N.J.B.A. Newsletter

NJBA Volume 9, Issue 1 04/24/04

Editors Soapbox

Well it's a rainy Easter afternoon and I'm grabbing a few minutes between having to do things to work on the newsletter. We have just completed two successful workshops, an anvil repair and gas forge workshops. Many thanks to those who coordinated and helped with these events. By the time you read this the Meet in Suffolk County at Bruce Ringier's shop will have finished. We have a pretty full schedule of events coming up this year so make some time and come out to as many as you can. Hope to see you soon
Larry Brown Editor

Upcoming events for 2004

Get you calendars out and mark these events down. For those on the web bookmark our web site and check for meet information. Remember most of our meets have an "Iron in the Hat" drawing, so be sure to bring something.

May 16th, 9:30—Kerry Rhoades demonstrating at the Silver Decoy Winery in Hightstown, NJ.

June 19 - 20th, 9:30—Cold Spring Village. The main meet is on **Saturday the 19th** with demos on Sunday. Details on Page 3.

July 7-11th , ABANA Conference in Eastern Kentucky University. Details on page 3.

July 21-25th, Monmouth County Fair. The meet officially on Friday Night at 7 pm, help is needed on Monday night to set up and Sunday afternoon at 6 pm to break down. Details on page 4.

September 17 –19th, 10 AM Washington Crossing Park, Engine Demonstration. Details in next newsletter.

October 3rd, Peters Valley Pig Roast, Details in next newsletter.

September ?, Hammer-in at the Red Mill Museum in Clinton, NJ. Details in next newsletter.

October 3rd, Walnford Day, Walnford Park
Details in next newsletter.

Kerry Rhodes at the Silver Decoy Winery in Hightstown

May 16th , 9:30
Kerry Rhoades is a full time blacksmith who owns and operates "Forged Creations", located in the center of historic Delaware City, Delaware. Kerry Rhodes is now in his mid 40's. He started smithing about 15 years ago and has been at it full time since 1998. He studied at Campbell school and worked under John Elsworth, Master Smith of Lewis, Delaware. If anyone has eaten at the cafe at Mike's Harley in Wilmington DE, Kerry did all the metal work in there.
Kerry plans on showing us: forging a wizard, forging a mouse, copper reposse, log tongs, and hammer technique ala Uri Hoff, and any requests we might have.

Directions:
Direction to **Silver Decoy Winery,**

From the North:
Take the NJ Turnpike to Exit 8, Hightstown, take Rt. 33 West 1.8 miles thru town to Airport Rd., turn left onto Airport Rd. (You will see a store called The Bike Rack at the corner) go .8 mile to the end of the road. Turn right onto CR 539, go 1.5 miles to the first light, turn right onto Windsor Rd., go .4 mile to # 610, winery is on the left

From the South:
Take I 295 or the NJ Turnpike to I 195 East, go to Exit 8, take CR 539 N. towards Hightstown, go 4.2 miles to the first light, turn left onto Windsor Rd. go .4 mile to the Winery, # 610 Windsor Rd.

From the East:
Take Rt. 33 West thru Hightstown, then follow directions from North.

From the West:
Take CR 571 into the center of Hightstown, at the light turn right onto Rt. 33/571 then follow direction from North.

NEW!!!
Official NJBA Address

NJBA
P.O. Box 761
Mt. Laurel NJ 08054

The old address was:
NJBA, P.O. Box 195
Howell, NJ 07731
This will still be active for a while but please note the change and start using the new address.

The NJBA Web Site!

The NJBA Web Site is up and running at:
`http://njba.abana-chapter.com/`
The Newsletter is at:
http://members.bellatlantic.net/~vze25jcc/index.htm
or the site may be linked to from the NJBA web site.

Rather than use room in the newsletter, All correspondence between ABANA and NJBA is now being posted on the NJBA web site. If you cannot access it there, contact me and I will send you copies

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Meet in Cold Spring Village Cape May, NJ June 19-20th, 2003

The New Jersey Blacksmith Association will hold a general meeting and demonstration at Historic Cold Spring Village (HCSV) in Cape May New Jersey. The meeting will take place on Saturday June 19th. There will be demonstrations on both Saturday the 19th and Sunday the 20th so if you can't make Saturday come out Sunday. The meeting will coincide with HCSV's "Men and Machines" event. HCSV is a 19th century village so period costumes are encouraged. NJBA members not wearing costumes are encouraged to wear NJBA t-shirts. Demonstrators should be in costume or be wearing a NJBA T-shirt. Lunch on both days will be provided to NJBA members. On Saturday we will probably have lunch in the grange - always a big favorite and family members are invited.

