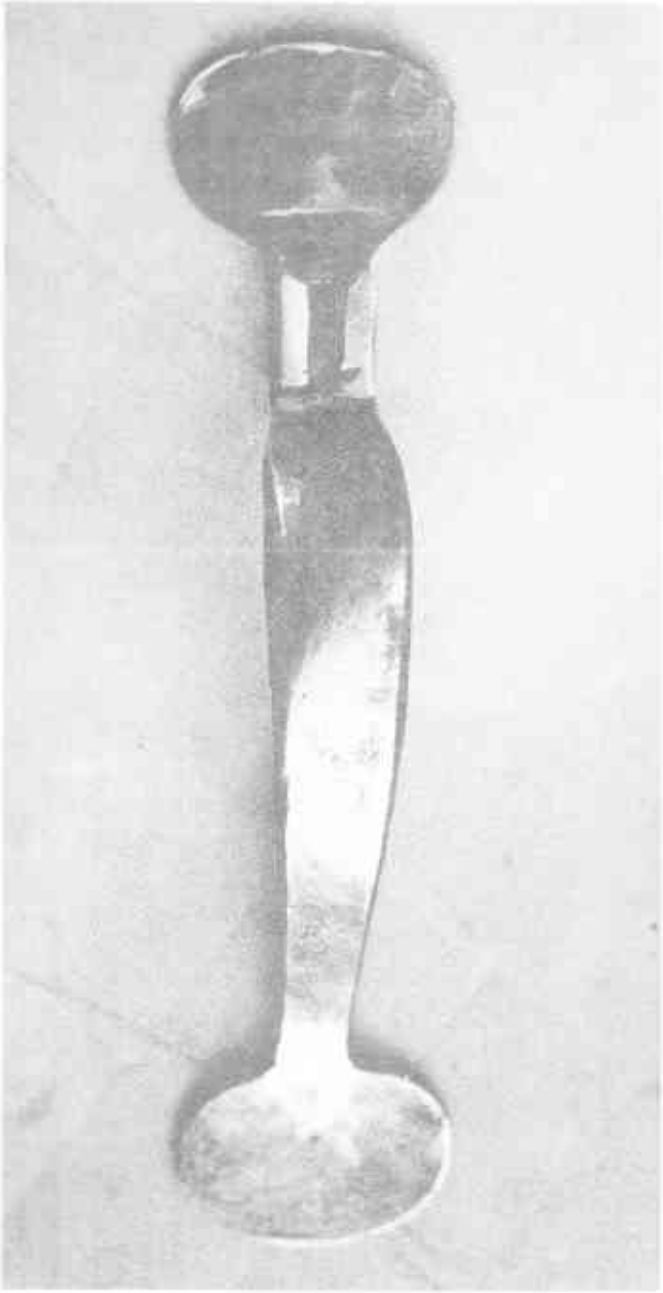
BAM

DECEMBER 1991 / JANUARY 1992



inside —

NEWSLETTER of the BLACKSMITHS ASSOCIATION OF MISSOURI

VOL. 8 NO. 6

The Blacksmith's Association of Missouri is a chapter of the Artist-Blacksmiths' Association of North America, and is devoted to the preservation and advancement of blacksmithing and to communication among blacksmiths in Missouri and surrounding areas. BAM's newsletter's goal is to support these aims. Letters to the editor, Tech Tips, tools for sale, or anything else which furthers these ends will be considered for publication.

BAM Membership Application

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Memberships are for one year from receipt of dues. Dues are $20, which includes a subscription to the bimonthly BAM newsletter. Please make checks payable to Blacksmith Association of Missouri.

SEND CHECKS TO:
Steve Austin
44 N.E. Munger Rd.
Claycomo, MO 64119

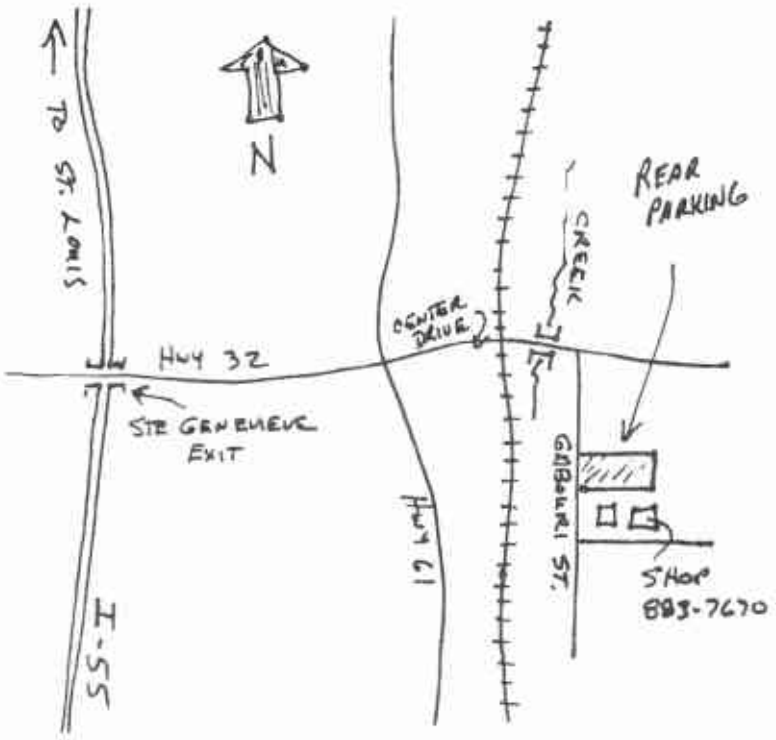
Membership Renewals

Be sure to check the date on the label of your newsletter. This is your membership renewal date. We will include a renewal reminder in your copy of the newsletter when your membership is due to expire. If the date on your newsletter label is not correct, please notify Bernie Tappel as soon as possible.

Next Meeting

February 8 —

The next meeting will DEFINITELY be on Feb. 8 at Stan Winkler's Muleskinner Forge in Ste. Genevieve, MO, because if he tries to change it again your normally mild-mannered editor will forge weld his tiny, grubby toes together. Trade item is to be a flower. You can talk to Stan at 314-883-7670.



Mississippi Forge Council
Grady Holley, President
Rt. 5 Box 141, Vicksburg, MS 39180
(601) 634-8803

Mississippi Forge Council Conference

May 16 - 17, 1992

8:00 am - 5:00 pm Sat. & Sun.

Grady Holley's Forge, Vicksburg, MS

Jerry Hoffman, author of "Blacksmith's Journal" featured demonstrator
Floyd Daniel, Madison, GA - Anvil Shoot
Col. Tim Ryan, Gordonsville, TN - Auctioneer
Benny Crevitt, Meridian, MS - Traditional Demonstrator
Leonard Landrum, Lumberton, MS - Bladesmithing Demonstration
Bob Heath, Ridgeland, MS - Old Time Pump Bellows
Grady Holley, Vicksburg, MS - Demonstrator
Mike Roberts, Clinton, MS - Demonstrator

$30 per person

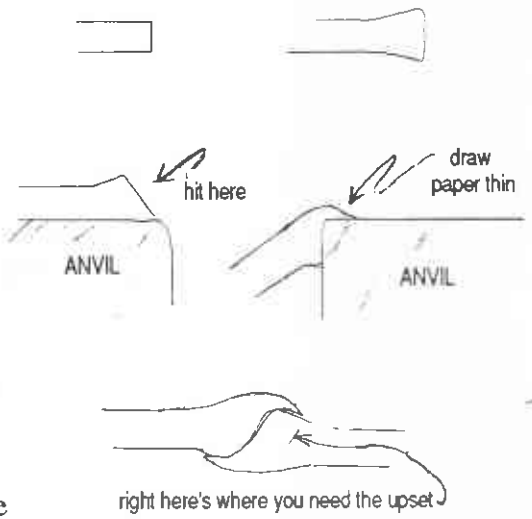
Lunch and Supper will be served Sat. on a donation basis or bring your own.
Please send registration to Grady Holley, Rt. 5, Box 141, Vicksburg, MS 39180
Map and additional information will be furnished upon registration
For further information, please call
Grady Holley - (601) 634-8803
Bob Heath - (601) 956-0361
Benny Crevitt - (601) 483-7025

December 14 Meeting

Our November meeting was in December this year, at Jerry Hoffman's shop near Londell. As always it was a special treat. Jerry cleaned the shop. Karen outdid herself on the goodies, and the weather was sunny and warm. Jerry was our demonstrator, and proved that those neat projects in *The Blacksmith's Journal* are not just pretty pictures, but things you really can do with a hammer and a little heat.

