ADVISE we have is to always work in a well ventilated area and try not to breathe any fumes if possible. There is little doubt our craft is an extremely hazardous occupation.

- SHOP TIPS FROM THE MODERN BLACKSMITH (a welding publication) as reprinted in the newsletter of the California Blacksmith Ass'n:

-- QUICK ANNEALING: This is a very simple method which has been used for years, especially by die makers. Heat the steel and hold it in a dark corner allowing steel to cool until red is leaving. Then dip into a bucket of very soapy water. This will make the steel as soft as if it had been buried all night in charcoal. A simple method and a time saver!

-- CUTTING IRON: If you do some rough cutting with old electrodes to save money, try soaking them in water first and then using a high heat. They will cut much faster.

-- REMOVING BROKEN DRILL BITS: Soak them in copper sulphate overnight, then soak in rust remover, and they will be loose.

-- CLEANING GAS TIPS: Never clean the end of a gas tip with a wire brush; the holes will get put out of shape. Use a fine file and a drill.

-- MARKER: A good marker is a brazing rod ground to a point. Often leaves a brass line.

-- DRILLING THROUGH A SHAFT: Find a nut the size of the shaft you wish to drill through, then drill out the threads so the nut slips over the shaft. Find the center on one side of the nut, drill a hole in it the size you wish to drill, then slip over the shaft and drill through. Will be right through the center of the shaft. Case harden the nut for future use.

-- A POPPING TORCH: If you have a torch which continually "pops" and you can't tighten the nut enough to make it stop, probably the seat of the torch has a damaged spot on it. Tin the spot with soft solder, wiping it off when still hot. The thin layer of solder will seal up the scored part in your torch.

HEAR YE! HEAR YE! HEAR YE!

The Blacksmith's Gazette and Then and Now have been combined into a single publication. The Gazette has been oriented towards the beginning blacksmith. Then and Now is buckskinning oriented. Cost is $15 for six issues to P.O. Box 842, Mt. Vernon, WA 98272.

A note on how membership renewals work. When your membership expires during the current newsletter period, I will highlight this on the mailing label area or by a separate note. You will be sent one reminder with the next odd-month mailout if you have not already renewed. After that you are on your own.

Members desiring to display their work at art shows, etc. in the local area, or to be considered for grant/commision work, are encouraged to join the Miami Valley Art Council (P.O. Box 95, Dayton, OH 45402 - $10 per year).

The Blacksmith's Cookbook: Recipes in Iron by Francis Whitaker is available from Jim Fleming Publications, Box 1211, Vail, CO 81658. Price of $31.50 includes S&H. Proceeds go to the ABANA Scholorship Fund.

Prescription didymium lens glasses are available from The Optical Shop, 6717 N.W. 11th Place, Gainesville, FL 32605. Cost is about $45.00 for single vision and $110.00 for bifocal. Telephone number is 904-373-1933. Clip-on didymium glasses are available thorough mailorder from Thomas Scientific Co., P.O. Box 99, Swedesboro, JN 08085-0099. Order Nr. 5774-C60-F02C03 for $31.00 plus $2.00 S&H. However, the clip-ons do not fit frames over about 1 1/2" in lens height. Didymium lenses greatly reduce glare from the fire and block ultra-violet rays.

Only one member has expressed an interest in a weekend repousse workshop conducted by Nahum Herson. Thus, the idea is being dropped due to lack of interest. We needed at least 15 firm interests to avoid the cost being prohibitive. The same applies to the casting workshop also mentioned in the last issue - no one expressed interest.

FOR SALE: Heavy-duty, castiron firepots. $125. Contact Bob Zeller in Medway at 513-849-1771 or send a SASE to the editor for a complete description.

The July/August 87 issue of the newsletter of the Tullie-Smith House Blacksmith Guild contains two articles of potential interest. The first is on how to add a brake to a power hammer. The second is directions for building an expanding work table (56"x56" to 56"x120"). For a copy of either send a 22¢ stamp to the editor.

I have available a three page article on a Portable Charcoal Kiln. For a copy send a 22¢ stamp to the editor.

QUAD-STATE REGISTRATION!!! Registration forms for the September 26-27 Quad-State Round-Up were mailed in mid-July. If you have not received yours yet, contact Dick Franklin at 7158 Klyemore Drive, Huber Heights, OH 45424 and another will be sent. Please, pretty please, register by mail prior to the event as it makes the registration process easier on everyone.