There usually is no "Iron in the Hat" at this location. We need members to bring portable forges and anvils for the demonstrations. Members bringing forges and other equipment should be there an hour earlier at 9 am. If you are interested in being a period demonstrator or have any other questions contact:

David Macauley, 732-206-1568,
732-420-4792 drmacauley@att.com

Directions: Take exit 4A south from the Garden State Parkway and follow the signs to Historic Cold Spring Village 720 Rt. 9 Cape May NJ 08204 (609) 898-2300.
This year they are requesting that we register for their records. We will have forms there or you can pre send the information to them, including: Men and Machines event, Dates you will attend, Name. Phone # and or e mail, Address and state no fee.
Historic Cold Spring Village, 720 Route 9, Cape May, NJ, 08204, Phone: (609) 898-2300 Fax: (609) 884-5926, www.hcsv.org

2004 ABANA Conference Richmond, Kentucky July 7-11, 2004

The 2004 ABANA "Design and Build" Conference. The conference is being held on the campus of Eastern Kentucky University (EKU), in Richmond, Kentucky. Conference Chairperson Dave Koenig is continuously working hard to produce an informative and exciting conference filled with plenty of activities for the whole family!

The Opening Ceremony, featuring the keynote speaker Melvin Rose of Melvin Rose Industries, will launch the five day event on Wednesday evening, July 7, 2004. Albert Paley will present a slide lecture at 8 p.m. that same evening in the brand-new 400 seat Student Center Auditorium. He will also present a second lecture Thursday afternoon, July 8, at 4:00 p.m. Also on that Thursday evening will be the formal opening of the Members' Galleries which will begin at 7:00 p.m. and end at 10 p.m. Thursday, Friday and Saturday will be jam-packed with presentations by our demonstrators, shows in our members' galleries, vendor and tailgating sales, auctions, Iron-in-the-Hat, and a general membership meeting. There will also be craft classes including metalwork, jewelry, appliqué, and stained glass, self defense and martial arts classes, computer-aided design classes, and charter tours of the Bluegrass Region. Sunday morning after breakfast will be open for everyone to leisurely round up the troops and make their way back home.

Maegan Crowley and Chris Winterstein are responsible for assembling the impressive array of national and international demonstrators. They will show you hot and cold forging, ferrous-and non-ferrous metalwork, knife-making techniques, repoussé, and highlight the processes that are involved in the realization of actual product from the design phase. Our demonstration schedule will begin each day at 8:30 a.m. and go until 11:30 a.m. when we break for lunch. Demonstrations then continue from 2:00 p.m. to 5:00 p.m. each evening.

We are also happy to have Tim Ryan coordinating a team to run the on-going silent auction as well as the ever-popular live ABANA auction, both fueled by members' donations.

The EKU conference site offers options for "cold-tent camping" or RV parking, if you prefer it to the campus' dormitory-style lodging, and the area provides near-by campgrounds with RV dump stations. And yes, your pets are welcome as per our simple guidelines! Please also see our list of hotel accommodations in Richmond and note that any persons with special needs in terms of ADA compliant accommodations can contact Michele Devine for assistance. The EKU food service schedule provides breakfast from 7:00-9:00a.m., lunch from 11:00-1:30 p. m., and dinner from 4:30-6:30 p.m.

Have questions about the campus, dorms, meal options, or other information you don't see listed here, please see the web site for a page of Frequently Asked Questions

These are great meets if possible try to get to this one!
Contact:
Michele Devine, M-F 9 am - 4 pm EST, Phone: 706-310-0323. E-mail: conference@abana.org

Mail to: ABANA Conference, PO Box 816, Farmington, GA 30638 • Fax: 706-769-7147
http://www.abana.org

Monmouth County Fair General Meeting East Freehold Park, NJ

July 23th, 2003 7PM

NJBA members will be providing a blacksmithing demonstration in conjunction with the Longstreet Farm Exhibit during the County Fair running July 21th - 25th. The fair times are Wednesday through Thursday 5 PM - 11PM, Friday through Saturday 11AM - 11PM, Sunday 11AM - 6PM. The general meeting will be held Friday Night starting 7 PM at the NJBA demonstration booth. Look for the Longstreet Farm Exhibit.