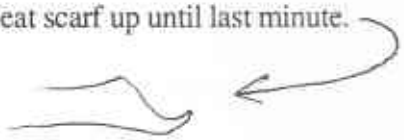
Jerry started by reading a card from Francis Whitaker listing three tests of an "advanced" vs. "retarded" intermediate smith: The ability to scarf and weld, to make an upset corner, and to form an accurate scroll, all with only hammer and anvil. Jerry then demonstrated all three. Even though I've seen all of them demonstrated and read numerous descriptions, and done them myself, I learned somethings I'd missed before. Here's what I have in my notes:

SCARF WELD:



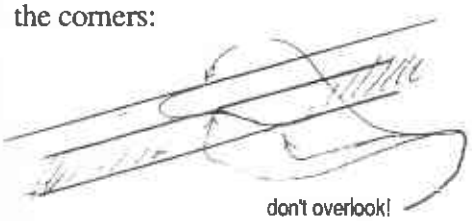
It really helps to take the necessary pains to make the scarfs right, and make them alike.

Heat in a big, deep clean fire. Jerry fluxed with the old E-Z at a fairly bright heat. He says the new E-Z available now also works. Heat scarf up until last minute.

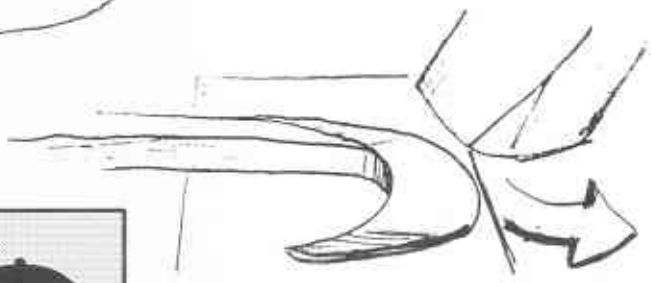


As the pieces approached weld heat, Jerry shut off the blower for a few seconds before taking them out.

Weld when flux is well melted. First blows are light and quick. When it's stuck roll it 180°, then 90°, then 180°, and finally catch the corners:

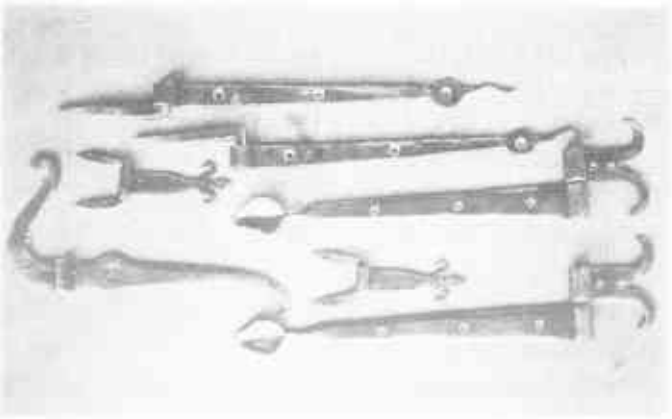


Jerry used his scarf-weld to put some extra material on the end of a bar to make a flared scroll. I'm not going to try to recap that here; see *The Blacksmith's Journal*, No. 14 for details. I did learn that I should have been thinning the edges of the flare with wiping blows:



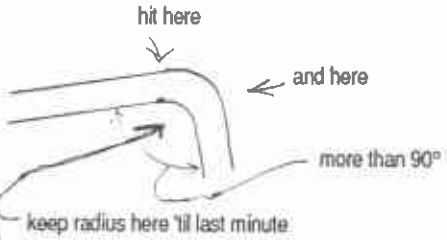
I'd been trying to do it all by upsetting into the triangular cross-section.

Jerry Hoffman "may be a redneck..."



The exchange- left: Jim Waller; right: Walt Hull; bottom: Pat McCarty; center: Kenny Valdejo

UPSET CORNER:



For the grand finale, Jerry made a handle for a Suffolk Latch (B.J. No. 15) — including forging and heat treating a slot-punch — and for laniappe threw in a beaded twist. A class demo, from start to end. Thanks, Jerry.

After that show there was some reticence about stepping to the forge, but finally Walt Hull and Jim Waller remembered that they owed each other a fire poker from a previous exchange, and set out to make it up. Walt's handle was four pieces of 1/4" square stock twisted and welded up, and Jim did a "mystery twist" in 3/4" square stock.

Ultimately we all faded into the sunset, memories of another good one still warm in our minds.

Jerry's demo items (see text).

December Business Meeting

The meeting was called to order by president Tom Clark.

Tom apologized for any hard feelings that might have been generated by the fact that the Clifton Ralph workshop at Tom's shop was an invitation-only event. He emphasized that it was not a BAM-sponsored event, even though those involved were BAM members, and that its organization began before Tom became BAM president. He discussed the possibility of an open workshop with Clifton for BAM as an organization and open to all, a "big show" type demo rather than small and hands on. Tom will pursue this.

The Ozark Regional will be held in Potosi on April 25 and 26. Tom says that demonstrators, Robb Gunter and Clay Spencer, together with blacksmith-auctioneer Tim Ryan and anvil shooter Floyd Daniels, are already firmed up. Tom emphasized that in addition to the major demonstrators there will be a very active "green forge" staffed by experienced smiths but providing the opportunity for beginners to burn their fingers and mash some iron.

The possibility was discussed that BAM might host the 1994 ABANA conference. We have been approached by ABANA. Apparently they are running behind in their planning and need to find a site very soon. They want to do 1994 either in Wisconsin (the Wisconsin chapter has hosted before) or in Missouri. It was our feeling at the meeting that BAM is not ready to manage an event of this size, though it would be reasonable to find out what really is involved, perhaps with an eye to hosting in '96. The issue is not dead, however. As of this writing Wisconsin is not known to have accepted, and ABANA may ask us again. It was agreed that it would be a very exciting thing to do but a tremendous amount of work. ABANA would provide both labor and financial support, but we don't know at this point how much would fall on BAM. Hank Knickmeyer has done some research on campuses where the event might be held. Please give us your thoughts on this, and stay tuned for further developments.

Tom suggested that we try doing an "Iron-in-the-hat" style raffle at each meeting to raise funds for BAM. You say you don't know what an Iron-in-the-hat" is? Bring something neat to Stan's and you'll find out.

Ken Markley reported on his research on t-shirts and hats, and there was considerable interest. Jerry and Steve were delegated to design a new logo that would work better. You'll see it on the cover of this newsletter, so let us know what you think. When I left Sunday A.M., Steve and Jerry were working out a color scheme.

The possibility of holding a gas forge building workshop for the Sandia Labs recuperative forge was discussed. This would be similar to the workshop to be held April 13 by the Rocky Mountain Smiths, but would be BAM-sponsored and somewhere in our area. Tom thinks interest might be greater after we've seen Robb Gunter demonstrate at the Ozark Regional.

BULLETIN —

Wisconsin will not host the 1994 ABANA Conference. ABANA wants us to do it. Charlie Orlando will be at the meeting at Stan's to talk to us about this. It's very important for everyone to show up who can. Hank Knickmeyer has been negotiating with Washington University and he will also report at the meeting. Please come.

Auction

A highlight of this month's meeting was an auction. I don't remember whose idea it was, maybe Tom Clark's. At any rate he proved an able auctioneer. Ken Woods, friend of Colin Campbell and dealer in Dillon Torches, donated several neat piezo-electric torch strikers. I got a couple and so did Tom, and Steve Austin grabbed a handful. Mark Laiben bought the Latch handle from Jerry's demo for $55.00 and J.K. Reynolds got the flared scroll for $10.00. I think the beaded twist also brought $10.00, but I don't know who got it.

All the proceeds, of course, went to BAM. Thanks to the donors and bidders.

"On Damascus Steel"

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with 120 duotone b/w
illustrations and 28 color plates

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Damascus Steel - Leo S. Figiel

The author has reviewed and summarized the pertinent literature dealing with the historical, technical and artistic aspects of Oriental and Mechanical Damascus steel. A comprehensive bibliography is included.

Persian and Indian sword blades, from 1600-1800, which have never been published, illustrate a wide range of patterns in Oriental Damascus steel. Mechanically contrived patterns such as the "Kirk-Narduban" and more complex variants such as "The Rose" or combinations of "The Ladder and Rose" are described and illustrated. The latter are the rarest of Oriental Damascus patterns. Two blades of royal provenance are featured.

The chapter on pattern welded steels includes a rare group of 17th and 18th century swords which exemplify the technical skills of Moghul and Indian blacksmiths.

A section on Damascus gun barrels features a group of 17th and 18th century matchlock rifles with complex pattern welded designs made by a variety of welding techniques.

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Forge Furnaces - Combustion Facts; Answers to Some Questions on Gas Forges

During the ABANA conference I found myself discussing some aspects of the new SANDIA furnace. Many questions were raised as to whether you can forge weld with a gas furnace and why is it necessary to preheat the air. In addition there were questions about fuels; can you use natural gas as well as propane? I prepared a fact sheet at the conference for a few of the attendees and the following is a more detailed explanation of that data, which comes from the Combustion Handbook, put out by North American Manufacturing Company.

Question 1: **Can steel be forge welded in a gas furnace?**

Answer: Yes. It was demonstrated with the Scandia furnace at the conference with Robb Gunter. Also, which may be of more interest, Mitch Fitzgibbon does it regularly with his propane furnace without air preheat. To forge weld you need that metal to be about 2500°. A rule of thumb is that the furnace gasses need to be 100-200 degrees hotter than the work, so 2700° gasses will be hot enough.