The group received a nice letter from Ruth Cook advising us of her decision to resign from the position of A.B.A.N.A. Executive Secretary and thanking us for the support we have provided to her for the past two years. I also understand that Jim Batson has resigned as A.B.A.N.A. President and has been suceeded by Dorothy Steigler.

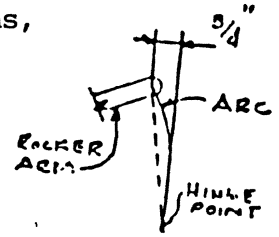
In the newsletter of the Indiana Blacksmithing Ass'n, Paul Moffett recommend blacksmiths check out the auto body repair shop sources as many of their tools are well suited for blacksmithing. He recommended The Eastwood Company, 580 Lancaster Ave, Malvern, PA 19355 - (800) 345-1178 or (215) 644-4412. Their catalog is free.

HELP WANTED: The Saturday evening entertainment at this year's Quad-State will once again be a tongs competition. However, this year the emphasis will be on quality rather than speed with a time limit of 45 minutes imposed. SOFA will furnish the stock and a rivet but teams must furnish their own tools. First through fourth prizes are $50.00, $25.00, $15.00 and $10.00 respectively for the team. We need a SOFA team organized in time for them to practice. So, round up a partner and let the event Coordinator (your Editor) know of your interest as soon as possible.

DEMONSTRATOR WANTED: Apple Festival, Allwood Farms, Sept. 12th & 13th, 9 AM - 5 PM, contact Abby Brown, 890-7360. You can sell your wares.

I forgot to mention in the last newsletter that the National Building Museum in Washington, DC also has a permanent display of some of Samuel Yellin's work. The museum is in the old Pension Building under restoration. As you exit the Metro at the Judicial Square entry/exit, the Museum is directly across the street.

Attention those who requested a copy of the "Low Bucks Power Hammer" article. According to the newsletter of the Northwest Ohio Blacksmiths, the plans need a hinge at the top of the hammer (which was 3" round stock 14" long) because of the arm traveling in an arc. It will lock up otherwise due to the hammer slide. See illustration at right.



Turley Forge (Rt. 10, Box 88C, Santa Fe, NM 87501) offers three and six week blacksmithing courses. Cost is $626.25 and $1,252,50 respectively. Roughly the first half of the course is mastering basic techniques with the rest working on personal projects under the guidance of Frank Turley. He has trained many of the smiths working today.

Beginning Blacksmithing Classes will be offered by Larry Wood when he has sufficient students signed up. Contact Larry at 233-6751 for additonal details.

The book Between Anvil & Forge by Angela Farris Fannin and Jerry W. Fannin is available for $9.95 from Eakin Press, P.O. Box 23069, Austin, TX 78735. Tells the story of some twenty simths still practicing in Texas with 116 photographs. Wouldn't you know it, the cover photo has the smith using a ballpeen hammer!

FOR SALE: Coke and three blowers. Contact Lawrence Hirt, 8745 S. St. Rt. 202, Tipp City, OH 45371.

Dick Franklin is looking for a 25 lb power hammer in good condition. If you know where one is available, contact Dick at 233-4878.

At the July meeting Ron Thompson donated some scrap pieces of W-1 (1095) spring steel about 1/16" thick. Would make good springs for latches, etc. Not all was claimed at the last meeting.

Rick Russ (667-8477) is looking for a good forge and post vise.

The next Western States Blacksmithing Conference will be August 21-23 in Basalt, CO. Demonstrators will be Francis Whitaker (masters class project), Daniel Boone, VII (general forging and dragon heads), Don Hawley (power hammer), Lynton McKenzie (engraving), Joe Pehoski (finishes), Mike Bondi and Ken Hamble (scrupture). Cost of $75 includes meals. For further info contact Mike Chisham, P.O. Box 83, Petaluma, CA 94953.

SHOP TIPS AND TECHNIQUES: (In most cases, these tips and 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, neither S.O.F.A. nor A.B.A.N.A. bear any responsibility for any adverse actions which may result).

- PINEAPPLE HANDLE WITHOUT GROOVING: Twist your square bar with a tight twist; then reheat and hammer twist back down to a square bar, leaving corners good and square. Reheat and slowly reverse your twist. As you do this, you'll see the square corners you left begin to come around and stand up. As you twist, you may want a bottle of water handy to cool your twist as the corner part gets to the right area. Try playing with a piece of 1/2" square bar progressing to 1" square. Leave the 1" stock 1" in the center and taper down each end on all four sides. This would make nice handles for fire tools. (By Jerry Grice from the newsletter of the Florida Artist-Blacksmith Ass'n).