Blacksmiths are encouraged to submit some of their work for a display at this venue on Friday night. All work will be displayed at the exhibit. This is a great opportunity for us to advertise NJBA and individual members. We can distribute business cards, brochures and talk to the public regarding our work.

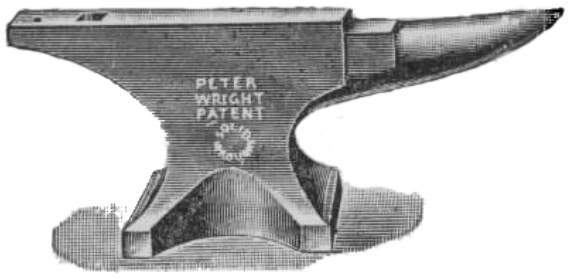
A forge, several anvils, some tools, stock and Coal will be kept at the fair site for demonstrators.

We intend to set up our demonstration area on the Monday before. Please check with David Macauley (Directors Page) as to the times and locations to help. with the setup. We intend to tear down the demonstration on Sunday July 25th at 6PM. We really would appreciate your help setting up and tearing down.

From Garden State Parkway:
Garden State Parkway to Exit 100, Hwy. 33 west. Follow Hwy. 33 to Kozloski Rd., turn right. Follow signs to Park. State Hwy. 9 to Hwy. 33 east, south of Freehold. Follow Hwy. 33 to Halls Mill Rd. North exit. Follow Halls Mill Rd. north to intersection. Road name will change to Kozloski Rd. Follow Kozloski Rd. to Park on left.
From Rt. 18;
Rt. 18 to Exit 22, Rt. 537 west. Take Rt. 537 west to Kozloski Rd., turn left. Follow to Park on right. It has also been recommended that to avoid traffic approach from Rt. 537

For more information contact:
David Macauley
732-206-1568 or drmacauley@att.com.

Free passes have been available for demonstrators in the past, but we need to know who wishes to demonstrate by June 30th, 2000. For general information on the fair call: (732) 842-4000.



Rob Hudson Demo

Report by John Chobrda

On Sunday Feb. 8, Dan Cruzan was gracious enough to open his shop in South Jersey for a blade-forging demo by Rob Hudson, Master Blade Smith of Rock Hall MD.

Rob opened with a talk about his background, his feelings about knife making, and the advantages of a forged blade over a blade ground from a blank. He also explained why a custom made knife was superior to a mass produced item.

The hands on portion of his demo started with him forging a practice blade out of a ½ by 1 inch piece of plasticine clay. Rob explained that he does this to work out the steps in forging a blade to the final shape he is aiming for. When he was satisfied with his clay form, he placed a ½ X 1 piece of W2 into the fire for his blade, He stressed that when forging a blade try to hammer equally on both sides of the stock and keep checking the work and keep it straight. He showed that if the blade is pointing to far up or down it can be forged using a wooden slab on the anvil and a wooden hammer. Rob adds a mild steel tang to his knives, (he gas welds this on using a nickel bearing rod) he does this because he peens the tang over to secure the handle and guard to the blade essentially making it one piece. Once the blade was forged to shape he annealed it by bringing it to critical temp. cooling in air, bringing it to critical temp again then putting it in annealing medium (in this case the blade was wrapped in kaowool) at this point we broke for lunch to let the blade anneal.