Question 2: **How high a flame temperature can we get?**

Answer: Flame temperature measurement is notoriously inaccurate so use the following values for comparison only.

Observed flame temperatures:
Cold Air-Natural Gas — 2895-3562°
1400° Air-Natural Gas — 3800-4100°

These figures show that even with cold air the flame can get hot enough to weld. Remember that temperature is only a distant relative of heat input. In other works, if the burner is big enough to overcome the furnace losses, the piece to be forged will approach the flame temperature.

Question 3: **Why pre-heat the air?**

Answer: Air is made up of 20% oxygen by volume, and 80% other gases, mainly nitrogen. Oxygen is needed for burning, but nitrogen is a free loader. But all the air must get to combustion temperature. This uses up some of the heat available in the fuel. Hence preheated air is more efficient. Fuel is saved when some of the heat otherwise lost to exhaust gases is taken back in addition to increasing the flame temperature. For a 2300° furnace, fuel savings can be calculated as follows:

60° Air	0% savings
800° Air	30% savings
1000° Air	36% savings
1200° Air	41% savings

Industry gets as much as 2100° preheat on a 2300° furnace, so you can see the savings possible. There are some pros and cons to preheating air, which will be left to another article.

Question 4: **What is the Comparison between Natural Gas and Propane?**

Answer: Calculated flame temperatures are as follows:

Cold Air	Natural Gas	3525°
Cold Air	Propane	3573°

Not much difference between the two. The main difference between the two gasses is that propane contains about 2.5 times the heat per cubic foot, which makes for a more compact system.

If you really want to get the temperature up, see what pure oxygen will do for flame temperatures.

Oxygen	Natural Gas	4790°
Oxygen	Propane	5130°

Clearly, welding temperatures can be attained with both gases, if we do not lose too much heat to the atmosphere. Hence, good insulation is needed.

Question 5: **How about heat losses?**

Answer: The two obvious losses, in addition to the heat lost up the flue, are heat loss through the insulation and losses due to heating air that is not used to supply oxygen to combustion. The problem is similar to keeping homes warm in the North. Since approximately half the heat goes up the flue, electric heat has some

merit. However, electric heat is radiant heat only, and lacks the heat transfer properties of gasses, which both conduct and radiate.

Insulation is a big area, which should be dealt with separately. The rammable refractory biscuit, used in the Scandia furnace, which is durable and can resist fluxes, is good. It does not drain too much heat to get it up to working temperature, which is a problem of most brick hearths.

Question 6: **How about excess air?**

Answer: If you use just enough cold air to burn all the fuel and have no extra oxygen left over, then 40% of the heat goes to heating the work. If, however, there is a 25% amount of excess air, then only 30% will go to heating the work; a loss of one-third of the heat.

There are many ways to ensure that air and fuel stay in ratio, but the one most commonly used by blacksmiths, and the simplest, is adjusting the flame by eye. A flame tinged with orange that licks out the furnace door, is slightly fuel rich, a good starting point. However, as extra air is added to the flame, the flame turns blue and often the sound from the burner increases.

Question 7: **How about secondary air?**

Answer: The other less obvious way to introduce too much air is to suck air into the furnace through cracks as well as through the door opening. This we combat with furnace pressure control, or damping off the flue to increase the pressure in the furnace. You cannot suck cold air if you are blowing out hot exhaust gases.

Question 8: **Why does the furnace suck in cold air?**

Answer: Hot air and gasses rise because they are more buoyant than room temperature air. This makes the lowest point in the furnace where cold air is most likely to first leak in. This is exactly where the hearth is and of course our work. The consequence is chilled work, or even worse, work that is cooler on one side than the other.

One type of industrial forge furnace that does not use a separate flue, is the slot forge, in which the work is pushed in through an open slot and since there is no flue and hot gasses exit around the work. This keeps cold air out and has an added benefit, that the hot gasses blow past the work, which increases heat transfer.

Another common practice with slot forges in industry is to spread a layer of "grog," crushed refractory, over the hearth. This saves the hearth from mechanical damage, allows gasses to get underneath the work, and keeps old scale from sticking to the work.

In summary, you should definitely think about trying a gas furnace, but remember the following safety tips:

1. Ventilate the room well. You cannot smell carbon-monoxide which is a killer.
2. Do not let unburned gasses accumulate in the furnace. If they do, purge the furnace before trying to relight it.
3. Always have your igniter burning before you turn on the gas.
4. Do not leave a burner unattended, not for one minute.
5. Remember, Propane is a heavier-than-air gas. It can accumulate in low spots such as basements and sump holes waiting for a spark from a switch or motor to ignite it.

Reprinted from *Bituminous Bits*

PROPANE GAS FORGES

by John Smith

Last year I built a propane forge the same as Jeffrey Funk (see the March 1988 issue of The Rivet), with a steel arched top lined with Kao-wool, firebrick base and sides, and two burners coming in through the top. I built this forge for one purpose --taking 36 inch long heats – for making the bases of my fireplace toolsets in one heat. It does a wonderful job and has already paid for itself several times over. It has two drawbacks; it takes quite a while to heat up, and it uses a lot of propane.

For 95% of the forge work we do, a 9 inch or 10 inch heat is enough. So I build a small forge of firebricks, with a single burner coming in the side, and this was quick and fairly efficient, but did not give an even heat.

A lot of efficiency is lost when the flame hits a brick wall a few inches away; in fact the brick area opposite the burner was black, even when the rest of the inside of the forge was bright orange.

I attended Northwest Blacksmith Association meeting in the fall where Darryl Nelson of Fire Mountain Forge had a new type of propane forge, which reached welding heat in about 5 minutes from light up, and ran on hardly any propane.
It was cylindrical - a piece of 10 inch pipe - lined with 1 inch thick Kao-wool. The burner came in horizontally near the top, creating a circular, swirling flame, giving a very efficient and even heat. I knew I had to have one!
There was, however, one thing that really bothered me about Darryl's forge, and that was the exposed Kao-wool, with the burner aimed right at it. (In Jeff Funk's forge the burners are aimed away from the Kao-wool.)

Kao-wool is extremely irritating to the throat, and when I have handled it without a mask I have experienced a very irritated throat and tight breathing similar to breathing galvanizing fumes, for several hours.

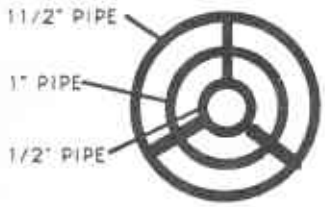
The brand name that is easily available here is "Inswool," from A P Green Refractories, and on the box it says to avoid breathing without a mask when handling as it gives "Temporary" lung irritation.
When Kao-wool is exposed inside a forge, with the burner flame blowing on it and the steel that is heating up is bound to touch it at times, it seems to me that this **must cause particles to become airborne.**

One of the reasons for giving up coal is to avoid the harmful airborne coal dust and ash - and I see no point in trading one health hazard for another if it possible to avoid both. So I built a round forge using a castable refractory material instead of Kao-wool.

It doesn't heat up as quickly, but once hot runs at a nice forging temperature at about 1/2 to 1 psi of propane pressure. At increased pressure it reaches forge welding temperature easily.

The castable refractory material I used is from A P Green and is called CA2004. There are several different mixes available, ranging from $25 to $70 per 25 Kg bag. CA2004 is about $35, and so far is working fine. You must add water and mix it up like concrete. After it has cured for 24 hours **it is important to dry it out thoroughly before lighting it as trapped moisture can turn to steam and explode.**
I set mine on top of our wood stove for a week. The stove was alight continuously and it dried the forge nicely, although there was steam created during the initial firing. It was heated slowly and we took several hours before we got the inside to glow. I did this outside, partly in case it did explode, but also because the steam coming off did not smell very nice.

Every thing went fine, and the next day we brought it inside and started using it. Initially I had a piece of 1 1/2 inch pipe with no concentric pipe added.....
.....And it really roared very unpleasantly. When I added the two extra pieces of pipe "See plans" it quieted right down.
Thanks, Jeff, for this important detail. Also, without the extra pipes in the burner, it was a bit temperamental, and until it warmed up it would occasionally blow itself out. Now the flame pattern is much better and it is not as touchy with the air/gas ratio. A big improvement. The heat throughout the forge is really even.