Appalachian Reprints

Cedar Lakes '85 or The Ira DeKovan Workshop

Text and Drawings by Jay Hurley

[Reprinted from Appalachian Blacksmiths Association Newsletter, March 1985]

This year's Cedar Lakes Spring Workshop started like all others, with the reacquaintances of kindred spirits, and good natured B.S.ing (not to be confused with blacksmithing). But here the workshop's similarity to others ended. As hot metal began to be pushed and mushed, drawn, twisted and punched into various forms by Ira DeKovan it became obvious to all that we were in for a new experience in contemporary iron work.

Ira demonstrated several interesting tools to push or sink iron into new shapes. With a ball bearing welded to a handle (fig. 1) that has a good flex joint (so it does not sting your hand), one can sink circular impressions in whatever to the extent of one's imagination.

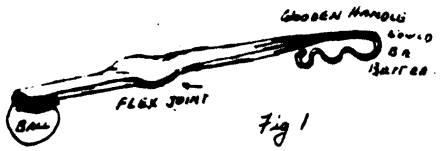
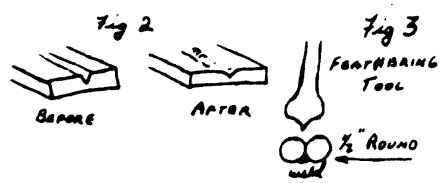


Fig 1

Another tool to add dimensions to hot cut accent lines is a special feathering chisel to round the edges of a hot cut groove (fig. 2). This tool is easily made by driving the heated end of a tool steel (coil spring, etc.) rod (1/2, 3/4") into the crevice made by welding two 1/2" rods side by side (fig. 3); annealing and round file finishing may be necessary.



A third tool demonstrated by Ira was a very handy spring fuller (fig. 4) for mushing bar edges (fig. 5) or fullering round stock, or even working pipe.

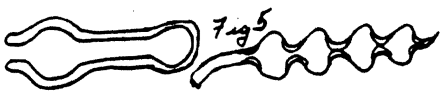
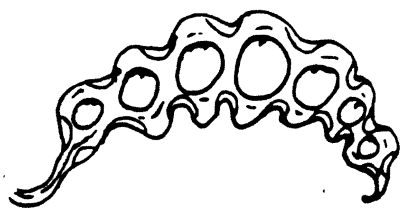


Fig 4 FOR FAR-OUT LEAF EFFECT PRODUCES UPSET RUFFLES

Put all these affects together and wild things begin to happen, even a plant leaf from the planet Tokeren.



Then came non-ferrous metal, another whole dimension in forging. By cutting out flower petal patterns in thin brass or copper sheet and working veins into them with dull or rounded chisels, texturing with cross pien hammer, sinking with ballbearing tool or round nose punch plus some generous twisting and wrinkling, amazingly life-like flowers were created.

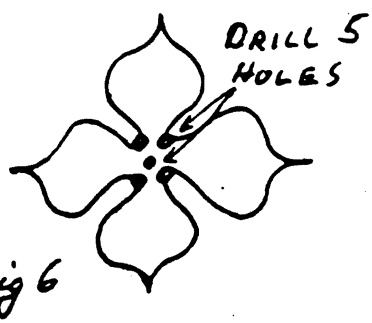
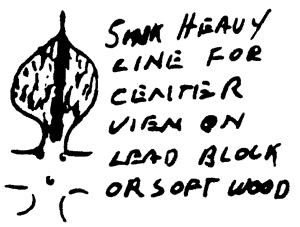


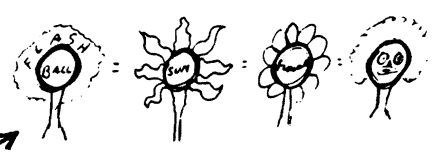
Fig 6

One other trick that comes to mind was the traditional balling tool wherein a hot bar is placed between two half ball swages and the tool is struck with a hammer. Rather than turn the bar to form an even ball, the rod is held steady and a large flashing is squeezed out around the edge of the ball. This edge and ball face can be worked in many ways to form unique finials, accents, flower or animal heads.