After a lunch of subs provided by NJBA and a large pot of homemade beef soup made by Dan Cruzan, Rob rough ground and filed the blade to its finished shape, then put a fine belt onto the square wheel grinder and gave the blade a final clean up before hardening. The blade was cleaned three times using lacquer thinner to remove all oils and fingerprints. He then used a mixture of Satanite (Harbison-Walker Ind.) and Kitty Litter thinned with water to paint a thin coating on the blade. After this dried he added a heaver layer on the back of the blade to introduce a pattern on to the blade and keep it a little softer. The clay mixture helps minimize warping and prevents scale. He then prepared his fire and quench for hardening the blade, for a quench Rob uses light vegetable oil pre heated to 450 degrees. He built a small cave in the coal fire using pine slabs; he stated that when they are burned they form a small, dark, charcoal oven that keeps oxygen away. The blade was slowly and evenly heated to critical temperature (Rob checks this with a small magnet on a wire that he touches to the blade in the fire) then plunged in to the oil and held still until boiling stopped. The blade was removed and checked for any warping, Rob explained that you now have about 45 seconds that you can correct any warping, after that the blade becomes too hard. The clay was cleaned off the blade using a brass scrapper and tempered. Tempering is done in a small toaster oven at 450 deg., the blade is placed in the oven, brought to 450 and held for ½ hour, this is done twice.

Rob's knives are handled in walnut epoxyed and tangs peened making a tool that will not come apart. For any one interested Rob holds knife-making classes that will walk you through the entire process at his forge in Maryland, for details please contact Rob at,

HUDSON KNIVES
Rob Hudson
22280 Frazier Road
Rock Hall, MD 21661
(410) 639-7273

Furnace Town Meet In Snow Hill, MD

Report by Bruce Freeman

Marshall Beinstock, and I drove down to Furnace Town on Friday to attend the demo and workshop by Walt Scadden. Due to inexplicable magnetic forces, we ended up at Jos. Fazzio's in Glassboro, from which we weren't able to extricated ourselves till about 3 pm. However, this still left us plenty of time to get to Furnace Town and to attend the slide presentation.

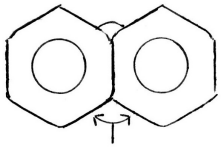
The demonstration on Saturday was of marine hardware. Walt was the blacksmith on the reconstruction of the Armistad, and had considerable familiarity with marine hardware before that as well. He demonstrated making a jib hank, an oarlock and some aspects of making an anchor.

On Sunday, we each chose a project to work on. Marshall chose to make a pair of oarlocks, and executed them with his usual elegant aplomb. After flirting with an anchor or sand anchor (grapple with flukes, not points) I chose to make a boat hook for a friend. This turned out pretty good. All-in-all, a weekend well spent.

Notes on the Furnace town Demonstration

Courtesy of Marshall Bienstock

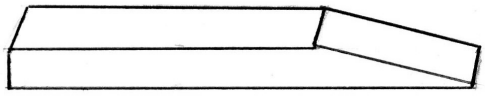
Drill Bit Angle Gauge



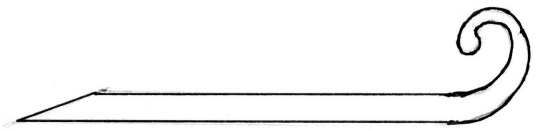
Drill Angle

JIB HANK

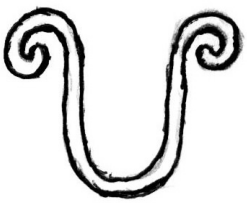
Holds sail to wood slide
Start with 1/2" Sq. about 7" long
Will need a 1/2" round bottom swage



Heat 1 - Taper 2-3" on one end
Heat 2 - Repeat on opposite end
Heat 3 - Start swaging one end
Heat 4 - continue down length of bar using hammer face
Heat 5 - Use cross peen to widen out in swage
Heat 6 - Work entire length in swage. Take a red heat

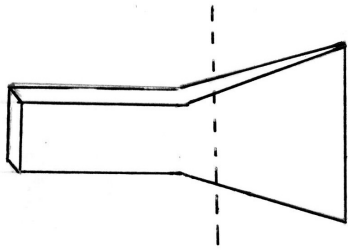


and scroll one end towards curved surface
Repeat other side
Take a red heat in the center of the piece and curve scroll back around.Curved side will be on the outside