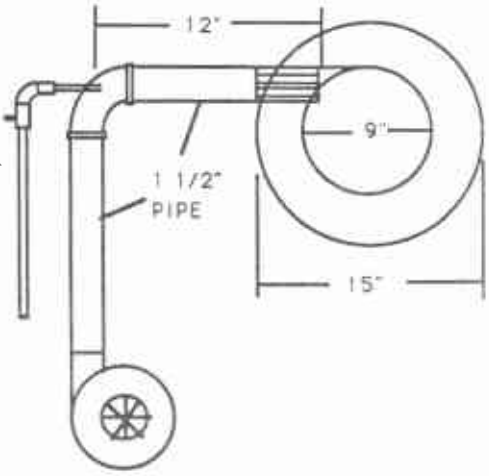


I built my forge specifically for it to be used by two people at once - one working at each end - so I just have loose firebricks stacked up to close off the ends, with an

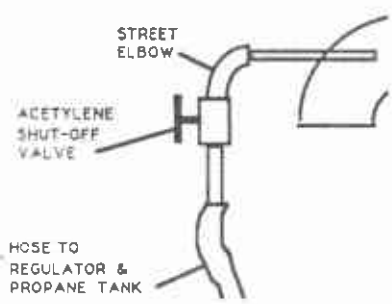
PROPANE GAS FORGES

adjustable opening to put the steel in. It is important to **use high-temperature firebricks.** I used "Prairie" from A P Green. (Regular fireplace firebricks fall apart when they get hot, as they do on the side facing the inside of the forge.)

My forge is fourteen inches long and the burner is in the center. It could be scaled up or down to suit individual requirements, and one end or both could be made from the castable mix, with a slot for work to go in,



and another slot in the back for heating the middle of a long bar.



I used what I had, but did follow A P Green's recommendation of making the lining 3 inches thick.

A CAUTIONARY NOTE: Propane gives off carbon monoxide which can be deadly. Do not operate a propane forge in a closed shop unless it is properly vented, and even then a supply of fresh replacement air is necessary. Medical books say carbon monoxide is harmful at a concentration of 100 ppm, which isn't very much.

I haven't used my coal forge since the blower burned out in November, and you know, I don't miss it. Using propane is so darned simple.

Editors note: John says that a 100 pound bottle of propane lasts him about 36 hours and that the cost of running the forge is about 70 cents per hour

Reprinted from*THE RIVET* , Western Canadian Blacksmiths Guild, Feb 1989. By John Smith

A gas forge presents possible hazards when compared with a coal forge. Gas and air in the right mixture with a spark will go bang. The gas forge will eat up all the oxygen in a closed room and leave carbon monoxide which ain't too healthy.

You must be safety conscious when using gas. Do not store or place the bottles near a heat source or on a platform which will turn over. **Be on the look-out for leaks. Check all the connections with soapy water. Do not use a flame.** Do not leave the forge on unattended. Do not look inside the forge when lighting. Be aware of flame-outs.

A gas forge can be safe, fast, and quiet, is inexpensive to build, is clean, will work you to death, will warm your shop on cold days, is addictive and is expensive to operate when compared with coal or coke.

After having seen the gas forges of the Fire Mountain Forge, Gene Chapman, Hans Peot, and the one auctioned off at Tipp City, I had to have one. So Clay Spencer and I each built a circular gas forge.
All of these gas forges were a spin-off of Darryl Nelson's basic design which is shown on the preceding page and on the left.

The smallest forge was Gene's. He had slipped a 3 Lb coffee can over another 3 Lb can. He used an exhaust pipe attached to a hair dryer for his air supply. He used a light dimmer switch to vary the air flow.

The gas line was regulated at a low pressure, had a cutoff valve and went into the elbow. I believe it was nothing but 1/4" copper tubing. There was no orifice or concentric flame holder.

PROPANE GAS FORGES

The coffee cans were lined with 1" thick Kao-wool. The ends were closed with firebricks. A broken firebrick was on the bottom of the forge. Gene forged and heat treated knife blades in this forge.

I believe that most gas forges are too big and therefore expensive to operate.

Clay made his forge, a small one, out of a Freon bottle. He cut one end out and a hole in the other, and lined it with Kao-wool. He followed the drawings on the previous page. Clay made a pivot hinge on the front and attached a Kao-wool lined door.

A needle valve had to be put into the gas line to obtain a reduced gas flow and a finer gas adjustment. At a low pressure and with the door closed, the gas mixture will burn at the gas inlet behind the flame holder. This presents a problem, now the inlet pipe which is uninsulated is being heated.

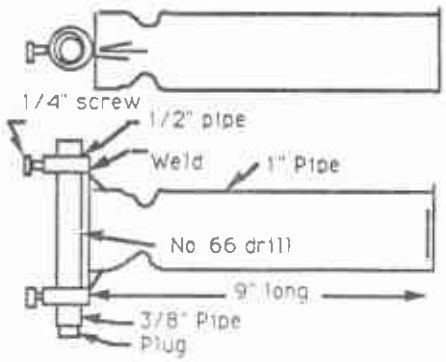
I made my forge out of a 11 1/2" ID heavy wall pipe which was 14" long. I welded a short piece of pipe larger than the air inlet pipe to the large pipe. This way I can detach the burner from the forge. I also welded two pieces of angle iron to the large pipe for a base. I cast a 2500 degree refractory called Plicast Tuff Mix into the pipe using a 6" stove pipe as a center core. A piece of plywood with spacers nailed to it were used to position the stove-pipe and pipe body. The two pipes were stood on end and the Plicast was rammed in from the other end. Paper was stuffed in front of the burner to fill the void.

The refractory was left to cure for about a day and a half. Then the forge was heated by burning the gas without air for short durations during a day. The next day it was run full bore for four hours. I was able to weld a large Damascus billet in this home-made gas forge.

I used about 50 Lb of refractory at a cost of $12 and 50 Lb of scrap metal @ 17 cents a pound. I had a used blower and the gas hose, regulator, fittings, cutoff valve and gage. You can build the same type gas forge for less than $100.

Clay and I bought the refractory products from:
Frank W Schaefer, Inc, P O Box 1508, Dayton, Ohio 45401, 513/253-2306

The Products were: Plibrico DuraBlanket- 8 Lb, 1"x 24" @ $3/sqft (Kao-Wool)
&
Plibrico Plicast Tuff-Mix @ $24 per 100Lb



Look in the yellow pages under refractories or ceramics.

by Jim Batson
Reprinted from Bits Vol. 5, No. 5 Sep-Oct 89,

GAS FORGE BURNER UPDATE

In the Sept-Oct 1989, Bituminous Bits, Jim wrote of our experiments with gas forges that Jim had seen on the west coast and I had seen at the Western Regional Conference and that we both had seen at the Quad State Roundup.

PROPANE GAS FORGES

Since then we have made different nozzles and burners and used in the two forges described in the referenced Bituminous Bits.

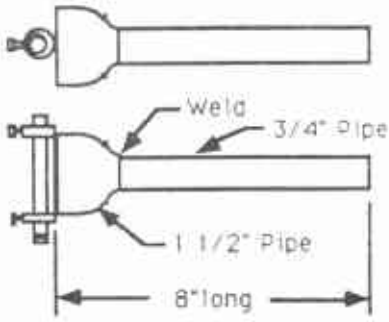
Jim was invited to demonstrate at a conference at Alpine, TX and saw a forge there used by farriers. It had two burners made out of 1" pipe, with a gas jet pointing down into a venturi fullered near the end of the pipe. The 9 inch long pipe was fullered or necked down to a 3/4 inch ID about 1 1/4" from the end. A tiny hole was drilled in the side of a 4" length of 3/8" pipe. We used a No. 66 drill. The hole was pointed down the center of the nozzle and held there by clamp screws.

No blower is required. The end of the burner inside the furnace must be tangential to the round inside of the furnace and at the center of the length of the furnace for the most efficient operation. This gives a circular flow to the flame burning in the furnace and apparently makes it more efficient than square or rectangular cross section furnaces.

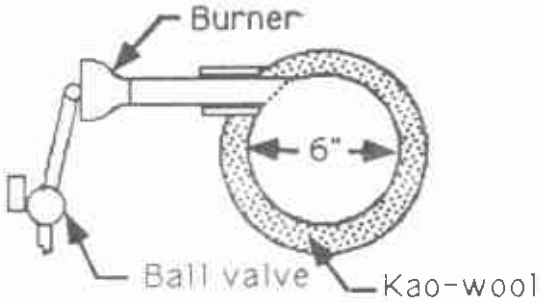
The ABANA plans for Recuperative Gas Fired Forge Furnace, by Robb Gunter, et al, from Sandia National Laboratories was the basis for the burner I have used in my Freon Bottle/ Kao-wool furnace.

Neck down a piece of 1 1/2" Sch 40 black pipe to 3/4" inside diameter at 1 1/2" from the end with a spring fuller. Cut at center of the fuller and you have two pieces. Arc weld this to a piece of 3/4" Sch 40 black pipe 8" long.

The jet in the 3/8" pipe should be aimed straight down the center of this burner and the jet pipe can be right at the end of the 1 1/2" pipe or back about 1/4" without any noticeable change in performance.



In my furnace, which is about 1/2 the volume of the ABANA forge, one burner will operate from 5 to 15 psi pressure. The higher pressure is needed to forge weld, but it normally operates at 5 psi for most other forging with the jet drilled with the No. 66 drill.



This Kao-wool furnace heats up very fast since it has low thermal lag and mass (this characteristic is similar to the ABANA forge). The insulation is not very durable and requires renewing the Kao-wool every 3 months unless you are careful to never snag the sides as you move work in and out of the furnace.