Among the items produced were two great tortured metal wall grills which demonstrated the extent to which smiths will go to make a perfectly straight, flat and clean piece of iron look like anything but iron; several brass flowers in single, double and triple layers, some with grotesque iron leaves setting off the lightly buffed brass petaled flowers, all of which encapsulated a copper center complete with punched nectar cells; a forged copper and iron Jack in the Pulpit on a DeKovan metal base; a set of forge welded copper manicles custom made to fit Tim Pyles, the craft coordinator; a lovely copper candle holder by DeKovan to add to our ABA showcase of treasures; and other items too numerous to mention.

We came, we saw, we learned, we became better smiths, thanks to Ira DeKovan.





BOLT HEADS — from California Blacksmith march 85

FELLOW IRONWORKERS,

I'd like to share with you some ideas and procedures that work well for me concerning decorative bolts.

If you want a totally hand forged lag bolt, forge yourself a square tennon with a square point (Fig. 1). Heat, holding the point in a vice and turn counter-clockwise. The square point will twist first because it has the smallest cross sectional area, when it has the thread pitch you want, pour a little water on it, freezing your pitch, and continue to twist.

This process is quite easy, the part I usually forget is to twist counter-clockwise, a clockwise twist will give you a left handed thread.

When making nails or bolts, I feel the desired shape has parallel sides with a point on the end. This is in comparison to a long taper. If you have ever pulled out a store-bought nail, you probably noticed that the wood tries to grip the nail uniformally for the duration of the parallel sides. When pulling a tapered nail, after a 1/4" it pops right out.

Early door hardware nails were deliberately made to be longer than the door was thick. After installing, the point protruding through the back side was hammered over which acted as a locking device. Once the nail was hammered over, it was then considered "dead" (without movement), hence, the term "deader than a door nail".

I don't make a lot of nails or truly hand-forged lag bolts as store-bought threads are sharper, deeper, and always uniform. I do, however, customize a lot of hardware store lag bolts which works well.

One style which has worked well for me is to start with a conventional lag bolt (8 sides), square off and head or start with a square headed lag bolt, set on your handy notch opposite sides, turn 90° and notch the remaining sides (Fig. 2 and 3). Now reheat, place in your header and with a cold chisel put in the 4 accent lines and center punch (Fig. 4). With a straight and couple of arc ed chisels,the number of patterns you can come up with is endless.

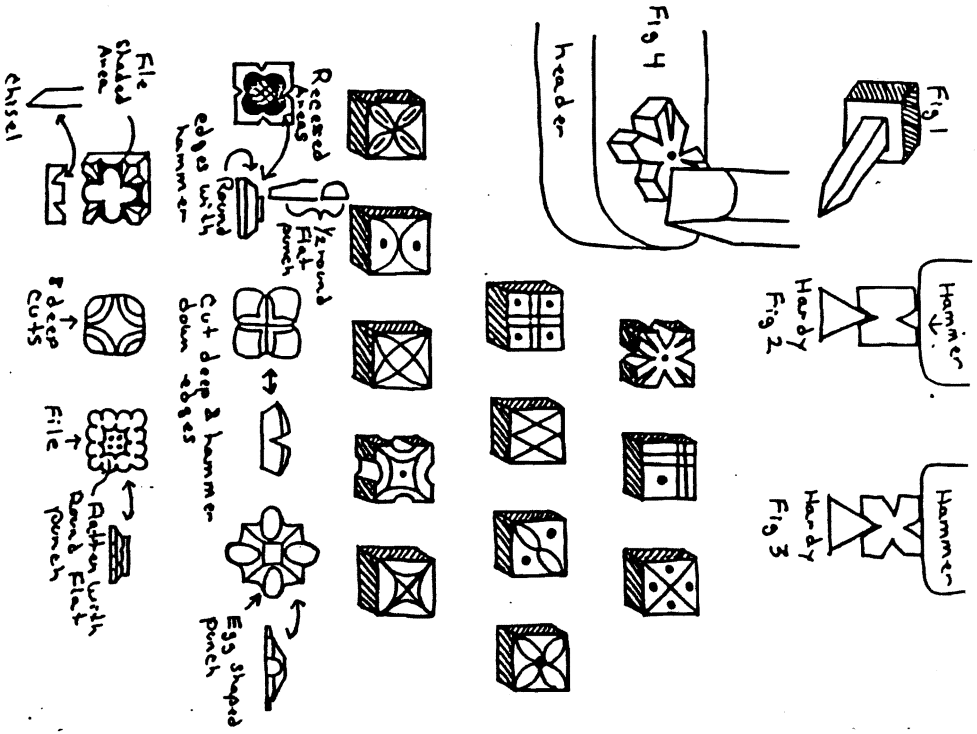
Recently I worked on some English gates that hdd some huge bolts that came to blunt square point (Fig. 7). After looking at them closely, it appears that the smith cut off about 1/2" from a piece of 1" bar and drilled a hole through the center. He then put a 3/8" machine bolt about 1/2 way through the hole, plug welding it from the top. In the case of the bolt, I saw they were then ground to a point (Fig. 5-7).