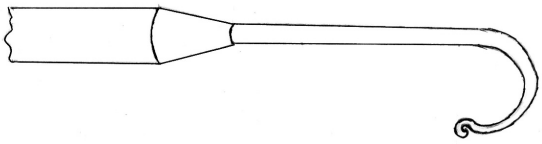


Boat hook

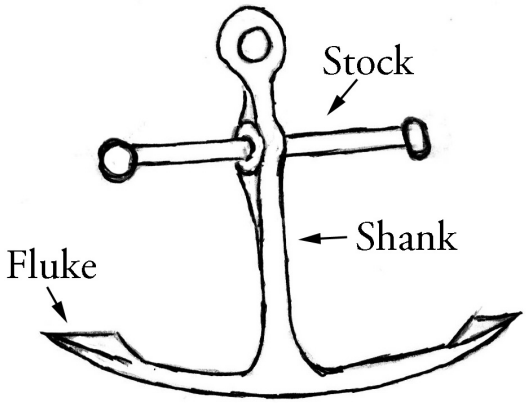
1/4 x 2" flat - Peen one end to a flat taper
Cut off



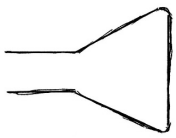
5/8 x 18" round
Taper one end to a point
Scroll end
Finish bend around anvil horn
Forge weld taper to rod
Heat and flux both pieces
Put together and reheat
Weld using swage on bottom
Walt uses 7014 rod if he wants to forge the weld afterwards



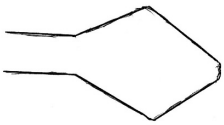
Anchors



Fluke 3/4" round
Upset one end

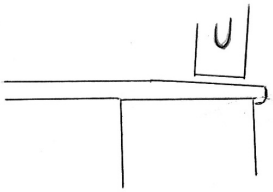


Start pointing end
Leave end thick for strength

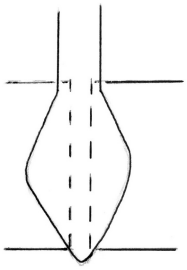


Forge a ridge in vise

Side View

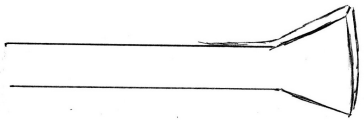


Top view



Shank

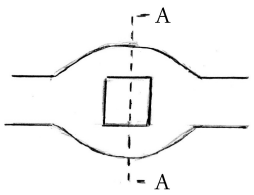
Bottom end
Upset end then flatten to a wedge shape (for strength)



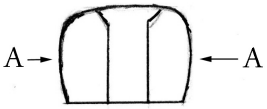
Top end split out for holes for chain and stock
Stock weld collars around ends of bar to form balls, first one end and then the other after inserting it through the shank. End is bent if it is meant to be folded for storage.

Oar Lock

Start similar to jib hank
after swaging mark center for slitting hole
Scroll ends
Bend to final shape, curved side will be on the inside



Slit and drift hole
Shank
Form Square tenon to fit above hole
Taper other end
Flatten end of tapered end for oar lock retaining pin
Heat and insert and set tenon
Some pictures will be posted on the web site.



Gas Forge Workshop

By Jeff Morelli

On April 3rd NJBA members got together to build 21 single burner gas forges.The plan was to roll 12"x12"x12" cylinders, line them with 2" of Kaowoll, install a supported kiln shelf on the bottom, an insulated rear door and a burner assembled from new parts including an adjustable regulator. To keep costs members would have to provide their own fire brick for the fronts.
At 9 AM we split into teams for rolling, welding, burner assembly, cutting and fitting the Kaowoll, sheet metal work, leak testing the hoses, etc. Most fabrication was done by lunch break since many special parts had been made in the previous few weeks.
By 2:00 the first forge was being tested by Marshall who gave a lesson on how to light the forge adjust test the flame. Twelve forges were sold and taken home by NJBA members, who were eagerly awaiting the following weekend to light them - the kiln shelves needed to cure another week and then be heated slowly.

Special thanks go to Marshal Bienstock for use of his shop, John Chobrda for buying the Kaowool and burner parts, Bruce Freeman for casting the kiln shelves, Dave Macauley and Tom Eden for pre-fab work, Bruce Hayes, Larry Brown, Mike Erdie, John Chobrda and Marshal for welding. If any NJBA members are interested in buying one of these "Must Have" forges, give Marshal Bienstock (directors list page 2)a call, they are a bargain at $200 apiece for members.