From our trials, it seems that the single burner, of either design, with the No. 66 drill jet is optimum for the 6" diameter by 11" long furnace. The castable refractory is slower to reach forging temperature, 15 minutes or more, but the refractory is very durable and much heavier and retains it's heat when a large, cold work piece is put in the furnace.
Clay Spencer Reprinted from Bituminous Bits, Vol. 6, No.1, Jan-Feb 1990

Reprinted from *The Hot Iron News*

THE TECHNICAL CORNER

Dear Editor:

In working with a propane furnace there is a totally different type of scale formed on the iron as from scale formed in a coal forge. The propane fire scale is hard, difficult to remove and tends to produce severe pitting.

Is there any source of information available that would help with this problem?

Paul Hinds
Milwaukie OR

Dear Paul:

There are two conditions present in any forge: heat and atmosphere. It's the interplay of these two factors that give all results, positive and negative. In a coal forge we have a relativly high temperature and an atmosphere of oxides of carbon. In a gas forge we have a relativly lower temperature and an atmosphere of oxides of carbon, oxides of hydrogen (mostly water) and a product called wet hydrogen.

The high temperature and intimate contact in a coal forge promote fast heating which reduces the time for scale to form. The carbonaceous atmosphere low in oxygen in a properly operated coal forge further reduce scaling.

In a gas forge the steel takes longer to heat and thus may scales more. It's also necessary to balance the atmsphere for the desired result. A lean mixture promotes scale from excess oxygen. A rich mixture produces less scale but a lot of wet hydrogen which is a severe decaburizing agent. The latter is quite detrimental to tool steels. For tool steel a neutral to slightly oxidizing fire is considered best. For decorative work a decidedly rich mixture should be used.

There can be a number of causes for the condition you discribe. The most common is poor mixture control or the ratio of fuel to air burned.

The forges with forced air blowers are generally easier to control. After adjusting to the approximate heat you require either the air or gas control should be adjusted to give the loudest "roar". Then it should be set so that a small amount of flame can be seen in the exaust. This will be a slightly rich mixture. For a neutral fire adjust so the flames just disappear.

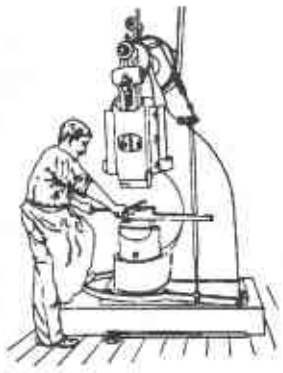
If the problem still exists I would check to make sure the flame is not impinging directly on the work. Until the combustion process is complete there is free oxygen in the mixture which can cause scaling. In a refractory furnace the flame should heat the walls of the furnace which will incandese and radiate infra-red and broad spectrum light. It is actually this radiation that does most of the heating of the work.

Other causes can be; too high a heat for the amount of work to be done to the piece, too many heats for the amount of work done or use of a high carbon or alloy steel.

Although a gas furnace is easier to just dive into and use than a coal forge, in the end you will find it requires every bit as much experience, care and attention as a coal forge. It is not a cure-all and it's unique character needs to be understood to get most out of it.

Hope this will be of some help to you. tech ed

If anyone out there has had similar experience and found solutions, let me know. There always seems to be several solutions to any problem. Editor.



Allison's Wells School of Arts & Crafts, Inc.

PO Box 924
234 E. Fulton St. (Historic Madison County Jail)
Canton, MS 39046

November 21, 1991

Blacksmiths' Ass'n of Missouri
Walt Hull
2043 Massachusetts St.
Lawrence KS 66046

Dear Friend,

As former Director of the John C. Campbell Folk School for the past six years, I am pleased to be the founding Director of the Allison's Wells School of Arts & Crafts, Inc., and Artist Incubator Center in Canton, Mississippi. We are now setting up the school curriculum and recruiting instructors who are masters in their particular field. We have re-established the oldest and largest arts and crafts school in the entire world in the downtown historic district, 20 miles north of Jackson, the capital city of Mississippi. The widespread support from a tremendous cross cultural citizenry from around the state of Mississippi is remarkable; the leadership of the state Governor, state Legislators, state Directors, local businesses, bankers and elected officials of Canton is unprecedented. The Board of Directors have worked with all the stakeholders long and arduous hours to bring this exciting project about. Their support to me and the staff is the finest I have ever experienced. Bonnie Staffel, former Program Director from the same school, a potter with 40 years experience in arts and crafts, is assisting me in the programming.

Many properties have been pledged and donated for use by the School. The old historic Trolio Hotel and adjacent historical buildings on the downtown square are now undergoing an $800,000 renovation from the $2 million contribution fund that has been raised since July, 1991. Artists and craftsmen, instructors and students will be fed and housed in the main facility including a gallery and incubator studios. Additional housing and studios are planned for several buildings around the town square as well as in the historic Canton train depot which is still serviced by Amtrak twice a day between St. Louis and New Orleans and beyond. The railroad station will house the Woodcarving, Woodworking and Woodturning studios and Incubator space for Blacksmithing. The historic fire station will be converted into a large blacksmith shop with sixteen forges. Grady Holley, President of the Mississippi Forge Council has pledge their help with work and equipment in getting the workshop ready for classes and is absolutely thrilled to be a part of the School.

Jane Hiatt, Executive Director of the Mississippi Arts Commission said, "We are pleased to support this arts resource as a tremendous asset to the State of Mississipi." Marjorie Bates, Executive Director of the Mississippi Craftsmen's Guild stated, "I have been excited about the possibility of an arts and crafts school since becoming associated with the Craftsmen's Guild of Mississippi. With our ideal weather, facilities, and available instructional craftsmanship, Mississippi can become a mecca for the preservation and promotion of traditional and contemporary crafts through the development of Allison's Wells School of Arts and Crafts." The plans for the student and instructor accommodations, dining facilities, art and craft gallery and studios are just now taking shape but there will be plenty of room to house the 200 students plus instructors of the School.

We appreciate your past support to us at the John C. Campbell Folk School and your continued support for the development of the arts and crafts and especially the art of smithing. Please add us to your mailing list.

Sincerely yours,

Ronald G. Hill
Director

ABANA

Artist-Blacksmiths' Association of North America

P.O. Box 1181, Nashville, Indiana 47448
Executive Secretary, Janelle Gilbert

Office Hours: 7:30-11:30am & 1:30-4:30pm
Phone: (812) 988-6919

PRESIDENT'S MESSAGE

January 1992

Dear Friends,

Wow! The holidays are almost here as I write this message for your January newsletters! I love this time of year. It's such a festive, positive time to look forward to. I hope this message finds you safe and sound after an enjoyable New Year.

The ABANA Board has voted to make Emmert Studebaker a lifetime member of ABANA. This is one of the highest honors that we bestow on our members, and it is rarely done. The recipient must be indeed worthy, and it takes the unanimous vote of the entire ABANA Board. Most of you know Emmert and realize that he was one of our founders, 20 years ago. Since then, he has donated more time and energy into ABANA and the advancement of blacksmithing than most of us can remember. Certainly more than I can list today. I am thrilled that this bestowed lifetime membership to a truly great person came under my tenure as President.

The information on the upcoming ABANA Conference will be in the mail to you after the first of the year. I think you will be pleased with the packet and I know you will get your money's worth out of the event itself. The committee is working very hard to see that everything is up to your expectations and we have a lot great programs for you and your family.

Several people and businesses are donating equipment and energy to the conference this year, as in the past. I spoke with Bill Pieh of Centaur Forge this weekend and he is donating several large air hammers for the event as well as the shipping. This is a substantial donation and I wanted to tell you because people do these things so that we can have a great event and sometimes, not very many people know about the unsung heros in the background. Frankly, without this type of sacrifice from people just like Bill, we couldn't do this and stay within budget. If you have a minute, drop Bill a line and thank him. Stop by the hammer events at the conference to take a look at the latest air hammers available.

Wishing you the best for 1992.

Warm Regards,

Dorothy Stiegler
President of ABANA

ABANA Chapter Liaison Committee
January, 1992

ANVIL'S RING INDEX - The Anvil's Ring contents list put together by ABANA member David A. Court from New Hampshire is in the ABANA office, and is available at no charge to anyone who sends a 5.25 or 3.5 inch pre-formatted IBM compatible disk to the ABANA office. The list contains information from 1974 Volume #1 Number #2 through 1990 Volume #18 Number #1. Thanks, David!

ABANA DEMONSTRATORS LIST - The ABANA Demonstrators and Schools List will be updated sometime around March and sent out to the Chapters. We are looking for both new demonstrators and demonstrators already in the list who may wish to change their information. You are the ones that make this list "tick", we do not solicit smiths to be included. Every single name on the demonstrators list was supplied by you. Do you know someone who should be on it? Please show the form found in this months Chapter Mailing to the demonstrators in your area.