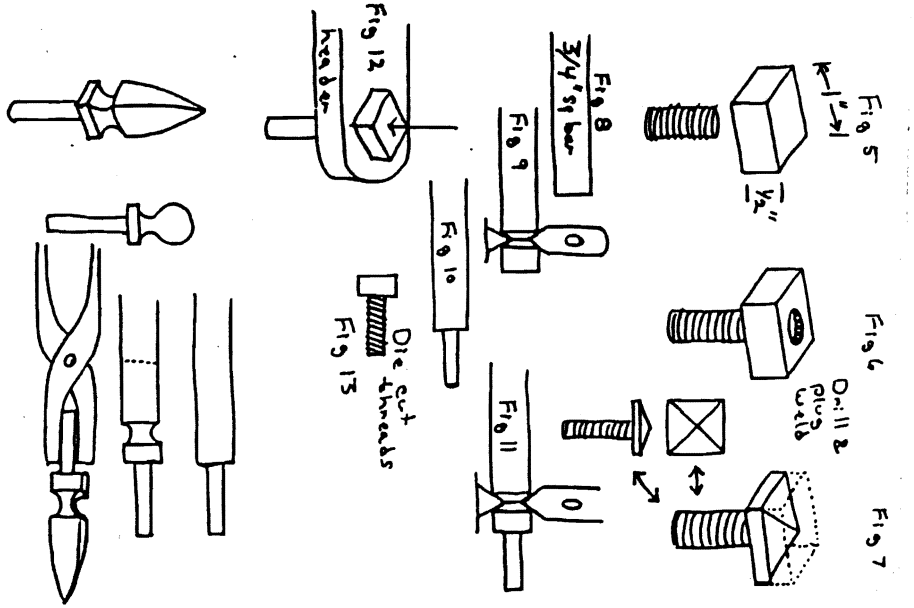
This process might be worth a try only as some alternatives to grinding to a point, try some decorative chisel work.

This large headed bolt could also be achieved by using traditional methods (Figs. 8-13) which I feel would give you a better product as the one piece unit would be stronger than the plug welded unit.

Good luck and let's keep on swingin!!

Bob Walsh
Minneapolis, MN





Bob Walsh

BLACKSMITH

EDGED TOOLS -- LIGHT-WEIGHT KIND

HINTS

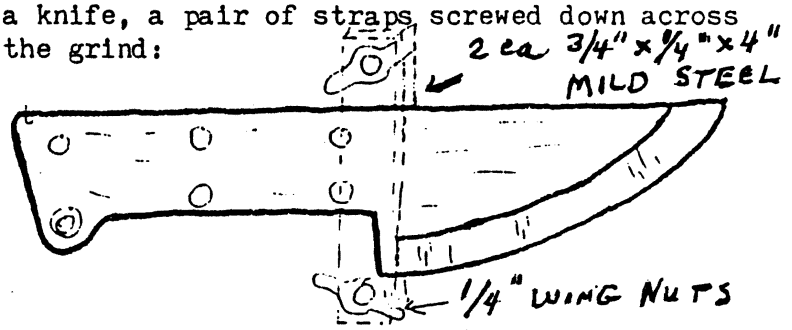
Vernon & Helen Raaen

(From the newsletter of the Appalachian Area Chapter - ABANA)

The Steel. We handcraft knives, choppers, cleavers, wood-carving tools, and almost any kind of small, edged tool. Because we do our own heat treating, we are limited to W-1, W-2, O-1, O-2, and L-6 steels. Of these, O-1 is easiest to handle in the annealed state. Salvage O-1 is difficult to find, and new stock is expensive (ca. $10/lb.). A 36" x 1" x 1/4" bar (ca. $25-30) will afford 7 to 8 forged hunting knives. If the knife is to be made by the stock-removal method--the method we usually use--it is customary to buy O-1 or other steels in 18" x 1-1/2"x 3/16' pieces. An 18" piece will provide two modest-sized sheath knives. If you object to the high cost of O-1 and to the warping of W-1, then you will use L-6, as we do. It is the so-called low-alloy (2% nickel) steel found in many kinds of saw blades, including band saw mills, circular saws, and diamond-edged masonry saw blades. It is a tough steel that resists breakage; it holds a satisfactory edge with hardness somewhat below that of O-1, D-2, 154CM, and a few others.