Casting "Kiln Shelves" for Gas Forges

Bruce Freeman

Forms were made using 3/4" plywood, covered with

plastic (garbage bags cut open). (It would have been better to have made more of an effort to stretch this plastic tight, as wrinkles cast into the shelves.) These were divided by means of nominally 1x2 (3/4" x 1.5") furring strips. Since the shelves were to be 7" wide by 12" long, 12" lengths of furring strips were placed between, and perpendicular to, longer pieces to form a grid. The furring strips were mounted to the plywood with 1 5/8" coarse wallboard screws.

The casting material was a (non-insulating) castable refractory cement, rated to 2800 F. Two 50-lb bags (about $34 total) were needed to make 21 shelves. The shelves were reinforced with 1/2" 304 SS wire clote (of 1/16" wire - slightly smaller wire would have probably sufficed), which was purchased in 12" x 24" pieces from McMaster-Carr (for about $13 ea). Each was cut using a heavy shear into ~6.5" x 11.5" pieces.

The refractory cement was mixed as per instructions, an entire bag at a time. Each shelf form was filled about halfway, then a piece of the wire mesh was inserted firmly. The form was then filled to the thickness of the form (3/4") or sometimes slightly thicker.

After setting two days, the wallboard screws were removed and the cast shelves broken apart from the furring strips. (The cement adhered somewhat to the furring strips, and had to be broken away gingerly. A wax or other mold release would have helped.)

These shelves need to be cured slowly before being brought up to a red heat.

Shelf Legs for Gas Forges

Bruce Freeman

Ice cube trays were used as molds for casting legs from refractory cement. (Egg cartons might have worked.) In retrospect, a mold-release should have been used, as the cement tends to adhere even to plastic. Insulating castable refractory cement was prepared as per instructions and troweled into the trays. The trays were covered with cardboard and left to set for two days. Unfortunately, when the trays were examined two days later, the cement was still wet, with no apparent setting whatever. When it had dried, it merely crumbled.

This fiasco was apparently due to the fact that the bag had been broached in 1998. It had not been waterproofed afterwards and, apparently, had picked up water in the intervening years. This was unfortunate, because ice-cube sized lumps of refractory would have been perfect legs for the shelves, six to eight per shelf.

Instead, ~1" thick slabs were cut from noninsulating fire bricks using a chop saw with masonary blade. (This was a messy, dusty process, requiring goggles and dust mask, however, attempts to cleave these bricks with a chisel were not successful.) These pieces of brick apparently function acceptably as legs.

(Note: in the April, 1998, gas forge workshop, bottoms were cast in place in the forges using insulating refractory cement. That procedure was effective, but inconvenient.)

Propane Forge Safety

by Bruce Freeman, with contributions by Robert Grauman .

Facts about Propane

1. Propane is a liquid in the cylinder, but is burned as a gas.
2. Propane gas must be tapped from the top of the cylinder.
3. As the propane vapor (gas) is pulled off, evaporation of more liquid propane within the cylinder cools the cylinder .
4. As the liquid propane cools, the pressure of the vapor above it drops.
5. Overheating liquid propane will cause dramatic, and potentially catastrophic increase in the pressure of the vapor above it. Most commercial cylinders have a pressure relief device. If this opens the cylinder will not explode. but it could vent the entire contents of the cylinder.
6. Liquid propane is not only flammable. it's an effective solvent. (The gas is not a solvent.)
7. A propane cylinder could leak, and it's best to assume it *does* leak.
8. Propane + air in a confined space (i.e., indoors) is a recipe for an explosion.
9. Propane is denser than air and can settle in basins or run along the ground to a source of ignition, then

flash-back. It could also drain into a sewer and cause an underground explosion hazard. It can fill up a basement, ignite from a furnace or other appliance, and demolish a house.

Facts about Regulators

10. Every regulator has a diaphragm. a poppet valve and several fitting. Any of these could leak.
11. In particular, the poppet valve, the diaphragm and the pressure gauge contain mechanical parts. Any mechanical part is subject to failure with use, sometimes suddenly.
12. Regulators are pressure-control components, not shut-off valves. A separate shut-off valve should be located immediately upstream of a regulator. (This is always the case anyway when the regulator is directly connected to a propane cylinder, but should *also* be the case if the regulator is mounted remote from the cylinder on pipe or tubing.)
13. Regulators are typically designed to handle only gases. Solvents can harm internal components and cause dangerous breakdowns (eg. of the diaphragm or poppet valve).