ARTIST INCUBATOR? - The new Allison's Wells School of Arts & Crafts in Canton, Mississippi will have an "Artist Incubator". This will be a place for new blacksmiths to work until they are well established enough to strike out on their own. It is highly commendable that Allison's Wells has thought to include such a facility in their plans. Hat's off to Allison's Wells, and to the members of the Mississippi Forge Council who have been helping to get the program up and running.

UPDATE OF THE SUPPLY DIRECTORY - The Chapter Liaison Committee is again updating the Supply Directory. Here is another service that benefits everyone, where the names for the list are supplied by you! Anyone having information on suppliers, sources for material, or services that would be of interest to the blacksmithing community please forward them to Ron Porter, RR 1 Box 64, Bunker Hill, Indiana 46914.

FREE TO CHAPTERS - Don't forget that ABANA Chapters are now entitled to two free videos or slide sets per year from the extensive ABANA Library. What a great way to spend some free time during the cold winter months! The regular timetable for return is in effect. Take a look in the back of the Anvil's Ring for a list of titles, and don't forget the popcorn!

TRAINING SESSION FOR REPOUSSE - I recently received a letter from Jean Wiart of the *Les Metalliers Champenois Corp.* (LMC Corp.) announcing another training session for repousse sponsored by the French Guild of Artisans "Les Compagnons du Devoir". This training session will be in April, and will last two weeks covering 78 instructional hours. The sessions will cover Repoussage-Relevage in the XVII and XVIII centuries in French styles. It will be held in France, and will cost $2,860. If interested, you better hurry- the registration deadline is March 15, 1992. Contact Mr. Jean Wiart, 118 2nd Avenue, Paterson NJ 07514, (201) 279-3573.

PERSONAL PROFILE - The latest newsletter from the New England Blacksmiths includes a personal profile from NEB member (and ABANA Board member!) Peter Happny. Peter, a very talented smith, provided a very nice peek at his career. The inside front cover shows Peter's six inch forged steel replica of the seal of the city of Portsmouth, New Hampshire, and is an excellent example of a blend of several metalworking disiplines that Peter has mastered.

A NEW LOOK - The Northwest Blacksmiths Association has struggled through changes in editorship for their publication, the "*Hot Iron News*", and has re-emerged with a very fine effort by editor Margaret Byers! I'd say the NWBA has some great issues to look forward to. Very well done, Margaret!

THE GEE WHIZ I WISH I HAD MORE SPACE DEPT. - Good luck to Alabama Forge Council member and former ABANA President Jim Batson, recovering from carpal tunnel syndrome surgery. The Illinois Valley Blacksmith Association is selling small cast anvils again, $15 plus postage, call the IVBA Editor. The topic for the December 15 meeting of the Blacksmith Guild of Central Maryland was to work on crosses for the cemetery gates in Monrovia, MD. The Southwest Artist Blacksmiths Association had a Holiday Family Get-Together and potluck December 15 with Robb Gunter providing the demonstrations. The Indiana Blacksmithing Association has a good disclaimer on the front cover of their newsletter, and is a good reminder to the membership to be careful as they try the tips inside. The newsletter of the California Blacksmith Association is three-hole punched, and all fit into a very nice three-ring binder custom imprinted with the CBA logo- very nice! The Florida Artist Blacksmith Association is selling a reprint booklet of all the how-to articles from the FABA newsletter in the last year for $2.25 each- a great idea!

THANKS - To all the chapters that have sent their newsletters our way. Clayton Carr, Chapter Liaison Committee, Rt. 2 Box 2911, Kennewick WA 99337.

1992 ABANA CONFERENCE

Where:
Cal Poly (California Polytechnic Institute) in San Luis Obispo, CA. Located on the beautiful coastline about halfway between Los Angeles, and San Francisco, San Luis Obispo is an easy 1/2 day's drive from many of California's best vacation spots (Big Sur, Yosemite National Park, Disneyland, etc. to name a few) and only a half-hour drive from the outrageous Hearst Castle.

When:
June 17-21, 1992. **Please note: this is a change in dates.** We were able to move the conference back by one day, the arrival/registration day is now slated for Wednesday the 17th. The program will run June 18-20, with Sunday the 21st as the departure date.

How to get there:
"Conventions in America" is your official conference travel service for '92, and will help arrange the cheapest flights and book rental cars. Of note: we have a special "star account" (#0162-V-5) established with American Airlines which will yield the lowest possible fare for those conference attendees wishing to fly. Amtrak, Greyhound and surfing will also get you there. Phone, toll free: (800) 535-1492, ask for ABANA Group Number 553.

Who:
We will begin here by listing our international guests. These smiths will be sharing their life's work with us by participating in lectures, panel discussions and demonstrations.

Manfred Bergmeister (Germany) has what is, arguably, the leading blacksmithing shop in Europe. They produce major commissions in iron and forged bronze.

Alan Evans (England) is one of the brightest stars from the UK, with a number of major commissions in contemporary design.

Hermann Gradinger (Germany), smith, designer and academic of the field, has produced award-winning designs, particularly in the area of light fixtures.

Goro Hatanaka and Kotaro Kurata (Japan) form a team producing extraordinary work in the architectural and sculptural areas of design.

Peter Parkinson (England), an artist-blacksmith and professor of design has a wealth of knowledge and talent to offer.

Walter Suter (Switzerland), a leading force in the Swiss blacksmithing world, is an accomplished smith, designer and author.

In the area of new talent, we will have a tandem demonstration by two young smiths, Cara Frost and Claudia Petley, also from England. These women are serious smiths and come to us with high recommendations by none other than Richard Quinnell.

From North America we have, so far, scheduled the following:

Joe Anderson	(North Carolina)
Jim Austin	(California)
Petr Baloun	(Ontario)
Louie Barrette	(Quebec)
Joseph Bonifas	(Ohio)
Jay Burnham-Kidwell	(Arizona)
Eric Clausen	(California)
Jeffrey Funk	(Montana)
Hoss Haley	(New Mexico)
Daniel Miller	(North Carolina)
Eric Moebius	(Wisconsin)
Daryl Nelson	(Washington)
Bruce Northridge	(California)
Brad Silberberg	(Maryland)
Rick Smith	(Illinois)
Doug Wilson	(Maine)

Specialty Presentations, Discussions, Debates, and More...

The 1992 ABANA Conference will offer presentations and lectures by the major American and foreign demonstrators invited to the conference. From Germany, Manfred Bergmeister's presentation will review work spanning a lifelong career. Goro Hatanaka and Kotaro Kurata from Japan, as well as Hermann Gradinger from Germany, will be making presentations of their work discussing their motivations and technical approaches. Peter Parkinson, Senior Lecturer at West Surrey College of Art & Design in England, will be giving a presentation on design as it relates to blacksmithing. Also from England, Alan Evans will treat us to a slide presentation of his work, as will Walter Suter, from Switzerland.

Most of the domestic demonstrators will be presenting slides of their work, as well as a number of additional smiths chosen from North America. Of interest to all of us, there will also be a room available for the impromptu slide shows of any members work.

"Sandia" Forge

Robb Gunter of Albuquerque, NM will make a presentation of the now famous Sandia gas forge, explaining the workings and benefits of this equipment. He will also be available to answer any questions you may have on the subject.

Blademaking

Phil Baldwin is working up an exceptionally intense program for those smiths who are specifically interested in blades. This is the first time ABANA has presented such a program within a conference. There will be both physical demonstrations at a specially designated site and lectures covering all aspects of blademaking. Each member of this blademaking forum is a specialist in a given area of the craft. This group is made up of the following:

Phil Baldwin	(Washington)
Bill Fiorini	(Minnesota)
Dan Maragni	(New York)
Daryl Meier	(Illinois)
Gene Chapman	(Washington)
Bill Harsley	(Oregon)
Jim Harisoulas	(Nevada)
Scott Lankton	(Michigan)

Hands-On

George Dixon, chief blacksmith at Samuel Yellin Metalworkers, will be leading a hands-on teaching workshop throughout the entire conference. The 17 permanent forging stations already at Cal Poly will be made available for this ongoing workshop, making it a very unique opportunity! George will be assisted by several skilled smiths specifically chosen for this program. Anyone wishing an opportunity to learn firsthand from some talented teachers should give this strong consideration. George Dixon has presented the same program before in this exact facility and it was most rewarding.

Watch for the conference logo as more information will be made available to all chapters in upcoming news releases. Also see the *Anvil's Ring* for more in depth coverage in the conference preview.

VOLUNTEERS SOUGHT

Dear ABANA Members:

I have been asked by the 1992 Conference Committee to arrange and organize the volunteer help necessary to produce the upcoming Conference in San Luis Obispo, CA. It takes a great deal of effort by the Conference Committee to arrange all of the different aspects of an ABANA conference--I won't bore you with a list. A few hours from the many members who are not already on a committee would help make the conference a smooth-running and enjoyable experience for everyone, even the committee heads.

Many of you have skills beyond your metal-working abilities that would be invaluable to the conference. Many more of you may have a few hours free before, during, or after the conference in which you could do a job that helps everyone.