Cutting the Steel. As-received salvage high-carbon steel is usually in a hardened state. The steel must be annealed before it can be cut with a band saw or chisel. Annealing is not necessary prior to cutting with an aluminum oxide cutting wheel or with a torch. We anneal L-6 at 1200°F in a kiln or the equivalent dull red heat in the forge; very slow cooling is essential (i.e., over an 8-hour period). For the masonry saw blades, we use a cutting torch with a cutting tip made for sheet-metal. The kerf is not clean--the slag from L-6 is not easily blown away, apparently melting at too high a temperature. The crudely cut pieces are annealed and then are ground to near-final dimensions on a wheel (35-grit and 1-h.p., if affordable!). During the grinding process, the relatively thin L-6 air-hardens and therefore must be annealed again before the draw-filing or other metal-removing operations are done to achieve the final outline. Making holes for rivets or pins is a drill-press operation.

Grinding the Edge. The 2"-wide belt sander is, by all odds, the best grinding machine for putting an edge on almost any tool and is invaluable to the knife-maker. The initial grind is made with a 35- or 40-grit belt, and the final grind with a 180-grit belt. For a knife, a pair of straps screwed down across the blade gives a clean break in the grind: Our grinding is done free-hand. Two spotlights are arranged so as to shine on the platen from left and right. Once a bevel is established, the machine "talks" to us, and, if we are in a listening mood, the grind is'nt too bad. All the better grinders are equipped with a rubber backing wheel (usually 8") to provide a hollow grind. Our grinds are flat (or as flat as we can make them!) usually in a dropped-V. Final thinning of the edge must be postponed until after hardening; otherwise, the very thin edge will harden while the rest of the blade remains soft. The result is a pronounced ripple along the edge of the blade.

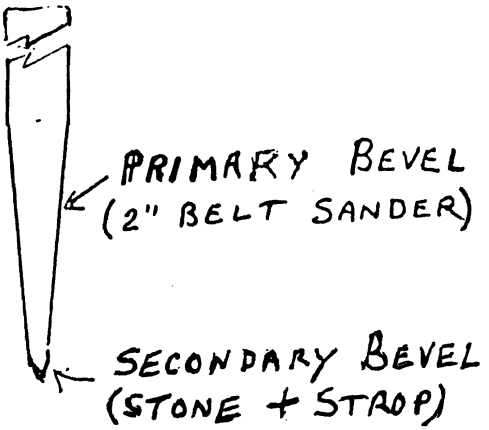


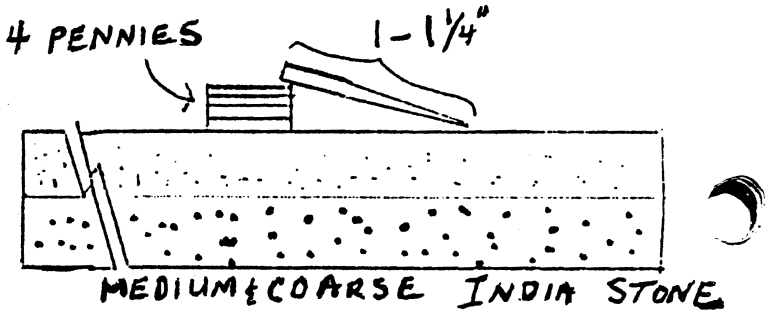
Hardening. Hardening of the steel (for L-6) is a matter of heating to the critical temperature (≈1475°F) and quenching in warm (110-125°F) oil. We use crankcase oil that contains about 25% kerosene as a thinner. It is important not to heat the piece much above the recommended temperature or to "soak" the thin steel too long, even at 1475°F. If one has doubts about the cherry-red to light cherry-red color being right, the magnet test can be made--steel at the

-over

critical temperature is not attracted to a magnet. The adhering oil is removed rinsing with kerosene or better by a wash with Gunk followed by a hot water rins As soon as possible after the heat treatment, a number of blades (usually about 5 to 80) are warmed in the kitchen oven to 325°F to relieve stress. They are then flap-sanded to remove scale and are then tempered at 430°F (a light-to-medium straw color). The handle and shank areas are further annealed to toughen them; the operation is done on a hot plate set at low heat. A torch can be used and is especially useful for the backs of small knives with heat-sinking of their blades in copper clamps. We leave the oxidation patina on our knives.