Facts about Refractories

14. Castable refractories require water to mix, set up overnight, and then must be fired slowly to cure. Too rapid heating the first time will cause spalling of the material. (This spalling can be a *dangerously violent* steam explosion.)
15. Any refractory that may have become wet should be heated slowly to dry it before it is exposed to full heat.

Facts about Combustion Gases

16. The two major combustion products of any carbon fuel (including propane) are carbon dioxide (CO2) and carbon monoxide (CO).
17. Other combustion products may also occur, depending upon the fuel and the combustion conditions. For example, when methane is first ignited, considerable formaldehyde is formed. When coal is incompletely burned, many complex combustion products ("smoke") are formed. These products are generally more harmful than CO or C02, but are present at much lower levels. Propane, like methane, is fairly clean-burning.
18. Carbon dioxide is only slightly poisonous. It is the waste product of animal metabolism, so animals have a pretty high tolerance for it. While it is an odorless, tasteless gas, it does combine with water to for carbonic acid which has an odor and taste. Anyone who has drunk soda water (a solution of carbon dioxide, with no other flavors) and belched knows what carbonic acid tastes and "smells" like.
19. Carbon monoxide is another animal. It is a potent poison, with an action rather like cyanide. Apparently its action is somewhat less severe than cyanide. but since you are more likely to be exposed to CO than to CN, that won't comfort your next of kin much. Symptoms of mild CO poisoning include headache.
20. While both CO and C02 are environmental pollutants, the quantities that a forge will produce are of no particular concern to anyone but you.

Therefore I suggest the following safety measures:

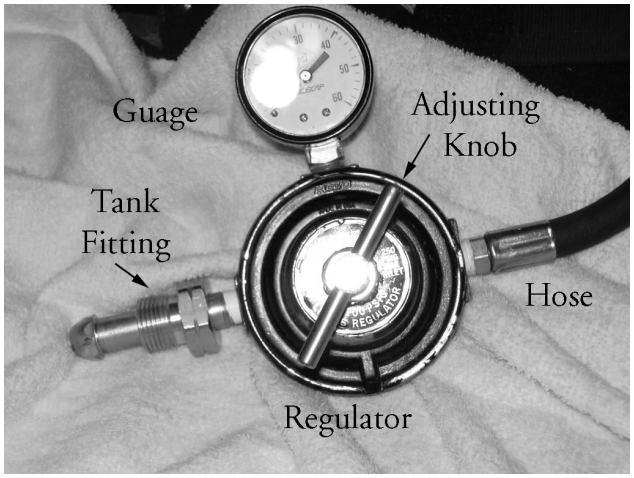
In General

1. Never allow a propane cylinder to tip while in use, as liquid propane may enter the regulator, possibly damaging the regulator and rendering it unsafe, and definitely resulting in a surge in propane flow..
2. If (during the cool months) your propane cylinder cools so much that you can't get the pressure you need, place it in a tub of cold water. Never apply artificial heat. (The tub-of-cold-water trick is not the best solution. Your propane cylinder is too small for the job, and you should consider using a larger one, or two cylinders in parallel, using an R V tandem valve for this application.)
3. Never allow the heat from the forge to heat the propane cylinder.
4. The regulator and hose are vulnerable components and should be treated gently, protected from heat and harm (watch where you wave that hot iron) and inspected before use. Solvents, sunlight, and other deteriorating influences can also affect the hose.
5. The first time you fire up a forge, do so delicately. Leave the doors open and heat at a slow rate. This will cure the refractory. Place the doors back in position after firing the body of the forge for a period of time.
6. Place the forge on a non-combustible surface. Keep combustibles away.
7. Have a dry chemical fire extinguisher ("ABC") handy.
8. Never leave a hot forge unattended, even if the fuel is shut off.
9. Never store a propane cylinder indoors.
10. Preferably operate a propane forge outside. If that is impossible or impractical, operate the forge *only where very* substantial ventilation is provided. This