Please make a photocopy of the form below, and mail it to: Toby Hickman, 6030 Roblar Rd., Petaluma CA 94952, or call me at (707) 664-8910. Thank you for making the extra effort to make the 1992 ABANA Conference a success.

Toby Hickman
Volunteer Coordinator

Name:
Address:
City/State: Zip:
Telephone: Work ( ) Home ( )
Best time to reach you (converted to Pacific time):

Skills other than smithing:

Special interests:

Time(s) you could be available at the conference:

ABANA

Artist-Blacksmiths' Association of North America

P.O. Box 1181, Nashville, Indiana 47448
Executive Secretary, Janelle Gilbert

Office Hours: 7:30-11:30am & 1:30-4:30pm
Phone: (812) 988-6919

DEMONSTRATORS LIST FORM

If it would make life easier, please feel free to use this handy form to add or change information in the ABANA Demonstrators List:

Demonstrator Name: _____

Business Name (If Applicable): _____

Address: _____

City, State and Zip: _____

Fees: _____

100 Words or Less on What You Do: _____

_____

_____

_____

_____

_____

Please send this form (or anything like it) to: Clayton Carr, Rt. 2 Box 2911, Kennewick WA 99337- Thanks!

ARTIST-BLACKSMITHS ASSOCIATION OF NORTH AMERICA
BIENNIAL CONFERENCE
JUNE 18—22, 1992
CAL POLY, SAN LUIS OBISPO, CALIFORNIA

November 1, 1991

Dear Steve

Like me, I suspect you are constantly asked to donate to worthy causes. I'm hoping to be first in line with my hand out asking for your help in promoting the art of b.s., (that's blacksmithing, of course) and especially the growth of ABANA. Yes...it's that time again and here's yet another plea for a piece of your life. Maybe you have already guessed that it is soon Auction time again. Thanks to all the donors for the 1990 ABANA conference auction, we made over $20,000, enabling the organization to upgrade the library and expand the Anvil's Ring among other things. In these lean times we need your support more than ever, so I hope you will please consider donating a piece of your work valued $100 and up to make 1992's auction even better. I am giving you plenty of time to keep this in mind as we wind up this year and look forward to June's conference in San Luis Obispo. In case you are void of ideas at the moment, I'm not. Here are some ways you can help:

- -donate a piece of your work
- -collaborate with a friend
- -turn this letter into a chain letter
- -instigate a collaboration in your ABANA chapter
- -convince an up and coming smith to donate
- -buy a piece cheap at a yard sale, then clean it up for donation
- -consider donating high quality blacksmith ephemera, paraphenalia, artwork or literature.

Send your donation to:

-arriving before June 1,'92:
Michael Bondi
1818 Shorey St.
Oakland, CA 94607

-arriving June 1-17:
Housing and Conference Service
Attn: Devon Schier
Cal Poly-State University
San Louis Obispo, CA 93407

Please mark all packages on the outside: **ABANA Auction**. On the inside, include a label with your name, address, and value of the item(s) you are donating.

This year we hope to have auction items on display throughout the time of the conference. I am enclosing a reply postcard so that I can do some planning. I hope to see you in California in June. Thank you for your support.

Sincerely,

Peter Happny

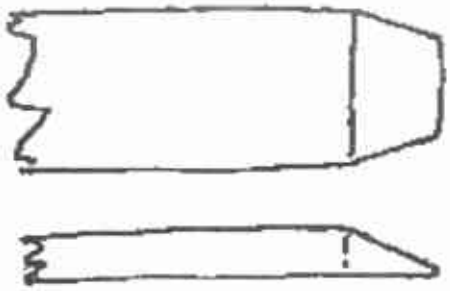
Peter Happny, Auction Chairperson
66 Rock Street
Portsmouth, N.H. 03801
(603) 436-4859

Reprinted from *Bituminous Bits*

WELDED EYE HINGE by JERRY DARNELL

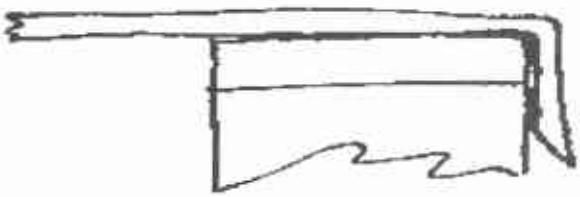
Make a hinge eye tool by welding a piece of round stock (same size as the pin) to a 4" length of flat bar a little bigger than the hinge stock to be used. The tool may be forged by making a short 90° bend on the end of the stock, upsetting and rounding it to pin diameter. Put a mark on the tool for the length of the eye material.

Heat and forge a very short taper on top and edges of a length of 3/8" x 1 1/4" stock.

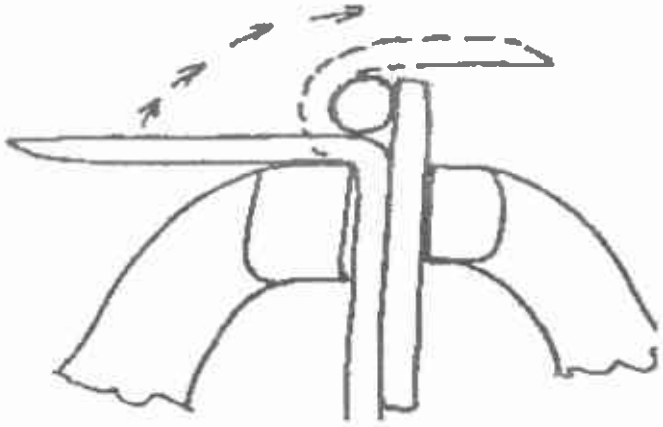


For 3/8" stock to go around a 3/8" diameter pin, it will take nearly 2 3/8" of stock (the diameter of the centerline of the 3/8" stock as it bends around the pin is 3/16" + 3/8" + 3/16" = 3/4". Circumference = 3.14 x diameter (3/4") =2.36.) This leaves 1 5/8" past the eye for the weld on the back of the hinge.

Make a right angle bend in the stock about 4 " from tapered end.



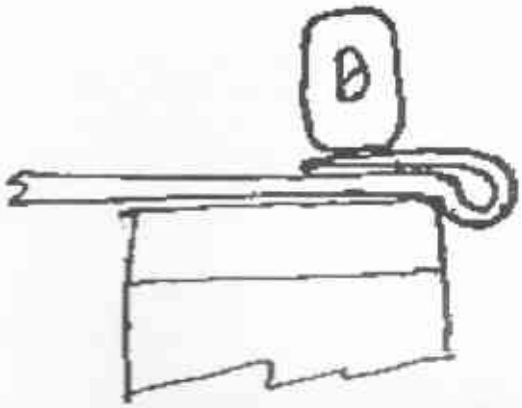
Clamp the hot bend in the vise in front of the pin on the tool Bend the end back around the



tool.

Put a drift in the hole and hammer closed on the anvil. Knock out the drift. Jerry's drifts are standard size (not upset) and a drill bit is run

through after welding.
Heat for welding, flux with borax, reheat and weld with eye sticking over the edge of the anvil.



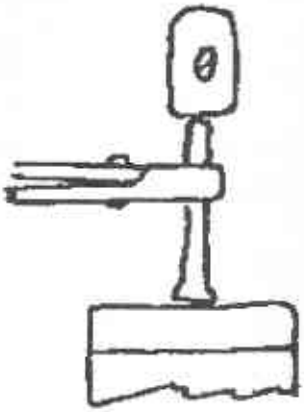
WELDED EYE HINGE by JERRY DARNELL

Put the drift back in and square up the hole to the hinge. Knock out the drift. Hammer around the edges of the ends of the eye.

Heat back up to welding heat and brush the borax off.

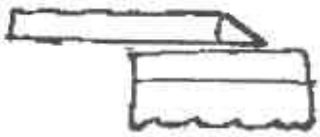
Square up the ends where it sits on the pintle. Mark and drill for nails and run 3/8" drill through pin hole.

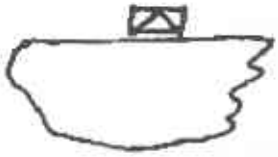
HINGE PINTLE
This pintle was made from 1/2" square stock with a 3/8" pin.



Heat one end of the 1/2" square and upset to 5/8" square.

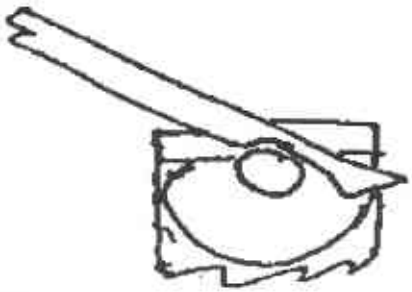
Forge a short taper on the end with a ridge on the taper.
Just behind the taper,



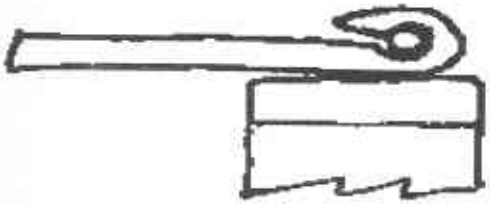


make notch on the edge of the anvil. About 1" farther back make another notch and draw the stock between the fullers to 3/8" thick by hammering from the back on the horn.