Sharpening. The final sharpening is done with 60- and 180-grit belts and is followed by a secondary sharpening with a medium India stone to form the working bevel. WD-40 is a very satisfactory honing oil for use with all of the common stones. Following the stone, a stropping on an abrasive-loaded, 4-sided, leather strop will give a razor-sharp edge. For a typical knife edge, the cross section will be as shown on the right. It is the secondary bevel that must be renewed from time to time; the primary bevel needs renewing only after prolonged hard use. The proper angle for the secondary bevel is a mystery to most knife users. For general kitchen use (as an example), we recommend the angle shown by stacking pennies between the back edge of the knife and stone as shown. For a narrow blade (e.g., 1/2 to 5/8"), a two-penney height will establish the angle. On the going-away stroke, one drags the thumb behind the blade to maintain the angle; on the return stroke, for the opposing bevel, the tip of the forefinger serves the same purpose. The four-sided strop has two pieces of leather with rough side out. One piece takes a slurry of 400-mesh carborundum in neatsfoot oil, the other piece receives a coating of 1000-mesh carborundum either in neatsfoot oil or mixed with saddlesoap. The third side of the hone is smooth-side-out leather, and the 4th is a cemented-on piece of aluminum oxide cloth. The stropping removes the burr left in the final grinding and stoning. If the burr is very objectionable, it can be removed by dragging the knife edge across the end of a piece of scrap oak board before stropping.





Adding the Handle. The blade is then taped, and the handle (previously prepared and drilled, for rivets or pins, to fit the steel blade) is attached with pins or rivets and a high-quality epoxy resin (we have used Devcon and Hysol and are currently using Chem Tech's T-88). The epoxy should be a high-strength flexible resin because, in spite of finished, wood dimensions vary greatly with humidity. Blind epoxy rivets (holes through the metal and blind holes 1/8" into the inside of the wood handles) are a help.

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2. Sid Latham, "Knifemaking," Stackpole Press, 1979. Good illustrations, many errors.
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4. Dona Z. Meilach, "Decorative & Sculptural Ironwork", Crown Publishers, Inc., New York, 1977. Chapters 10 & 11 on bladesmithing and Damascus steel are good.
5. H. Walton, "Guide to Sharpening," Popular Science, Harper & Row, N.Y. 1976. An inexpensive and helpful guide to the sharpening of most common tools.

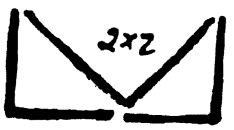
SOLDERING PIECES: For soldering three pieces, etc., stick the pieces in a can of wet sand. They will stay in place. (From a demonstration by Micheal Dosemagen from the newsletter of the Upper Mid-West Blacksmiths Ass'n).

- COLLARING: I had a job which required putting 3/16" collars on a piece of already installed work. To hold the collars in place I ground a groove in the center of a piece of 1" square stock 1/16" smaller than the collar stock. The collars were then bent into the "U" shape, put in place and the block used to back them up by clamping with large C-clamps above and below the collar. With the heat of the torch it was not even necessary to back it up with a sledge. (By Francis Whitaker from the newsletter of the Appalachian Area Chapter - ABANA).