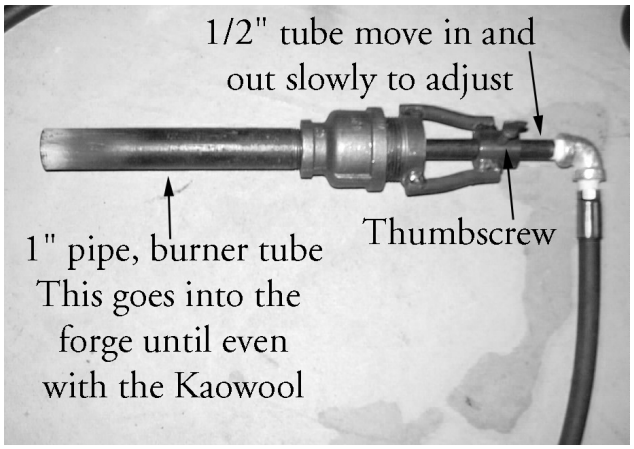
means, either *no walls* (roof only) or *forced ventilation*. This precaution is necessary both to prevent fire (propane leak) and to prevent CO poisoning. If you ever suffer a headache while working with any combustion equipment, *get out of there!*

Assembling your NJBA Forge

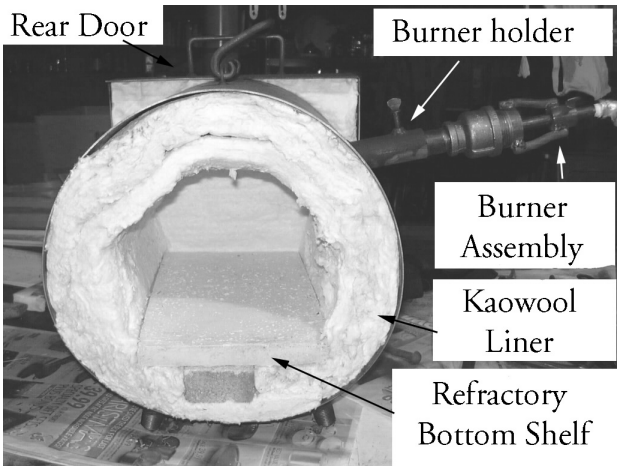
11. For NJBA forges, the burner assembly is comprised of a ½" pipe with a brass orifice screwed on one end and a rubber rube crimped on the other end. The rubber tube should be connected to the regular. This ½" pipe fits within a 1" tube that is welded to a flange that is in turn screwed into a 1" pipe. A thumbscrew is used to secure the position of the ½" pipe within the 1" tube.



12. Insert the burner assembly into the 1.25" tube that has been welded to the side of the forge. The 1" pipe end of the burner assembly should be flush with the insulating durablanket. Make sure the brass end of ½" tube is within the flange but not all the way into the 1" pipe. Tighten the thumb screws the secure the assembly to the 1.25" inch tube and the ½" pipe within the outer 1" pipe.



13. Place the door on the back of the forge.
14. Optionally pile firebrick in front of the forge up to the level of the kiln shelf. Place firebrick to form a square opening in front of the forge large enough for your stock. This tends to contain the flame and heat within the forge more. Be sure you don't seal up the front of the forge.



Suggested Procedure for Lighting a Propane Forge

15. Inspect your propane cylinder (especially the valve), your regulator (especially the connector to the cylinder and its O-ring) and your burner (especially the hose) for any signs of wear or problems. Do not install the regulator if you see any sign of problem.
16. Install the regulator by hand, without tools, until the nut (left-hand thread, remember) is fully seated. *Immediately* tighten the nut with a wrench. (If you wait, you might forget and have a very serious propane leak when you turn on the propane.) Do not over tighten the nut, as this will only ruin the connectors.
17. Make sure the forge is safely situated (no combustibles nearby), the burner is properly and firmly installed, and all is well before lighting the forge.
18. Before lighting the forge, ensure that there is proper ventilation. If you are outside or only under a canopy, no problem. If you are inside, provide forced ventilation. At a minimum, this should consist of a high-powered roof or window fan (preferably blowing out) and an open door or large window, *turn on the fan before* or *immediately after* lighting the forge. (The noise of a fan