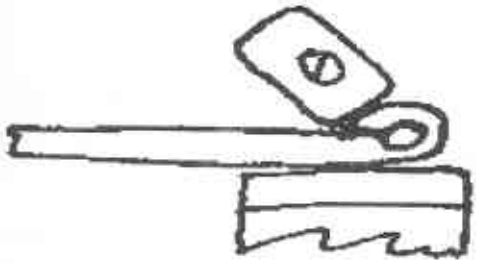
As with the welded eye, it will take over 2" to go around the 3/8" pin.



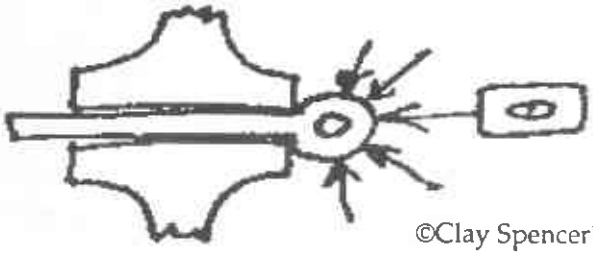
Bend the eye around the tip of the horn, but don't close.



Heat and cut a 2 1/2" length of 3/8" round nearly off on the hardy.
Heat both pieces, stick the pin in the hole with nearly 1/2" sticking through. Continue bending but don't completely close scarf around pin.
Break off pin.



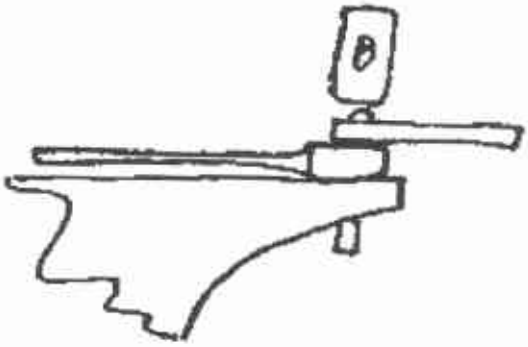
Heat and flux with borax and close bend.
Heat to welding heat. Clamp shank in the vise with eye next to jaws. Weld by hammering around the eye.
Reheat, reflux and bring to welding heat.



WELDED EYE HINGE by JERRY DARNELL

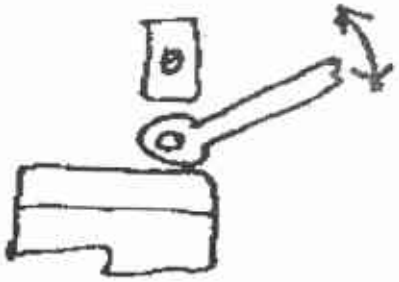
Stick long end of the pin through a 3/8" bolt header on the anvil and weld the stub end to the eye.

Round the bottom and true up the eye on the

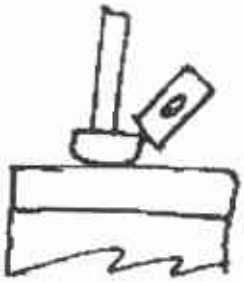


anvil.

Break the top edges, straighten the pin.



Cut off the shank and draw to a 3" long tapered



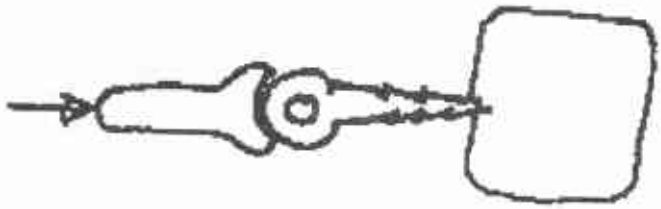
square shank. Use hot cut to cut barbs on the corners of about 2" of the taper. Farriers tongs

with a 3/8" notch cut in one jaw are great for holding the pin end.

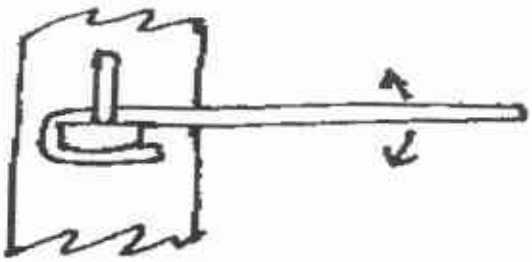
Cut the pin off even with the top of the hinge.

Jerry furnishes his customers two tools to drive and aline the pintle while driving.

Drill a 1/4" pilot hole and place the cup tool against the end of the eye to drive without damaging the pintle.



The twisting wrench is used on the shank to twist it so the pin is vertical as it is driven.



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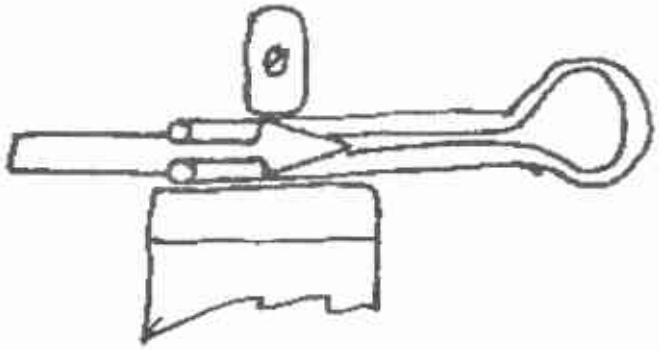
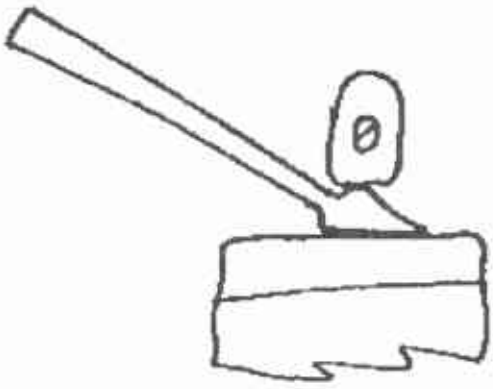
WEEPING HEART FINIAL by JERRY DARNELL

This hinge would appropriate for a small inside door. Make two hinges at the same time. Heat and point one end of the stock.

At three inches from the end use a spring fuller to neck down to half the width.

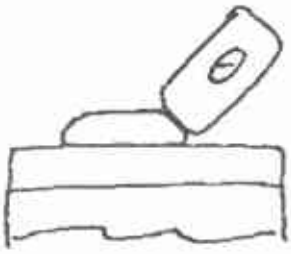


Taper the stock behind the fuller on the power hammer, flatten and work other side.



Round the corners of point with hand hammer.

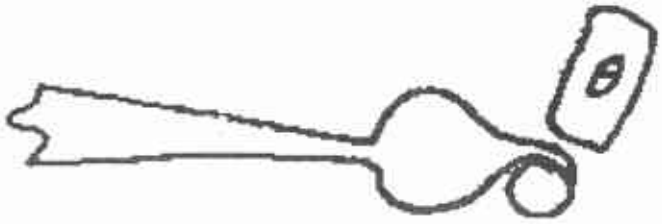
Round and chamfer the edges of the tapered shank. In all this forging, use equal number of hammer blows on each side at equal heat to keep reasonably straight.



Use power hammer to widen the heart, working from the end of drawing dies. Start in the center and leave the edges thicker than the center.

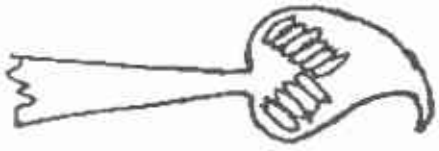
With hand hammer tilted slightly so that you are using the edge of the face, push out the cheeks. Turn hinge back and forth as you hammer.

Bend tip to one side over the horn tip.



Fill out the hollow in the off side to make a smooth curve.

Draw out the cheeks more (don't hit the edge), moving the metal from the middle out and down. The heart lobes go down while the tulip



or spade goes out.

Width and symmetry are important to make a nice heart.

Finally work near the edges, keep smooth curves and cup down so it fits against the door all around.

We Apologize

Do you know anyone who hasn't been getting the newsletter? Somewhere between Steve's desk and Bernie's computer one list of members got lost. We think we've got it straightened out, but if we haven't, we need you to let us know.

Here's how it works:

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collects dues and passes the paid-up list to

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Henley, MO 65040
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who prints the labels and sends them to

Jacquie Waller
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House Springs, MO 63051
314-942-2529
who sticks 'em on and mails 'em.

Walt Hull
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is your editor. Any of us will be glad to try and fix it if there is any problem with your membership.

Please accept our apologies if you haven't been getting the newsletter when you should.

WH

Happy birthday to Andrew Winkler, 2 years old 12-29-92 (I think).

BAM
2043 MASSACHUSETTS
LAWRENCE, KS 66046

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