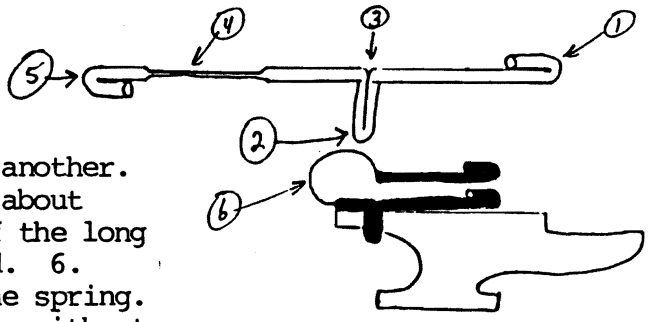
- TWISTING TIPS: 1. When you twist becomes uneven, pour water on the tightest part, then twist to even. 2. When twisting in your vise, twist sideways instead of upward. You may find this a little bit easier to control. 3. Always even your twist by closing the vise on the twist. First on the diamond, then on the sides. As you put the various sides in, even both sides of the bar with the twist. Knowing your twist will be almost perfectly straight, you can even your whole piece this way. 4. Use a two handled twisting bar, either a piece of stock bent into a double "U" shape or a wrench on which a top handle has been welded. (By Ryan Johnson from the newsletter of the Appalachian Area Chapter - ABANA).

- PATINAS AND FINISHES FOR NON-FERROUS METALS: Patinas: 1. Liver of Sulphur produces brown, gray or black on copper, bronze or silver. 2. Ammonia fumes procues blue or black on bronze and black or green on brass. 3. Heat treating produces tempering colors. 4. Ammonia and salt produces purple or brown on bronze or copper. 4. Allcraft Green Patina produces green on copper and bronze. Finishes: 1. For a matte (dull) finish use pumice, fine emery paper or sandblast. 2. For a satin (soft) finish use a brass brush, #0000 steel wool or 3M Scotch Brite Pad. 3. For a high polish (mirror/glossy) buff finish. (By Lynn Fieldhouse from the newsletter of the Upper Midwest Blacksmiths Ass'n).

- V-BLOCK: To make a v-block to be used on a drill press table to hold round stock steady, use three equal length pieces of angle iron, two 1½"x1½"x¼" and one 2"x2"x¼". Weld at the bottom seam and at the top two seams. Grind the bottom smooth. (By John Babcock from the newsletter of the Western Canadian Blacksmiths' Guild).



- ONE PIECE SPRING FULLER: Stock - about 3' of 1/2" rod. Forging sequence: 1. heat and bend back two inches of one end. 2. bend a second time about 10" from first bend. 3. Open both sides about 4" from second bend so both legs are in line with one another. 4. Flatten a section of the long end, ending about 8" from the tip. 5. Bend back the last 2" of the long end in the opposite direction of the other end. 6. Heat and bend the flattened section to form the spring. Bending back the two ends allows deep fullering without flattening the work piece with either the anvil or the hammer. (As demonstrated by Mike Person from the newsletter of the Western Canadian Blacksmiths' Guild).



- SLITTING HOLES: When slitting holes (e.g., to put 1/2" holes in 1/2" stock), put a wood block under it to prevent nicking your slot chisels. For more control when opening hole, put it in the vise and use a torch for local heat. (From the newsletter of the Blacksmiths Ass'n of Missouri).

- RESTORING STAINLESS STEEL QUALITIES: You can restore the stainless quality of stainless steel after forging by heating it to a bright orange heat and quenching it in water. (From a remark by Steve Weis in the newsletter of the California Blacksmith's Ass'n).

- LIGHTING A COAL FIRE: I, like most beginners, have a small forge. Mine is a rivet forge with the sides built higher. The problem is that when trying to start a fire, the coal keeps falling in and blocking the tuyere. My solution is to take a 1 lb coffee can with both ends cut out. I clear the center of coal and place the coffee can over the tuyere. I then light one sheet of balled up newspaper and place it in the coffee can. While delivering a gental blast, I placed a couple of handfuls of coke in the can. Then I crank a good blast until the coke is going strong. I then take the can away with tongs and I'm left with a pile of red hot coals over the air blast; a nice beginning for a good fire. I know this may sound like a lot of work, but from beginning to end it only takes about one minute. (By Larry Barrieau from the newsletter of the New England Blacksmiths').

- BRAZING BAND SAW BLADES: David Umstadt showed us how to braze bandsaw blades. He bevels both ends, puts on some flux and a small amount of brass rod. For heat he uses a heavy pair of hot tongs. He makes a gauge to check the thickness when finished and files off any extra thickness of brass. Makes a very neat job of it. Somebody there said the cost of buying a roll of blade is much cheaper than preassembled blades. (From the newsletter of the Upper Mid-West Blacksmiths Ass'n).

- REPOUSSEING COPPER: Use a wet stump and a backup. This gives a smoother finish than on the anvil. (From a demonstration by Lynn Fieldhouse from the newsletter of the Upper Mid-West Blacksmiths Ass'n).

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